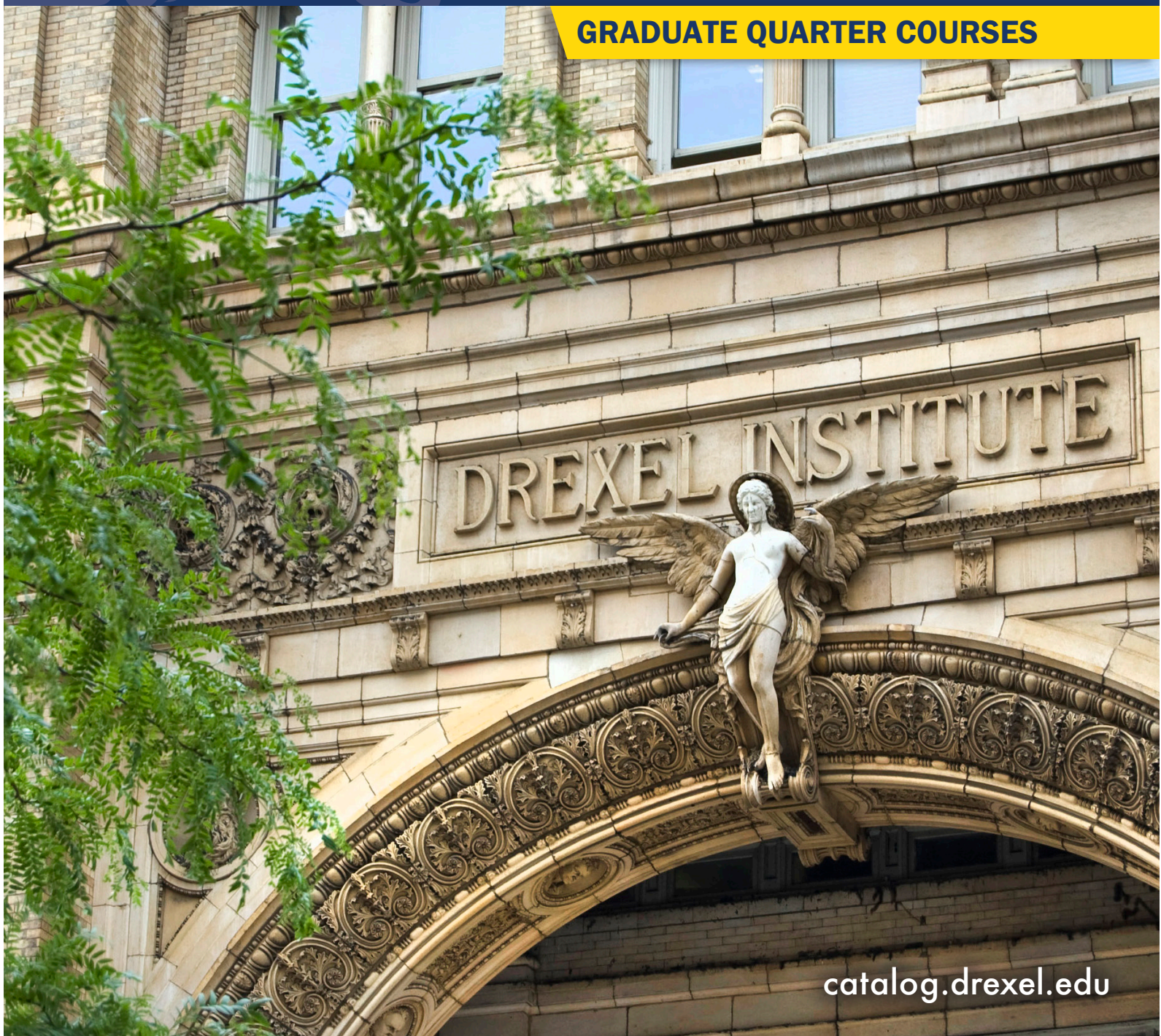




# CATALOG

2023-2024

**GRADUATE QUARTER COURSES**



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## Interdisciplinary Business

### Courses

**INDS T680 Special Topics in Interdisciplinary Business 0.0-12.0**

#### Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Accounting

### Courses

**ACCT 510 Essentials of Financial Reporting 2.0 Credits**

This course introduces how economic events are captured in financial statements, including the Balance Sheet, Income Statement, Statement of Retained Earnings, and Statement of Cash Flows using Generally Accepted Accounting Principles (GAAP). It also introduces how financial statements are used in investing and other business decisions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 600 Accounting Analysis & Theory 3.0 Credits**

This course focuses on going from textbook to no book, helping accounting students understand WHY you are doing something as opposed to just HOW to do it. The four main areas of discussion are the FASB, the SEC, the Big 4, and the IRS. Within each of these areas, students dive into the rules, regulations, and resources available to assist researching abstract accounting questions and effectively communicating authoritative responses.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 323 [Min Grade: C] or ACCT 627 [Min Grade: C]

**ACCT 601 Managerial Accounting 3.0 Credits**

Explores the concepts and tools managers use to measure, monitor, and motivate performance. The course emphasizes value-added, practical applications of analytical tools and applies them to strategic and operational planning. This includes combining quantitative and qualitative information as well as measuring financial and non-financial performance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 501 [Min Grade: C] or ACCT 510 [Min Grade: C]

**ACCT 603 Strategic Cost Management 3.0 Credits**

The ability to understand and manage costs is vital to an organization's success. Using tools from practice and theory, this course exposes students to the ways that companies measure costs and make strategic decisions about them. Quantitative analysis is mixed with discussions of organizational strategy and environment to inform these decisions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 604 International Financial Reporting 3.0 Credits**

Examines the international dimensions of financial reporting with primary emphasis on financial reporting and disclosure under International Financial Reporting Standards.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 605 Advanced Auditing 3.0 Credits**

Focuses on emerging issues related to assurance services and involves researching and resolving practice-oriented problems. In addition to other relevant topics selected by the instructor, the course covers issues related to the audit of a company's internal controls.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 606 Current Issues in the Accounting Profession 3.0 Credits**

This course focuses on key issues facing the profession. Students will apply tools, techniques, theories and knowledge from prior academic, experiential learning, and extracurricular activities to examine and critically evaluate select issues. The course takes an experiential approach to analysis highlighting effective communication using case studies, robust class discussions, and in-depth research. In addition, students will hear from speakers in and outside the accounting profession about topics, including personal career issues, keys to professional success, and profession-wide developments.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 607 Forensic Investigation 3.0 Credits**

Study of the process of locating, investigating, and documenting fraud in a business environment. Topics include: discussion of criminal statutes related to financial crimes, techniques used in solving financial crimes, interviewing, rules of evidence, sources of information, forensic accounting procedures, and current issues in financial investigations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 608 Government and Not-for-Profit Accounting 3.0 Credits**

The course focuses on the role of accounting information as a means of communicating a mission, accomplishments, and fulfillment of fiduciary responsibility that are unique to not-for-profit and government organizations. The emphasis is on financial leadership and decision-making based on comparative data analytics and financial data analysis. Students will study the creation, use, presentation, and analysis of budgets as well as financial reporting unique to these sectors with an emphasis on best practices for data visualization as a means of communication and decision making.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 622 Advanced Financial Accounting 3.0 Credits**

This course examines complex accounting concepts such as equity accounting, business combinations and consolidated financial statements, accounting for foreign entities, and other selected topics. The purpose of this course is to prepare students to execute, evaluate, interpret, and explain the accounting and financial aspects of complete entity accounting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ACCT.

**Prerequisites:** ACCT 323 [Min Grade: C] or ACCT 627 [Min Grade: C]

**ACCT 625 Financial Accounting Theory I 3.0 Credits**

Introduces preparation of the income statement and the balance sheet. Covers analysis and recording of business transactions and a detailed study of accounting for current assets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 626 Financial Accounting Theory II 3.0 Credits**

Continues study of financial accounting theory and current practice. The emphasis is on generally accepted accounting principles underlying the measurement, recognition and reporting of long-lived tangible and intangible assets and long-term liabilities including bonds, pensions, and leases.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 625 [Min Grade: C]

**ACCT 627 Financial Accounting Theory III 3.0 Credits**

Extends study of financial reporting to higher level accounting topics and serves as a bridge to more advanced accounting topics. Its focus is generally accepted accounting principles underlying equity transactions and reporting, accounting for income taxes, investments, accounting changes, and preparation of the statement of cash flows.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 626 [Min Grade: C]

**ACCT 628 Accounting Valuation Issues 3.0 Credits**

This course is designed to provide students with exposure to the field of valuation for asset and liability appraisal, mergers & acquisitions and other key business transactions and financial reporting activities that require application of valuation tools and techniques. The course materials are based on information from the AICPA and NACVA organizations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit



**ACCT 631 Advanced Strategic Cost Management 3.0 Credits**

The course delves deeper into cost management and planning topics by exploring recent innovations and problems facing today's businesses. Students will integrate theory and practice to evaluate current issues, apply appropriate tools and techniques, and design solutions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 601 [Min Grade: C] or ACCT 603 [Min Grade: C]

**ACCT 635 Strategy & the Master Budgeting Process 3.0 Credits**

This course covers the essential concepts, tools, and practical applications of the entire master budgeting process. This includes budget development from the strategic plan, periodic forecasting, performance management tools, and the tie-in to the monthly actual financial closing cycle. The course will not only emphasize value-added, practical applications of these concepts as utilized in present-day business environment but will also demonstrate the business acumen associated with successfully navigating through the competitive landscape.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 601 [Min Grade: C] or ACCT 603 [Min Grade: C]

**ACCT 640 Auditing Theory and Philosophy 3.0 Credits**

This course is designed to provide a basic overview of the audit profession, role and responsibilities of the external auditor and the audit process. You will become familiar with concepts, processes and procedures that an external auditor utilizes during the scope of an audit engagement.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 322 [Min Grade: C] or ACCT 626 [Min Grade: C]

**ACCT 644 Internal Auditing 3.0 Credits**

Internal auditing provides an organization with independent, objective assurance and consulting activity designed to add value and improve an organization's operations. Topics covered vary at the discretion of the instructor and frequently include: the Institute of Internal Auditor's International Professional Practices Framework, risk assessment including internal control system evaluation and enterprise wide risk assessment, corporate governance, and the relationship of management and employee fraud to the internal audit process. The course includes outside speakers and cases to highlight current issues.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 648 Introduction to Accounting Research 3.0 Credits**

The objective of this course is to provide a framework for understanding academic accounting research. The course will introduce the scientific method and the philosophy of science, development of research questions, research paradigms and methods, and academic writing. To give this context, students will explore foundational research studies as well as current research issues in accounting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 650 Accounting Information Systems 3.0 Credits**

Examines the relationships and distinctions between accounting information systems (AIS) and the total management information system, with major emphasis on computerized AIS. Covers oral and written communication, objectives and procedures of internal control, proper system documentation through flowcharts and other techniques, and systems analysis and design methodologies.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 653 Analytical Accounting and Systems 3.0 Credits**

The rapid evolution and diffusion of information technology (IT) is transforming businesses and managed organizations. This course will introduce a number of key concepts and contemporary issues related to Accounting Information System applications in organizations, including: understanding of the processes related to the flow of accounting information, using accounting information to identify risks, controls used to protect business resources and conduct a sustainable business. Students will use Microsoft VISIO to document the business processes following UML guidelines. Additionally, students will use tools such as Tableau, among others, for converting large quantities of data from accounting information systems.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 655 Data Analytics & Technology in Accounting 3.0 Credits**

This course integrates accounting concepts with data analytics for actual applications across multiple organizations. It introduces business intelligence and analytics, including the use of financial and operating data, quantitative methods, predictive models, and evidence-based approaches to inform business decisions and actions. We will highlight the interaction of these throughout the decision-making process to provide insight and value to firms and professionals.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (STAT 601 [Min Grade: C] or STAT 510 [Min Grade: C] or STAT 610 [Min Grade: C]) and (ACCT 510 [Min Grade: B-] or BUSN 501 [Min Grade: B-])

**ACCT 665 Financial Statement Analysis 3.0 Credits**

In this course you will develop a deeper understanding of the uses and limitations of financial statements as well as the traditional and non-traditional methods of analyzing them (e.g. comparative analysis, ratio analysis, risk and profitability analysis, quality of earnings, asset and corporate valuation, forecasting cash flows, and strategic financial analysis). You will evaluate the performance of actual companies using tools like Excel and Tableau. In addition to the quantitative analysis, the course will highlight financial responsibility and ethics and analyze qualitative information for insight into the decisions made by management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 510 [Min Grade: B-] or BUSN 501 [Min Grade: B-]

**ACCT 910 Research Methods in Accounting 3.0 Credits**

Provides in-depth analysis of the application of research methodologies in accounting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**ACCT 912 Applied Research Methods in Accounting 3.0 Credits**

The primary objective of this course is to develop the academic skills necessary for the selection and utilization of various research methodologies when investigating an accounting issue.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 921 Empirical Research in Accounting I 3.0 Credits**

An introduction to empirical research concerning financial accounting and the capital markets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**ACCT 922 Empirical Research in Accounting II 3.0 Credits**

This course builds upon the material in ACCT 921 and examines topics in empirical research in financial accounting and the capital markets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ACCT 921 [Min Grade: C]

**ACCT 941 Doctoral Seminar in Managerial Accounting 3.0 Credits**

The objective of this course is to cultivate an appreciation of the breadth and depth of managerial accounting research and develop the skills necessary to conduct managerial accounting research.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 942 Doctoral Seminar in Auditing Research 3.0 Credits**

This course provides an introduction into research issues in auditing. It is intended to develop an understanding of auditing theory, practice, and empirical research methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ACCT 998 Dissertation Research in Accounting 1.0-12.0 Credit**

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT I599 Independent Study in ACCT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT I699 Independent Study in ACCT 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT I799 Independent Study in ACCT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT I899 Independent Study in ACCT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT I999 Independent Study in ACCT 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**ACCT T580 Special Topics in ACCT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT T680 Special Topics in ACCT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT T780 Special Topics in ACCT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT T880 Special Topics in ACCT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ACCT T980 Special Topics in ACCT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Adult Education

### Courses

**EDAE 601 Foundations of Adult Education 3.0 Credits**

This course examines the history of adult education, philosophical foundations, and the practice and the profession of the field.

Philosophical, sociological and political foundations of adult education will be explored. Insights gained from the course will require students to develop philosophy and historical perspective papers.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



# Animation

## Courses

### **ANIM 588 Spatial Data Capture 3.0 Credits**

Students learn about the tools available to integrate components from the physical environment into computer animations and games. Aspects covered will be 3D scanning, motion capture and imaging techniques.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 505 [Min Grade: B] and DIGM 506 [Min Grade: B]

# Applied Behavior Analysis

## Courses

### **ABA 630 Fundamental Elements of Behavior Change 4.5 Credits**

This course is designed to provide students with an understanding of behavioral processes as described and defined by the behavior analytic orientation of psychology. Students will learn the terminology associated with operant and classical conditioning including understanding the difference between a procedure and a process, reinforcement, extinction, punishment, association, conditioned stimulus and unconditioned stimulus.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### **ABA 631 Measurement and Experimental Design 4.5 Credits**

This course is a graduate level intensive introduction to research methods in behavior analysis. The empirical methods of inquiry used in behavior analysis are substantially different than those used in traditional psychology, with the single subject design serving as the hallmark of behavior analytic research. Therefore, this course is designed to provide knowledge of the concepts and issues related to single-subject design as used in applied behavior analysis research. Topics will include the distinction between single subject and group research designs, issues related to reliability and validity, data collection and analysis techniques, treatment integrity, and other ethical and professional issues.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

### **ABA 632 Behavioral Assessment and Functional Analysis 4.5 Credits**

This course is designed to provide knowledge and skills of behavioral assessment and methodologies for evaluating the effectiveness of interventions. The first half of the course will explore a range of assessment techniques to use in a variety of settings, from home to school and clinic. Topics will include direct observation/data collection methods, data analysis, functional assessment, stimulus preference and reinforcer assessments, and ethical and professional issues. The second half of the course will deal specifically with functional analysis including the history of and variations to the methodology. The relationship between assessment techniques and the development of the least-restrictive but most effective behavioral intervention will also be discussed.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

### **ABA 633 Behavioral Interventions 4.5 Credits**

This course is designed to provide the student with advanced knowledge of behavioral interventions designed for both skill acquisition and reduction purposes. Considerations of ethical, social, and cultural variables affecting the selection and effectiveness of intervention strategies will also be highlighted. The course readings and writing assignments will provide students with the skills and opportunity to critically evaluate various intervention procedures and identify opportunities and methods to promote generalization and maintenance of treatment outcomes.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]) and (EDEX 632 [Min Grade: B] or ABA 632 [Min Grade: B])

### **ABA 634 Consultation, Systems Change and Supervision 4.5 Credits**

This course is designed to provide the knowledge and skills necessary to effectively consult with education, mental health and behavioral health staff working in community settings. The course is designed to familiarize students with theories and models of adult behavior change, and the procedures and processes used in an indirect-service delivery model. Students will be expected to apply the knowledge acquired through the consultative process and with a consultee.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

### **ABA 635 Ethical Considerations and Professional Conduct 4.5 Credits**

This course introduces the Behavior Analysis Certification Board's Professional and Ethical Compliance Code for Behavior Analysts. These professional and ethical standards are required to be upheld by professionals obtaining and maintaining certification as a Board Certified Behavior Analyst. Students will be introduced to the standards, disciplinary complaint and review process, and possible disciplinary actions. Additionally, students will be introduced to the various professional membership organizations and the resources available from each.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

### **ABA 636 Applications of Fundamental Elements of Behavior Analysis 4.5 Credits**

This course provides intensive practice in application of behavioral concepts introduced earlier in the program course sequence. Students will be introduced to basic concepts and practices of Organizational Behavior Management (OBM) and Performance Management (PM) in order to create meaningful procedures and materials that can be used as future behavior analysts. Course topics and assignments also include creating plans for future supervisory relationships, pinpointing behavior definitions, developing measurement plans, creating a means for feedback, effective use of reinforcement, management strategies with the greatest effect, overall evaluation of management/supervision strategies, and ethical/professional issues.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

**ABA 640 An Analysis of Verbal Behavior 3.0 Credits**

This course will introduce students to Skinner's (1957) analysis of verbal behavior, including the use and classification of verbal operants, private events, and language training. Students will learn strategies to assess language deficits and instructional tools to teach vocal and non-vocal verbal responses. Lastly, students will read seminal and current research related to verbal behavior and understand its application to teaching individuals with language delays.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

**ABA 641 Therapeutic Approaches Using Principles of Behavior Analysis 3.0 Credits**

This course will explore therapeutic approaches for a wide range of mental health concerns using the principles of behavior analysis. This includes historical approaches starting in classic behavior therapy to modern "Third Wave" contextual behavior therapies such as Acceptance and Commitment Therapy (ACT), Behavioral Activation (BA) and Functional Analytic Psychotherapy (FAP). The course will have a more specific focus on learning ACT in detail as ACT is the most comprehensive and well-researched model out of these contemporary approaches and incorporates various aspects of BA and FAP.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**ABA 642 Seminar in Applied Behavior Analysis 3.0 Credits**

This seminar course is designed to allow students to delve into advanced and/or current topics in applied behavior analysis. Course format includes readings, discussion, student presentations, and guest speakers.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ABA 630 [Min Grade: B] or EDEX 630 [Min Grade: B]

**ABA 780 Capstone in ABA I 3.0 Credits**

This course is the first of a two-part capstone sequence for students in the Master's in ABA program. In this course students will conceptualize and design a research project using single subject design methods. By the end of this course, students will have secured a site for data collection, conducted a literature review, and designed a methodology for their proposal.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ABA 631 [Min Grade: B]

**ABA 781 Capstone in ABA II 3.0 Credits**

This course is the second of a two-part capstone sequence for students in the Master's in ABA program. In this course students will collect original field data pertaining to their capstone project approved in ABA 780. By the end of this course, students will have collected and analyzed their data and discussed its implications for future research and the applied field of behavior analysis and submitted their final research paper and professional poster.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ABA 780 [Min Grade: B]

# Architectural Engineering

## Courses

**AE 510 Intelligent Buildings 3.0 Credits**

An overview of the present and future role of Information Technology in the construction industry with emphasis on the computer tools used throughout the building life cycle by all stakeholders, primarily Building Information Modeling (BIM) and the role of networked-linked sensors and actuators.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**AE 540 Responsive Urban Environments 3.0 Credits**

This is a real-time Global Classroom that meets simultaneously in Philadelphia and Milan, Italy. The Responsive Urban Environment (RUE) looks at the city through the lens of ecosystem management. RUE considers the city as a complex network of interrelated systems that rely on each other to maintain system balance. RUE helps students understand the close relationship between the engineering design choices that take place at the scale of the building and neighborhood to the environmental impacts that occur at the wider scale of the urban level.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**AE 541 Bio-inspired Design 3.0 Credits**

This course introduces bio-informed sciences into engineering design to help students develop engineering strategies for the built environment to promote human health and wellbeing. Topics covered include neuroscience, photobiology, biomimicry, biophilia, and chronobiology.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**AE 544 Building Envelope Systems 3.0 Credits**

Science and engineering fundamentals in analysis and design of building envelopes and wall systems. Architectural, structural and environmental (thermal and moisture) concerns; features of selected cladding systems; air and moisture leakage, thermal deficiency, structural distress and premature deterioration; building envelop construction, condition evaluation, maintenance and retrofit.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE.

**Prerequisites:** AE 391 [Min Grade: C] or CIVE 303 [Min Grade: C]

**AE 550 Indoor Air Quality 3.0 Credits**

Introduces basic concepts about indoor air quality, indoor air pollutants, including their sources and health effects, transport of pollutants, modeling of pollutant concentration in buildings, and ventilation as well as air cleaning systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is ENVE.

**AE 551 Building Energy Systems I 3.0 Credits**

This course covers inverse modeling as a scientific approach to data analysis, different types of inverse methods as applied to building & HVAC & refrigeration equipment energy use, calibrated simulation approach, current research trends.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is MECH.

**AE 552 Building Energy Systems II 3.0 Credits**

This course covers topics related to building and power grid integration, such as smart grid, building energy systems, and demand response strategies. Using black and gray box modeling methods to analyze building dynamics and develop energy forecasting models are also discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is MECH.

**AE 555 Data Acquisition and Analytics in Built Environment 3.0 Credits**

Introduce concepts on data acquisition, data storage and data analytics in the context of built environment. Students will be learning sensor technology and database design and operation in buildings, as well as novel concepts of leveraging data science for engineering challenges.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**AE 561 Airflow Simulation in Built Environment 3.0 Credits**

Introduce concepts about both computational and physical modeling of airflow in and around buildings. Help students to acquire skills in using computation fluid dynamics (CFD) techniques as design tools for buildings via the use of commercial software packages.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**AE 997 Architectural Engineering Research 1.0-12.0 Credit**

Requires students to select a topic for investigation and obtain the approval of the student's PhD advisor or committee. The hours and credits are determined for each individual. The student will communicate about their progress with the advisor on a regular basis throughout the duration of the research effort.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE 998 Architectural Engineering Dissertation 1.0-12.0 Credit**

Requires students to write and defend their PhD dissertation. The hours and credits are determined for each individual. The student will communicate about their progress with the advisor on a regular basis throughout the duration of the dissertation development.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE I599 Independent Study in Architectural Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE I699 Independent Study in Architectural Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE I799 Independent Study in Architectural Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE I899 Independent Study in Architectural Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE I999 Independent Study in Architectural Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE T580 Special Topics in AE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE T680 Special Topics in AE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE T780 Special Topics in AE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE T880 Special Topics in AE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**AE T980 Special Topics in AE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit



# Architecture

## Courses

### ARCH 684 Specialized Studio 4.0 Credits

This design studio is taught as vertical studio combining students from multiple years. Sections of this studio focus on a variety of special issues in the broader realm of architecture, urbanism and design and may be taught as an interdisciplinary studio.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 16 credits

### ARCH 747 Summer Study Abroad 3.0 Credits

This is an intense three week study of Rome or Paris and its environment. Study combines site visits, sketching, and analysis. The travel portion of the course is preceded by lectures and reading assignments and is followed by preparation of analytical reports.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH I599 Independent Study in Architecture 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH I699 Independent Study in Architecture 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH I799 Independent Study in Architecture 0.0-3.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH I899 Independent Study in Architecture 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH I999 Independent Study in Architecture 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH T580 Special Topics in Architecture 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH T680 Special Topics in Architecture 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH T780 Special Topics in Architecture 0.0-3.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH T880 Special Topics in Architecture 0.0-3.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### ARCH T980 Special Topics in Architecture 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

# Art History

## Courses

### ARTH 530 History of Modern Design 3.0 Credits

This course examines the products of the decorative arts and applied design during the past 150 years. Material includes examples of furniture, household objects, industrial design, fashion, and graphic design. The emphasis is not upon a particular design profession or medium, but rather upon how design functions in relation to political, economic, and social history.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ARTH 102 [Min Grade: D] or ARTH 103 [Min Grade: D]

# Arts Administration

## Courses

### AADM 505 Overview of the Arts 3.0 Credits

Examines the role of culture in communities and how it is manifested. Explores how arts, culture, and creativity are valued in society through examinations of the role of professional artists, the history of the field, cultural heritage, cultural democracy, and current trends in research and professional practice.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

### AADM 510 Writing for the Arts 3.0 Credits

Covers strategies for writing non-marketing materials in the arts such as funding proposals, advocacy letters, board communications, and persuasive speeches.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

### AADM 520 Creative Enterprise and Innovation 3.0 Credits

Explores the wide range of enterprises that make up the arts, cultural, and creative sector with an emphasis on successful business structures and practices. The role of innovation and innovative practices in start-up creative entities as well as established cultural institutions is studied as a means to develop leadership skills to create sustainable and resilient programs and organizations.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**AADM 660 International Cultural Policy 3.0 Credits**

The course explores some of the major themes in international cultural policy today: globalization, culture and development, diversity and identity, and cultural diplomacy, in five different regions of the world (Western Europe, Eastern Europe, Latin America, Asia and Africa).

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 690 Equitable Cultural Practices 3.0 Credits**

This course will examine equitable practices in museums, arts, and cultural organizations. Through readings and case examples, students investigate racial and social identities that influence practices within museums, arts, and cultural organizations. Students will design a strategic action plan to disrupt patterns of inequities within a cultural organization, presenting it during the final class for feedback from peers in a supportive and co-creative manner.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 720 Leadership in the Arts 3.0 Credits**

Explores the concepts of leadership and examines leadership experiences and potential as they relate to the field of non-profit arts and culture.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 731 Human Resources Management in the Arts 3.0 Credits**

Examines human resource management and labor relations specific to non-profit arts and cultural organizations. Students will learn about labor union contract negotiations when working with performing and visual arts institutions.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 740 Production Laboratory in the Arts 3.0 Credits**

Provides practical experience in artistic production or management. This course may be used for a student's individual exploration of any area of arts production or management, as approved by the program director.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**AADM 741 Arts Entrepreneurship 3.0 Credits**

Provides students with hands-on learning and practice related to the development and implementation of an arts enterprise, program, or service. Students will have the opportunity to use the course to take a creative idea from conception to implementation. Working individually or in small groups, students can pursue any type of creative enterprise, program or service, from new arts ventures to new programs in existing organizations to creating services for the sector.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 742 Advanced Fund Development 3.0 Credits**

This course covers an advanced level of fundraising and development topics, including major gifts, planned giving, and capital campaigns. Building upon knowledge gained from the program's two core courses in development and fundraising, this is an elective for students who wish to gain a deeper knowledge of development policies and practices in order to further focus their education, and possibly their master's thesis and/or careers, on this aspect of arts administration.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 745 Arts in Education 3.0 Credits**

This course examines arts education with a focus on improving educational programs within schools, community groups and arts organizations. Concentration is placed on educational best practices, creating and cultivating school and community connections, and evaluating organization needs. Topics covered include advocacy, assessment, curriculum standards and national trends.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 746 Creative Placemaking 3.0 Credits**

This course explores art practices that bear location and geography in mind, and seek to transform place through the inclusion of creative interventions. It includes examination of the economic and social impacts of arts, arts-led gentrification and neighborhood change, and the contemporary state of placemaking practices in the field. The course offers students the chance to be up to date on one of the driving issues of today's arts funding landscape.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 752 Performing Arts Management 3.0 Credits**

Provides an introduction to and overview of management practices of non-profit performing arts organizations. The primary focus will be on current theory and practice in day-to-day operations, management, and associated planning for the performing arts: theatrical, dance and music organizations.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 753 Visual Arts Organization Management 3.0 Credits**

Special problems and challenges related to managing visual arts organizations. The course will build on learning from foundation-level courses, discussing issues related to managing art museums, art schools, galleries, public art programs, and more.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 755 Community Cultural Planning 3.0 Credits**

This course explores the practice of community cultural planning, investigating the work from technical and philosophical approaches. Students will learn the stages of a community cultural planning process and various methods for implementing such a process. Throughout the course, attention will be given to: the intersections of arts, culture, and community; the responsibilities of leading or participating in a community cultural planning process; and, ways to thoughtfully and authentically engage with a community in this work.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**AADM 757 Political Activism in the Arts 3.0 Credits**

Course examines the strategies, trends and dynamics of arts based issues from a variety of political perspectives. Using case studies, class will explore systems that influence activism in politics and the arts and instances when art has been politically controversial, its causes and consequences.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**AADM 759 Cultural Organizations in Transition 3.0 Credits**

Identifies issues and trends that will have an impact on cultural organizations of today and extends the examination of those impacts into the future through forecasting and scenario creation. Uses multiple disciplines such as economics, technology, and organizational development to assess influence.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**AADM 785 Research Design in the Arts 3.0 Credits**

This course covers research design for the arts and culture field, including qualitative, quantitative and mixed methods. Students identify and shape a research question related to the arts and culture field, then conduct an in-depth literature review, shape a methodology for researching questions, and report their findings in a thesis.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**AADM 798 Thesis Development 3.0 Credits**

Enables students to begin work on original research related to the thesis, a scholarly work related to the student's individual research interest. In the first term, students conduct primary research, including fieldwork such as interviews, observations, focus groups and surveys. In the second term, students write and revise their written thesis document.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 1 times for 6 credits

**Prerequisites:** AADM 785 [Min Grade: C]

**AADM 799 Thesis Completion 0.5 Credits**

This course allows the student to work with a thesis advisor to complete the thesis, which began during AADM 798. This optional course will be taken only by students needing more than two terms to complete the thesis.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 5 times for 3 credits

**Prerequisites:** AADM 798 [Min Grade: CR]

**AADM I599 Independent Study in Arts Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM I699 Independent Study in Arts Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM I799 Independent Study in Arts Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM I899 Independent Study in Arts Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM I999 Independent Study in Arts Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM T580 Special Topics in Arts Administration 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM T680 Special Topics in Arts Administration 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM T780 Special Topics in Arts Administration 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM T880 Special Topics in Arts Administration 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**AADM T980 Special Topics in Arts Administration 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit



# Arts Administration and Museum Leadership

## Courses

### **AAML 525 Legal and Ethical Issues in Arts and Culture 3.0 Credits**

This course explores legal and ethical issues in the arts and cultural sector, including copyright, trademark, intellectual property, contracts, advocacy and lobbying, conflicts of interest, nonprofit and for-profit governance, boards of directors, governing documents, the US legal system, mission statements and organizational purpose, and obscenity and defamation.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 550 Management Techniques in Arts and Cultural Organizations 3.0 Credits**

This course examines the theory and practice of managing arts and cultural organizations including strategic human resource management, managing boards and consultants, regulatory and compliance practices, and management approaches for organizational effectiveness.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 560 Marketing & Engagement in Arts and Cultural Orgs. 3.0 Credits**

This course emphasizes the methods that arts and cultural organizations use to develop their strategies for engaging their communities, understanding current and potential audiences, and building an audience base that responds to an organization's artistic mission. Students will study the theory and practice of strategic marketing and communications management.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 575 Revenue Development in Arts and Cultural Orgs. 3.0 Credits**

This course explores how arts and cultural entities attract financial resources, and the kinds of money needed for different purposes and types of cultural organizations, including museums. Topics covered include donor cultivation and stewardship, capitalization, grantwriting and the grants process, earned income, contributed income, public funding, and recent trends in fund development.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 610 Financial Accounting in Arts and Cultural Orgs. 3.0 Credits**

This course covers accounting principles, accounting procedures and internal control, forecasting, balance sheet analysis, budgeting procedures, and financial reporting for non-profit arts and cultural organizations.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 660 Technology Tools for Arts and Cultural Managers 3.0 Credits**

This course enables students to understand, use, and deploy technology systems and tools to advance an arts and cultural organization's mission and vision. Students will research and explore trends and developments in electronic marketing, social media, website design, audience engagement strategies, and customer relationship management. This course will have a particular focus on analytics and data-driven decision-making as well as cultivating an understanding of the participatory nature of contemporary arts experiences.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

### **AAML 680 Leadership, Strategy & Planning in Arts and Cult. 3.0 Credits**

This course explores leadership theory and practice, strategic thinking and planning, and the theory and practice of organizational and program planning in the arts, culture, and creative industries, including museums. It provides an opportunity for students to reflect on their orientation to the field, what they have learned through their studies, and individual self-awareness / leadership style.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

# Behavioral & Addictions Counseling

## Courses

### **BACS 500 Theories of Counseling 4.0 Credits**

This online, graduate level course provides a comprehensive survey of the major counseling theories and principles. Coursework includes the following theories: psychoanalytic, Adlerian, existential psychotherapy, person-centered, gestalt, behavioral, cognitive behavioral, reality therapy/choice theory, postmodern approaches, family systems, multicultural perspectives, and integrative approaches.

**College/Department:** College of Nursing Health Professions  
**Repeat Status:** Not repeatable for credit

### **BACS 510 Introduction to Addictions and Substance Use Disorder 3.0 Credits**

This course provides a broad overview of the psychological and biological models of addictions and the ways in which addictions and substance-use disorders affect specific populations. The basic understanding of addictions and substance use disorders will equip students to develop specific skills and competencies in treatment of substance use disorders.

**College/Department:** College of Nursing Health Professions  
**Repeat Status:** Not repeatable for credit

**BACS 530 Understanding Prevention and Prevention Programs 3.0 Credits**

This course provides a comprehensive overview of prevention theories and prevention programming related to substance use disorders. Course topics include principles and models of prevention, evidence-based practices, strategic planning, and outcome evaluation. This course will focus on use, and the interaction between the person at risk and the environment. Effective programs motivate individuals to make low-risk choices through a variety of evidence-based practices including the social norms approach, environmental interventions, and public health models.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 531 Research Methods in Behavioral Sciences 4.0 Credits**

This course focuses on research methods for behavioral health, and is designed to review contemporary research methods through a multi-method approach. Issues in the clinical assessment of individuals, couples, and families will be explored from diverse contextual variables.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 532 Ethical Issues in Addictions Counseling 4.0 Credits**

This course discusses the philosophical, legal, and moral responsibilities of Addictions Counselors. Students examine and discuss a wide array of ethical issues and moral dilemmas and will work to establish knowledge and skills to perform ethical decision-making using an ethical decision making model.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 534 Approaches to Substance Use Disorders 3.0 Credits**

This course explores the bio-psycho-social impact of substance use disorders on individuals and their families. Students learn about the continuum of substance use and evidence-based practices associated with recovery. Students also experience first-hand the challenges in developing motivation for behavior change.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 535 Motivational Enhancement Skills 3.0 Credits**

In this online, graduate level course, students learn to employ Motivational Interviewing, the Transtheoretical Model of Counseling (stages of change), and Solution-Focused Brief Therapy strategies in the treatment of substance use disorders. Experiential activities assist the student in understanding conceptual frameworks and in developing effective counseling skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 537 Psychopharmacology & Addictions 3.0 Credits**

This course provides a broad understanding of psychopharmacology theories of substance use disorder and treatment. This course provides an overview on drug use as a social problem and a brief analysis on the history of drug policies in the United States. Coursework includes learning about the adverse effects and dynamics of substance use disorders on the nervous system and actions of drugs (stimulants, caffeine, tobacco, alcohol, psychedelics, cannabis, as well as dietary supplements, over-the-counter drugs, performance-enhancing drugs, and medications for mental disorders) Preventing substance abuse and treating substance use disorders and drug policy alternatives are also discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 540 Treatment Planning and Relapse Prevention 3.0 Credits**

Students gain a comprehensive understanding of the recovery process including factors influencing relapse. Marlatt's relapse prevention model is used to explore the antecedents and consequences of substance use, risks associated with relapse, and the paths to recovery as experienced by people with a variety of co-occurring behavioral health disorders.

In addition, comprehensive treatment and admission planning will be explored in order to understand how to execute relapse prevention and recovery planning. Understanding the purpose of the treatment plan and how to execute a treatment plan from intake to discharge will be taught.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 541 Addictions Practicum Supervision I 2.0 Credits**

This course facilitates student development of foundational skills necessary for the practice of an advanced addictions counselor. Students are expected to spend two hours weekly in group supervision (with an approved supervisor) and 10 hours of addictions counseling practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 542 Addictions Practicum Supervision II 2.0 Credits**

This course facilitates student development of foundational skills necessary for the practice of an advanced addictions counselor. Students are expected to spend two hours weekly in group supervision (with an approved supervisor) and 10 hours of addictions counseling practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 543 Addictions Practicum Supervision III 2.0 Credits**

This course facilitates student development of foundational skills necessary for the practice of an advanced addictions counselor. Students are expected to spend two hours weekly in group supervision (with an approved supervisor) and 10 hours of addictions counseling practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 545 Psychopathology & Co-Occurring Disorders 3.0 Credits**

This course provides a broad understanding of psychopathology and co-occurring disorders. This course provides an overview on psychological symptoms and problems related to co-occurring disorders. This course also explores the treatment needs of persons with co-occurring disorders. Coursework includes learning about co-occurring disorders and types of medications prescribed to treat substance use and/or mental health disorders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 560 Preventing Substance Use Disorders 3.0 Credits**

This course provides a comprehensive overview of prevention theories and prevention programming related to substance use disorders. Course topics include principles and models of prevention, evidence-based practices, strategic planning, and outcome evaluation. A paradigm shift is occurring in substance use prevention programming. We are less focused on the use, and more focused on the user / environment interaction. New, effective programs motivate individuals to make low-risk choices through a variety of evidence-based practices including the social norms approach, environmental interventions, and public health models. Strategies for assessing target communities and then developing specific prevention programs will also be examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 568 Substance Use Counseling with Special Populations 3.0 Credits**

The focus of this course is on effective approaches to assessing and treating people with substance use disorders who have unique needs. These populations include youth, older adults, women, people with co-occurring physical or psychiatric disabilities and members of the LGBT community. Appreciating how the values and attitudes of society and health care professionals influence working with these special populations are issues of particular importance.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 570 Clinical Supervision Skills 3.0 Credits**

This course is an introduction to theoretical and practical issues associated with clinically supervising the substance use disorders practitioner. The course covers models, strategies, legal and ethical considerations, and stages of supervision. An emphasis is placed on leadership in promoting evidence-based best practice in behavioral health.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 573 Group Dynamics and Techniques 4.0 Credits**

This course prepares students to develop advanced skills necessary for group facilitation. Students engage in readings, didactic learning, and experiential activities to develop their group facilitations skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BACS 570 [Min Grade: B]

**BACS 646 Multicultural Approaches in Addictions Counseling 4.0 Credits**

This course explores how sociocultural concepts define and affect social, interpersonal, and professional interactions in addictions counseling. This class will explore an understanding of issues and trends in a multicultural and diverse society, multicultural counseling and identity development and multicultural competencies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**BACS 672 Family Trauma and Addictive Disorders 4.0 Credits**

This course explores the assessment of the impact of both acute and chronic trauma on family members and the response of the family system. This course examines addiction in the context of the family system including relapse and recovery, emphasis on family system, techniques of addictions counseling, both internal trauma (domestic violence) and external trauma are investigated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BACS 540 [Min Grade: C]

**BACS T580 Special Topics in Behavioral & Addictions Counseling 1.0-3.0 Credit**

This course focuses on topics of current interest to faculty and student in the fields of behavioral and addictions counseling; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

## Biomedical Engineering & Science

### Courses

**BMES 501 Medical Sciences I 3.0 Credits**

First course in a three-course sequence designed to acquaint students with the fundamentals of biology and physiology from an engineering perspective. This first course covers evolution, genetics, molecular biology and basic cellular physiology.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 502 Medical Sciences II 3.0 Credits**

Second course in a three-course sequence designed to introduce students to the fundamentals of biology and physiology from an engineering perspective. This second course covers important concepts in cell physiology and highlights applications of these concepts in biomedical engineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 501 [Min Grade: C]



**BMES 503 Medical Sciences III 3.0 Credits**

Third course in a three-course sequence designed to introduce students to the fundamentals of biology and physiology from an engineering perspective. This third course focuses on understanding physiology from the cellular to systems scales, with an emphasis on biological control systems and applications in biomedical engineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 502 [Min Grade: C]

**BMES 505 Mathematics for Biomedical Sciences I 3.0 Credits**

This course is for students of biology and related medical fields aimed at bridging the gap between qualitative and quantitative approaches in the study of biological processes. Topics include single and multivariable calculus infinite series, etc.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 506 Mathematics for Biomedical Sciences II 3.0 Credits**

This course for students of biomedical science or biomedical engineering is designed to permit the student to go on to advanced studies in engineering and science in which differential equations are needed. Biological applications are emphasized.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 505 [Min Grade: C]

**BMES 507 Mathematics for Biomedical Sciences III 3.0 Credits**

This course covers topics in Fourier series and orthogonal functions, partial differential equations, and boundary value problems. Applications are made to problems in neuro-physiology, cellular transport, and biological oscillations.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 506 [Min Grade: C]

**BMES 508 Cardiovascular Engineering 3.0 Credits**

This course emphasizes engineering approaches to the analysis of the cardiovascular system focusing on fundamental mechanics and emerging technologies.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 501 [Min Grade: B] and BMES 502 [Min Grade: B]

**BMES 509 Entrepreneurship for Biomedical Engineering and Science 3.0 Credits**

This course serves as the foundation course in entrepreneurship and is designed to provide students with a complete working knowledge of the modern entrepreneurial and business planning process.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 510 Biomedical Statistics 4.0 Credits**

This course introduces the graduate student to the fundamentals of inferential statistics with biomedical applications. It covers topics in data presentation, sampling, experimental design, probability and probability distributions, significance tests, and clinical trials.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 511 Principles of Systems Analysis Applied to Biomedicine I 3.0 Credits**

Covers formulation of biological problems by rigorous mathematical techniques, including application of conservation laws, network theorems, and mesh and nodal analysis.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 512 Principles of Systems Analysis Applied to Biomedicine II 3.0 Credits**

Continues BMES 511. Emphasizes input/output transfer function problems, linear systems and linear operations, and impulse response.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 511 [Min Grade: C]

**BMES 515 Experimental Design in Biomedical Research 4.0 Credits**

This course is designed to introduce students to the fundamental principles of experimental design and statistical analysis as applied to biomedical research with animals and humans. Topics to be covered include experimental design, clinical design, and protocol submission and review.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 510 [Min Grade: C]

**BMES 517 Intermediate Biostatistics 3.0 Credits**

The purpose of this course is to acquaint students with some of the statistical tools commonly used in biomedical and health sciences research. The course will provide the student with a basic theoretical background on the procedures of repeated measures ANOVA and selected multivariate statistical tests. It will familiarize students with the use of computer-based statistical analyses.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 510 [Min Grade: C]

**BMES 518 Interpretation of Biomedical Data 3.0 Credits**

The focus of this course is on understanding the methods used to analyze and interpret the results of quantitative data analyses in the biomedical and health sciences and determine their meaningfulness (clinical significance). Fundamental to this process is an understanding of the interrelatedness of statistical power, effect size, sample size and alpha.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 510 [Min Grade: C]

**BMES 524 Introduction to Biosensors 4.0 Credits**

An introductory course in the general area of microsensors covering basic sensing mechanisms and various types of conductometric, acoustic, silicon, optical and MEMS microsensors. Two case studies involving biosensors and acoustics sensors allow students to acquire in-depth knowledge in the theory and design of microsensors.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 525 Advanced Biosensors 4.0 Credits**

The second course in a two-course sequence, this course covers aspects of modern biosensor design methods and addresses challenges associated with fabrication technologies and instrumentation techniques. Topics covered include the theory and modeling of biosensors, fabrication steps, and testing methods.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 528 Pediatric Engineering I 3.0 Credits**

This course will introduce students to concepts related to childhood injury and disease and to current treatment paradigms for pediatric patients.

The objective is for students to develop a fundamental understanding of childhood injury and disease, healthcare, and treatment strategies which underscore the need for new and innovative therapies for pediatric patients. Instructors will discuss how the needs of pediatric patients vary considerably due to differences in size, rates of growth, critical development periods, anatomy, physiological differences, and physical activity levels.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 529 Pediatric Engineering II 3.0 Credits**

This course will leverage the content from BMES 528 by introducing students to the challenges and limitations of current treatment paradigms for pediatric patients and by studying the landscape of pediatric medical device development. Focus will be on the scientific and engineering concepts, methods, and approaches to address healthcare challenges with direct relevance to pediatric patients, including pediatric medical devices and unmet clinical needs. There is and has been a compelling and recognized need for the development of new medical devices and therapies for pediatric patients. The objective is to train the next-generation of students for future scientific and technical careers in pediatric engineering, healthcare, entrepreneurship, and innovation that will have a lasting impact on global health.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 528 [Min Grade: B-]

**BMES 531 Chronobioengineering I 3.0 Credits**

This course advances the student's knowledge of biological time-keeping and adaptive functions of biological clocks. It includes such topics as biochemical and physiological models of biological blocks, adjustment to environmental cycles and rhythms in behavior and models.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 502 [Min Grade: C]

**BMES 532 Chronobioengineering II 3.0 Credits**

This course continues BMES 531. It covers topics in the patterns, rhythms, evolution, neurology, psychology and overall functions of sleep.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 531 [Min Grade: C]

**BMES 534 Design Thinking for Biomedical Engineers 3.0 Credits**

This course is a studio-seminar exploring principles and theories of product design, systematic design process, problem-solving, decision-making and design as authorship. The course uses design research methods and topical design issues to explore and experience design thinking.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 535 Introduction to Product Design for Biomedical Engineers 3.0 Credits**

This course introduces students to basic product design techniques. It combines lectures, demonstrations, discussions and problem solving exercises exploring product design as a creative process in the production of simple objects. Students develop a command of product development, skills in modeling and communication of their novel solutions.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 534 [Min Grade: D] or PROD 101 [Min Grade: C]

**BMES 538 Biomedical Ethics and Law 3.0 Credits**

Introduces a wide spectrum of ethical, regulatory, and legal issues facing health care practitioners and biomedical researchers. The course helps students become aware of the ethical and legal issues involved in their work while increasing the student's understanding of how legal and ethical decisions should be made in biomedical research, as well as what sources of help and guidance are available.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 541 Nano and Molecular Mechanics of Biological Materials 3.0 Credits**

This course aims to provide students with the fundamental knowledge and latest scientific developments in molecular mechanics of biological materials. The first half of the course will introduce interdisciplinary theoretical background including molecular physics, electrostatics, colloidal science, biocompatibility and polymer mechanics. The second half will describe the most recent advances in nanotechnology and nanomechanics-related biomechanical and biomedical research. Students are expected to understand the fundamental knowledge of the molecular-level phenomena in biological systems, and to grasp the basic design and operation principles of nanomechanical instruments.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 543 Quantitative Systems Biology 4.0 Credits**

This course uses a data-driven systems engineering approach to provide a foundation in systems biology. Topics covered include the organization of robust networks of genes and proteins; intercellular communication; and cells as basic units of life.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B]

**BMES 544 Genome Information Engineering 4.0 Credits**

This course is designed to provide students with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering. The underlying goal is to develop an understanding of highthrough experimental technologies, biological challenges, and key mathematical and computational methods relevant to biomedical engineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 545 Biosystems Modeling 4.5 Credits**

This course provides hands-on experience in advanced computational methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 502 [Min Grade: C] and BMES 512 [Min Grade: C]

**BMES 546 Biocomputational Languages 4.0 Credits**

This course aims to develop the computational skills relevant to Bioinformatics and related fields. MATLAB will be the primary programming languages utilized in this course, and some exposure to Python will be provided. The focus will be on gaining hands-on knowledge in these programming languages and in the biocomputing toolboxes and libraries available for them.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 547 Machine Learning in Biomedical Applications 3.0 Credits**

Machine Learning is a computational approach for construction of algorithms that can learn from and make predictions on data. The focus of the course is to deliver a practical approach that can help appropriate utilization of machine learning methods for data exploration and prediction tasks in biomedical applications. Applications will be drawn from bioinformatics, neuro-engineering, and biomedical image analysis, with special emphasis given to feature extraction and representation strategies specific to the data types prevalent in these domains. The machine learning concepts and methods will include parameter density estimation, dimension reduction, supervised and unsupervised learning, neural networks, and support vector machines.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B]

**BMES 548 Structural Bioinformatics and Drug Design 3.0 Credits**

This is an interdisciplinary course that introduces students to protein structure and drug design, using computational methods. Experimental and computational modeling methods for biomolecular structures will be discussed and state of the art software tools will be introduced for homology modeling, protein design, drug design, and molecular docking applications.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 543 [Min Grade: B] (Can be taken Concurrently) and (BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B])

**BMES 549 Genomic and Sequencing Technologies 3.0 Credits**

This course provides an introduction to modern genomic and sequencing technologies, focusing on genomic technologies to extract information from three primary biological molecules, DNA RNA, and protein. The course takes an engineering approach that studies the key technological advancements driving the development and utilization of these methods. In addition to a technical investigation of these technologies, the course will also discuss biomedical applications of these technologies and introduce basic data analysis algorithms developed for processing their output. This course will involve both lectures and hands-on lab experience.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 501 [Min Grade: B] and (BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B])

**BMES 550 Advanced Biocomputational Languages 4.0 Credits**

This course provides hands-on education in programming languages used in biomedical applications. Specific programming languages explored will reflect the current state of practice and may include one or more of MATLAB, Python, R, Php, C/C++, and Java languages. This course focuses on advanced programming topics including data communication, high performance computing, database systems, web interactions, and graphical and web interfaces. The principal application areas to be investigated include Bioinformatics (algorithms on strings and sequences), image analysis, feedback and control systems, and network modeling and simulation.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 551 Biomedical Signal Processing 3.0 Credits**

Introduces discrete time signals and systems; origin and classification of biomedical signals; data acquisition, filtering, and spectral estimation of medical signals; compression of medical signals; new processing approaches and time-frequency representation and wavelets.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 555 Biomedical Additive Manufacturing 3.0 Credits**

Additive manufacturing, also known as 3D printing, is currently revolutionizing the way things are created and used in biomedical engineering, especially in the context of the regulated medical device industry. In this introductory course, we will focus on the materials and printing technologies used for additive manufacturing of medical devices as well as bioprinting, including developing skills needed for hands-on assembly and operation of extrusion-based 3D printing of low temperature polymers. The goal of this course is to provide students with basic hands-on skills and an overview of additive manufacturing in a biomedical engineering context, and to prepare students for independent research and investigation of more advanced topics in 3D printing of medical devices and implants.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 571 Biological Evolution: Applications to Human Health and Performance 4.0 Credits**

This course is designed to provide students with an evolutionary perspective on health and disease. The focus is on humans as products of evolution by natural selection and as such, subject to the same relationships and historical precedents that govern the rest of the natural world. Topics to be covered include ecological damage and emerging diseases, sociobiological perspectives on behavioral disorders, the development of resistance in pathogens, and adaptation and maladaptation of humans to urban environments.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 585 Medical Technology Innovation: Devices 3.0 Credits**

This course helps students gain exposure to medtech innovation culture and community by interfacing with innovators, prototype engineers, industrial designers, product and business developers, entrepreneurs, intellectual property, regulatory and legal professionals, and economic development experts and investors. Students are expected to study ecosystems that engender medical innovation and conduct due diligence on actual companies in terms of technology, management, and commercialization viability. Through this course, the medtech innovation journey comes alive; as a bonus, students expand their medtech networks and outreach to innovation industry.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 586 Medical Technology Innovation: Biologics 3.0 Credits**

Medical Technology Innovation: Biologics course is focused on biologics, in particular, emerging fronts in medical biotechnologies including biosensing, gene, cell, tissue and immune technologies. This courses provide a primer on basics of Biologics medical technology innovation from concept to commercialization, starting from laboratory proof-of-concept studies as well as translational research and technology transfer of research discoveries.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 587 Brain Technology Convergence: Your Brain on the Metaverse 3.0 Credits**

This interdisciplinary course brings two futures together: Neurotechnologies and Virtual Immersive Virtual Worlds. Starting with a primer on natural (human) and artificial (computational) intelligence, virtual and immersive media and the Metaverse, students are introduced to emerging neuro-technologies including brain-computer interfaces (BCI), neuro-imaging, neuro-stimulation, neuroergonomics, brain-in-the-loop systems, human-robot teaming, humanoid robots and 'human autonomy.' The course then proceeds to application domains such as gaming, entertainment, health, aerospace, learning and behavioral economics. The content emphasizes 'responsible brain-technology convergence' that is respectful of our neurorights as individuals and responsive to potential social, professional, legal and ethical implications.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 588 Medical Device Development 3.0 Credits**

Medical device product development must take into account a diverse set of disciplines to achieve a safe and successful product. This course exposes the student to several of these disciplines with the objective of raising the student's awareness of safety throughout the product development life cycle. Students will learn to appreciate the complex engineering decisions that support development of a safe medical device through an examination of risk management, regulatory processes, human factors and clinical studies.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit



**BMES 596 Clinical Practicum 3.0 Credits**

This course provides biomedical engineering students with an opportunity to observe basic operative and postoperative procedures with the idea of both learning about such procedures and identifying the role of biomedical engineering in these clinical settings.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 604 Pharmacogenomics 3.0 Credits**

Covers the interaction between chemical agents and biological systems at all levels of integration. Discusses general classes of drugs, with particular emphasis on general concepts and problems of medical importance.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 609 Emerging Technologies in the Healthcare System 3.0 Credits**

The course provides a robust understanding of the current healthcare landscape and offers a view into the "future-state" of the quickly changing environment. Students will learn to address the complexities of the healthcare industry and global challenges faced by 4P's (pharma, patient, payer, and provider) through innovative problem solving. Students will gain insights about the application of emerging technologies and data to tackle the future-states of the healthcare system.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 611 Biological Control Systems 3.0 Credits**

Introduces the basic concepts of feedback control systems, including characterization in terms of prescribed constraints, study of input and output relationship for various types of biological systems, and stability and time delay problems in the pupillary reflex/eye-hand coordination system.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 613 Biological Control Systems III 3.0 Credits**

Covers mathematical models of biological systems, with emphasis on non-linear and adaptive systems study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 621 Medical Imaging Systems I 4.0 Credits**

Provides an overview of the field of medical imaging. Covers aspects of light imaging; systems theory, convolutions, and transforms; photometry, lenses, and depth of field; image perception and roc theory; three-dimensional imaging; image acquisition and display; and image processing operations, including scanning and segmentation.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 622 Medical Imaging Systems II 4.0 Credits**

Introduces medical visualization techniques based on ultrasound propagation in biological tissues. Includes generation and reception of ultrasound, imaging techniques (A-mode, B-mode, M-mode, and Doppler), typical and emerging diagnostic applications, elements of ultrasound exosimetry, and safety aspects from the clinical point of view.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 621 [Min Grade: C]

**BMES 623 Medical Imaging Systems III 4.0 Credits**

Introduces elements of wave imaging, including wave propagation, Fourier optics and acoustics, limitations on resolution, ultrasound transducer characterization, and synthetic aperture systems. Examines MRI imaging in detail, including physical principles and scanning methodologies. Includes aspects of the psychophysics of human vision.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 622 [Min Grade: C]

**BMES 624 Principles of Neuroimaging 3.0 Credits**

This course introduces types and categories of neuroimaging methods that can measure brain anatomy as well as brain activity including MRI, PET, CT, SPECT, EEG and NIRS. For each modality, basic principles, technical foundations of its operation, neural signals, visualization and analysis of multidimensional data, relevant standards will be provided as well as an overview of the clinical and translational applications.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 631 Tissue Engineering I 4.0 Credits**

This course is designed to familiarize students with advanced concepts of cellular and molecular biology relevant to tissue engineering. This is the initial course in a three-course sequence combining materials from life science, engineering design and biomaterials to educate students in the principles, methods and technology of tissue engineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 502 [Min Grade: B]

**BMES 632 Tissue Engineering II 4.0 Credits**

This course familiarizes students with advanced concepts of developmental and evolutionary biology relevant to tissue engineering. The second part of a three-course sequence combines materials from cellular/molecular biology, evolutionary design, and biomaterials to education students in the principles and methods of tissue engineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 631 [Min Grade: B]

**BMES 641 Biomedical Mechanics I 4.0 Credits**

Designed to acquaint students with the response of biological tissues to mechanical loads and with the mechanical properties of living systems. Covers topics in musculoskeletal anatomy and functional mechanics; a review of mechanical principles, statics, dynamics, and materials; soft and hard tissue mechanics; mechano-pathological conditions in biological tissues and their correction; and prosthetics.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 642 Biomedical Mechanics II 4.0 Credits**

Continues BMES 641.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 643 Biomedical Mechanics III 4.0 Credits**

Continues BMES 642.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 644 Cellular Biomechanics 3.0 Credits**

This course of cellular bioengineering focuses on mechanics and transport. Material builds upon undergraduate engineering education to place engineering mechanics into the context of biological function at the cellular level.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 651 Transport Phenomena in Living Systems I 3.0 Credits**

Covers physical principles of momentum, energy, and mass transport phenomena in blood and other biological fluids; diffusion and convection at the microcirculatory level; physiology of arteries and veins; and local and systemic blood flow regulation and vascular disease.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 660 Biomaterials I 4.0 Credits**

First course in a three-quarter sequence designed to acquaint students with the behavior of materials used in biomedical application under load (i.e., mechanical properties), their modes of failure and as a function of their environment. This course provides students with the fundamentals needed to proceed with Biomaterials II.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 661 Biomaterials II 4.0 Credits**

Second course in a three-quarter sequence in biomaterials. The goal of this course is with an understanding of, and ability to select, appropriate materials for specific applications taking into account mechanical, thermal, and rheological properties taught in Biomaterials I and combining them with the biocompatibility issues covered in the present course.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

**BMES 672 Biosimulation I 3.0 Credits**

This course focuses upon the mathematical analysis of biomedical engineering systems. As the first course in the biosimulation sequence, the course is a blend of analytical and numerical methods with strong emphasis on analytical approaches. The class concentrates on the application of mathematical concepts to biomedical problems drawn from physiological systems, cellular and molecular systems, bioimaging and biomedical device design.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 673 Biosimulation II 3.0 Credits**

The second in a two-course sequence, this course focuses upon the mathematical modeling and subsequent computational analysis of complex biological systems. Specific examples are drawn physiological systems, cellular and molecular systems, bioimaging and biomedical device design and analysis. Topics covered include: modeling of complex bioengineering systems; parameter estimation and optimization of such models; and application of probability and statistical approaches as required.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 672 [Min Grade: C]

**BMES 675 Biomaterials and Tissue Engineering III 4.0 Credits**

This course provides students with in-depth knowledge of factor-mediated tissue engineering and regenerative medicine. Students learn about fundamental repair and regenerative processes and gain an understanding of specific biomaterials being used to mimic and/or enhance such processes. Students also learn about the delivery methods of agents which promote the proper functional development of specialized tissues.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 660 [Min Grade: C-] and BMES 661 [Min Grade: C-] and BMES 631 [Min Grade: C-] and BMES 632 [Min Grade: C-]

**BMES 677 Mathematical Modeling of Cellular Behavior 3.0 Credits**

This course focuses upon the mathematical analysis of cellular processes. Topics include reaction kinetics, enzyme kinetics, receptor-ligand binding and trafficking dynamics, cell signaling processes, cell migration and cytoskeletal dynamics, and cell-scale transport phenomena.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 678 Biocomputational Modeling and Simulation 3.0 Credits**

This course focuses on computational methods used to simulate and analyze dynamical systems in biological systems. Solutions of ordinary differential equations using both symbolic and numerical methods and parameter estimation from experimental data are discussed. 3D modeling and simulation are introduced. Graphical tools to design and simulate models are demonstrated.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 546 [Min Grade: B] or BMES 550 [Min Grade: B]

**BMES 685 Experimental Methods in Neuroengineering 2.0 Credits**

This course explores an exciting field of neuroengineering, brain computer interfaces (BCI), in a hands-on laboratory setting. The course addresses both the human and computational elements of the technology emphasizing an engineering perspective while utilizing and modifying common paradigms in electroencephalogram (EEG)-based BCIs such as motor imagery and the P300 speller. Students are expected to understand the EEG signal and develop good recording techniques to assess and modify data collection and processing in real time. This course will also discuss how the techniques and algorithms addressed in this class translate to other modalities such as fNIR as well as more invasive systems. This course includes a lecture and laboratory component.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 710 Neural Signals 3.0 Credits**

This course covers aspects of neural signaling, including fundamentals of action potential generation, generator potentials, synaptic potentials, and second messenger signals. Students learn Hodgkin-Huxley descriptions, equivalent circuit representations and be able to derive and integrate descriptive equations and generate computer simulations.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 711 Principles in Neuroengineering 3.0 Credits**

This course is an in-depth student of some of the cutting-edge technologies in neuroengineering. The course draws on faculty in the College of Medicine and School of Biomedical Engineering, Science and Health Systems to present and investigate three topics in neuroengineering.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 710 [Min Grade: B]

**BMES 715 Systems Neuroscience and Applications I 3.0 Credits**

This course will introduce you to the neuronal and circuit basis underlying sensory processing and perception, to neurological disorders that are result of incorrect neuronal processing, and to the application of these circuits to devices around us. Emphasis will be placed on cutting-edge techniques: Computational, experimental and therapeutic techniques will be covered.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BMES 710 [Min Grade: C]

**BMES 718 Brain Computer Interfaces 3.0 Credits**

Brain Computer Interface (BCI) is defined as a combination of hardware and software systems that allows capturing brain activities to control or interact with external devices such as computers and robots. This course will familiarize students with principles and main methods in the emerging and rapidly growing field of BCI technologies. The goal of this course is to provide an introduction to the state-of-the-art brain computer interface technologies, current approaches, limitations, potentials and various types of applications.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 722 Neural Aspects of Posture and Locomotion I 3.0 Credits**

Studies physiology of sensory/motor systems, with emphasis on modeling of neural systems and biomechanical aspects of functional tasks. Begins with an analysis of the transportation of materials in and out of cells, followed by an examination of the origin and maintenance of membrane potentials. Discusses intra-and extracellular and surface measurement of potentials, generation and transmission of action potentials, synaptic processes, and the structure/function of muscle. Combines these elements to study reflex systems as well as vestibular and ocular effects on posture. Culminates in the study of the control of motor systems with respect to bipedal locomotion.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 725 Neural Networks 3.0 Credits**

Explores the mathematical and biological bases for neurocomputing. Involves construction by students of computer simulations of important models and learning algorithms. Discusses applications to pattern recognition, vision, speech, control, and psychological modeling.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 821 Medical Instrumentation 3.0 Credits**

Provides a broad overview of the applications of health care technology in diagnosis and therapy. Reflects the persuasiveness of biomedical engineering in medicine by describing medical instrumentation and engineering technology used in most of the main areas of specialization in medicine.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 822 Medical Instrumentation II 3.0 Credits**

The objective of this course is to prepare the student for following an industry-accepted standard for designing a medical device. Students will work in teams to identify and design a response to medical need. The resulting design will either address an unmet medical need or present an improved approach to an existing solution. After identifying a particular project, the students will learn and implement particular processes for both design and documentation.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 825 Hospital Administration 3.0 Credits**

Provides an analysis of the administrative process, including planning, organization, design, decision-making, leadership, and control. Presents methodologies and techniques that can contribute to the effective performance of administrative responsibilities examined in the light of significant and unique factors in hospital health care administration.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 864 Seminar 0.0 Credits**

An invitation seminar for discussion of research topics in biomedical engineering and science.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated 2 times for 0 credits

**BMES 870 Graduate Research Talks 1.0 Credit**

This course provides a structured forum for graduate students to present their ongoing research and provide feedback and critiques to their peers.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated 8 times for 9 credits

**BMES 897 Research 1.0-12.0 Credit**

Requires investigation of a biomedical problem under the direction of a faculty adviser.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES 898 Master's Thesis 0.5-20.0 Credits**

Requires the study and investigation of a research or development problem. Requires results to be reported in a thesis under the direction of a faculty adviser. No credit granted until the thesis is completed and approved.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Not repeatable for credit

**BMES 998 Ph.D. Dissertation 1.0-12.0 Credit**

Requires the study and investigation of a research or development problem. Requires results to be reported in a dissertation under the direction of a faculty adviser. No credit granted until the dissertation is completed and approved.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES I599 Independent Study in BMES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES I699 Independent Study in BMES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES I799 Independent Study in BMES 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES I899 Independent Study in BMES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES I999 Independent Study in BMES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES T580 Special Topics in BMES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES T680 Special Topics in BMES 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES T780 Special Topics in BMES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES T880 Special Topics in BMES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit

**BMES T980 Special Topics in BMES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Biomedical Engineering, Science Health Systems

**Repeat Status:** Can be repeated multiple times for credit



# Bioscience & Biotechnology

## Courses

### BIO 500 Biochemistry I 3.0 Credits

Covers the fundamentals underlying the energetics and kinetics of macromolecular interactions of enzymes, membranes and nucleic acids in living systems.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 501 Biochemistry Laboratory I 2.0 Credits

Accompanies BIO 500.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C], BMES 501 [Min Grade: C] (Can be taken Concurrently)

### BIO 530 Microbial Genetics 5.0 Credits

Covers genetic organization and regulation in viruses (primarily bacteriophages), bacteria, fungi, and algae; techniques of genetic manipulation of microbial genomes; genetic interactions of microbes under natural conditions; and the use of microbial modification in industrial processes.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

### BIO 534 Bioinformatics I 3.0 Credits

This course uses a combination of lecture and hands-on exercises to develop computational, algorithmic, and database navigation skills used in the analysis of genes and genomes. Topics include genomic databases, genome assembly and annotation, sequence alignment, phylogenetics, and comparative genomics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 535 Bioinformatics II 3.0 Credits

This course uses a combination of lecture and hands-on exercises to develop programming and software skills used in the study of functional genomics. Topics include genetics, transcriptomics, proteomics, and metabolomics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 548 Neuroscience: From Cells to Circuits 3.0 Credits

This course provides an introduction to the biological basis of human and animal behavior. This course will emphasize fundamental aspects of neuroscience including how individual neurons respond to stimuli, how these neurons connect to form circuits during development, and how ensembles of neurons work together to mediate simple tasks.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 549 Behavioral Neuroscience 3.0 Credits

This course provides an introduction to the biological basis of human and animal behavior. This course will emphasize fundamental aspects of neuroscience with a focus on the principles of how circuits function in the nervous system. Topics covered will include how neural circuits mediate sensory perception, drive behavioral output, and generate thoughts and emotions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 610 Biochemistry of Metabolism 3.0 Credits

Covers how enzymes function and form metabolic pathways, how the pathways fit into cell physiology, and how these pathways are regulated. Overall considers how organisms digest nutrients and utilize them to support life. The terminology and technology commonly employed in contemporary biochemistry laboratories are emphasized.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

### BIO 613 Genomics 3.0 Credits

This course aims to elucidate current technologies, theory, and applications of genomic research. Though a large emphasis will be placed on the use of genomic tools to study human health, we will also study the genomes, transcriptomes, and proteomes of bacteria, fungi, plants, and other animals.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 614 Behavioral Genetics 3.0 Credits

This course explores the role of genetics in determining variation in animal (including human) behavior, and the role of gene expression in regulating behavioral development. The course surveys techniques for quantifying and analyzing genetic variation, behavioral effects, and gene expression.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### BIO 615 Proteins 3.0 Credits

Discusses protein structure, function, and isolation. Emphasizes biochemical, biophysical, and molecular biological techniques.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

### BIO 616 Biochemistry of Major Diseases 3.0 Credits

This course focuses on the biochemical bases of several selected human disorders including neoplasm, cardiovascular disorders, diabetes and obesity. Biochemical changes and their regulation by signaling pathways under the disease conditions will be examined. The relevance of diagnosis and treatment will be discussed.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 620 Biomembranes 3.0 Credits**

Covers biochemical properties of membranes and membrane components, including phase properties, structure, organization, permeability, transport, and biosynthesis of membrane components.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 626 Immunology 3.0 Credits**

Covers the fundamental concepts of innate and adaptive immunity, including the molecular and cellular mechanisms that generate responses to a broad spectrum of infectious threats, self/non-self recognition, immune regulation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 630 Cell Biology of Disease 3.0 Credits**

An introduction to the pathobiology of human disease as it relates to principles of cytoskeleton and membrane biology. The course reviews basic intracellular mechanisms and examines how they go awry in respiratory, heart and kidney diseases, diabetes, cancer, neurodegeneration and during viral and microbial infections.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 632 Advanced Cell Biology 3.0 Credits**

Advanced Cell Biology is an up-to-date examination of the basic components and processes of the eukaryotic cell with the goal of understanding how these processes are integrated to drive complex cell behavior. Specifically, the course focuses on the molecular principles, modules and functions that sustain cell motility by integrating the essential concepts presented in class, including energy production, intracellular signaling, vesicular trafficking, and cell adhesion. Students will present cutting edge research publications and ideas spanning cell biology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 633 Bioinformatics I Laboratory 2.0 Credits**

In this course, students develop and apply computational skills in bioinformatics to address a quarter-long research project. Topics generally focus on the ecology and evolution of microbes, which have become much easier to study thanks to the advent of molecular tools and software for the analysis of DNA sequences.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 631 [Min Grade: C] (Can be taken Concurrently)

**BIO 635 Advanced Genetics and Molecular Biology 3.0 Credits**

Covers classical prokaryotic and eukaryotic genetics; DNA/RNA structure; DNA replication, transcription, translation and their regulation; major molecular techniques used in the analysis of genes and genomes. Includes readings from primary literature, covering recent advances and classical experiments in genetics, genomics and molecular biology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 636 Population Genetics 4.0 Credits**

This course surveys population genetics theory as applied to studies of micro-evolutionary changes. We will examine the forces of evolution—mutation, selection, inbreeding, gene flow, genetic drift—and how they can (and cannot) change allele frequencies in populations over time. We will apply the theory that you have learned by also examining current primary literature on human evolutionary history, population genetics and patterns of adaptation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 644 Human Genetics 3.0 Credits**

Covers the fundamentals and principles of genetics with an emphasis on their relevance to human genetics and disease. Topics include human genetic disorders, pedigree analysis and genetic testing, cytogenetics, epigenetics of cancer, gene therapy, stem cell research and human genomics and biotechnology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 646 Stem Cell Research 3.0 Credits**

This course will focus on recent and important topics relevant to stem cell research and development. Topics will include nuclear reprogramming and epigenetics, environmental influences on stem cell differentiation, stem cells and cancer, stem-cell-based therapies for heart and neurodegenerative disorders, stem cells and ageing, and politics of stem cell research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 650 Virology 3.0 Credits**

Discusses major viral groups, including biochemistry and molecular genetics of viral replication, structure, gene expression, latency, and role in disease.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 653 Protein Dysfunction in Disease 3.0 Credits**

Proteins are essential for the function and health of the cell. Misfolded and damaged proteins are at the root of numerous human diseases, known collectively as conformational diseases. In this course we will examine cellular mechanisms involved in biosynthesis, folding and maintenance of proteins, and discuss how the failure of these mechanisms contributes to disease.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 660 Microbial Physiology 3.0 Credits**

Covers the physiology and metabolism of microorganisms. Emphasizes aspects unique to prokaryotes, including envelope structure, chemotaxis, transport systems, modes of nutrition, biosynthesis, growth, and mechanisms of action of antibiotics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 661 Neurobiology of Autism Disorders 3.0 Credits**

Autism disorders arise from changes in neurodevelopment that deeply affect how individuals interact with the world around them. As study of autism has increased over the past several decades, it has become clear that autism actually comprises a large, heterogeneous set of similar disorders, most of which are genetic in origin. In this class, we will study how neuronal cell biology is disrupted in known forms of autism, and how distinct forms of autism can arise from alterations in common cellular pathways. Further, we will discuss how these discoveries may lead to eventual treatments or cures. Classes will include both lectures and discussion of recent papers from the scientific literature.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 662 Biology of Neuron Function 3.0 Credits**

Covers molecular and cellular mechanisms underlying neuron function. Topics include: molecular and cellular biology of neurons and neural development; molecular biology and physiology of sensory and motor neurons; molecular biology of muscle function; molecular and cellular basis of learning and memory in model organisms.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 663 Molecular Mechanisms of Neurodegeneration 3.0 Credits**

This is an advanced course on the current, primary literature in the area of neurodegeneration. Students are expected to be conversant in areas of Genetics, Cell Biology, Molecular Biology, Biochemistry, and Neurobiology. This is a discussion course based on reading current manuscripts from the primary literature.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 532 [Min Grade: C] or BIO 632 [Min Grade: C]

**BIO 664 Neurobiology of Disease 3.0 Credits**

The objective of the course is to provide a basic understanding of molecular and cellular biology of disorders of the human nervous system. Advances developed from experimental models that have armed clinicians and basic scientists with new tools for diagnosis and treatment of disease and injury will be presented.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 670 Medical Microbiology 3.0 Credits**

Covers infectious diseases in humans, including mechanisms of pathogenicity, techniques of diagnosis, modes of transmission, and methods of treatment.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 675 Advanced Immunology 3.0 Credits**

Covers failure in host defense, immunotherapies, clinical concepts in immunology, and emerging concepts in immunology research. Material is presented in a combination of a Lecture and Journal club format with a focus on class participation, presentation and discussion.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 526 [Min Grade: C] or BIO 626 [Min Grade: C]

**BIO 679 Issues in Scientific Research 3.0 Credits**

The course will cover topics related to the appropriate and correct conduct of personnel in a research setting. Issues will be discussed dealing with choosing a research mentor, how to record data, authorship and publication, and the correct and ethical treatment of animal and human subjects.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BIO 500 [Min Grade: C]

**BIO 701 Bioscience Grant Writing 3.0 Credits**

This writing-intensive course provides the fundamentals to write effective research grant proposals for graduate students with research thesis projects in life and environmental sciences. The course focuses on grantsmanship skills and mechanics, and trains students in articulating well-reasoned hypotheses and clear rationales, as well as organizing and discussing experimental approaches, caveats, outcomes and interpretations. Through peer-partner work, mock review panels and instructor feedback, the course instills the criteria of grant peer review and fosters the critical self-awareness that is necessary for successful grant applications. The course will equip students with skills for competitive fellowship applications, and careers that involve research project design and presentation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 740 Readings and Critical Thinking in Biology 3.0 Credits**

A course for first year graduate students emphasizing communication skill sets necessary to excel in Biology and related Graduate Programs. Students will become skilled in critically reading and presenting primary literature, presenting their own research to a scientific audience and generating proposals for interdisciplinary studies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 864 Graduate Research Seminar 1.5 Credit**

This research seminar is a forum for Biology PhD students to present on their research to faculty and graduate student peers. Discussion of the scientific content as well as feedback on presentation style and quality follows every presentation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is BIO or major is ENVS and program is MS or MSES or PHD.

**BIO 898 Master's Thesis 0.5-20.0 Credits**

Master's thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**BIO 997 Research in Bioscience 0.5-20.0 Credits**

Research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO I599 Independent Study in BIO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO I699 Independent Study in BIO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO I799 Independent Study in BIO 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO I899 Independent Study in BIO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO I999 Independent Study in BIO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO T580 Special Topics in Bioscience & Biotechnology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO T680 Special Topics in Bioscience & Biotechnology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO T780 Special Topics in Bioscience & Biotechnology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO T880 Special Topics in Bioscience & Biotechnology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**BIO T980 Special Topics in Bioscience & Biotechnology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

# Biostatistics

## Courses

**BST 551 Statistical Inference I 3.0 Credits**

The objective of this course is to introduce students to the fundamental concepts and methods of statistical inference. Topics include: point and interval estimation, methods of moments, maximum likelihood estimation, Bayes estimates, hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests and large sample approximation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 569 [Min Grade: B]

**BST 553 Longitudinal Data Analysis 3.0 Credits**

Longitudinal data measure characteristics on the experimental units repeatedly over time. It is an essential design to study temporal change and to establish causal relationships. The analysis of longitudinal data requires sophisticated methodologies due to the correlation introduced by repeated measurements. This course covers modern statistical techniques for longitudinal data from an applied perspective.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 560 [Min Grade: B] or (BST 570 [Min Grade: B] or BST 870 [Min Grade: B])

**BST 555 Introduction to Statistical Computing 3.0 Credits**

Research projects often involve the management and manipulation of complicated sets of data. This course is designed to introduce the student to practical issues in the management and analysis of health and pharmaceutical data using the SAS programming language. Data from a variety of public health and biomedical applications will be used throughout the course to illustrate the principles of data management and analysis for addressing biomedical and health-related hypotheses.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**BST 557 Survival Data Analysis 3.0 Credits**

This course covers the basic techniques of survival analysis. These approaches are useful in analyzing cohort data, which are common in health studies, when the main interest outcome is the onset of event and time to event is known. The response is often referred to as failure time, survival time, or event time, and this course will introduce students to methods necessary for analyzing this type of data.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 560 [Min Grade: B] or (BST 569 [Min Grade: B] or BST 869 [Min Grade: B])

**BST 558 Applied Multivariate Analysis 3.0 Credits**

This course introduces students to statistical methods for describing and analyzing multivariate data. Topics to be covered include basic matrix algebra, multivariate normal distribution; linear models with multivariate response, multivariate analysis of variance; profile analysis, dimension reduction techniques, including principle component analysis, factor analysis, canonical correlation, multidimensional scaling; discriminate/cluster analysis; and classification/regression trees.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 551 [Min Grade: C] or BST 751 [Min Grade: C]



**BST 559 Intermediate SAS 3.0 Credits**

This course is designed to teach students the art of data management. The focus of the course is the application of prior coursework, specifically methodological courses in epidemiology and biostatistics, to issues in data management and analysis. Issues in data management are typically specific to study design and analysis and, as such, methods to handle data will focus on the many ways variables may be operationalized to answer research questions. The course will cover a number of topics and aims to provide a language of data that will allow the students who complete the course to tackle any methodological data issue they may encounter in the future.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 555 [Min Grade: B]

**BST 560 Intermediate Biostatistics I 3.0 Credits**

This course is an overview of statistical models and analysis tools commonly used in epidemiological and public health studies. Topics include simple and multiple linear regression, diagnostics, model-building and remedial measures for regression models, analysis of variance, logistic and conditional logistic regression, and models for multi-category outcome data. Statistical software SAS will be an integral part of the course. Familiarity with SAS (or other statistical software) is expected.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 571 [Min Grade: B] and BST 555 [Min Grade: B]

**BST 561 Design & Analysis of Clinical Trials 3.0 Credits**

In this course, we will introduce the process of performing a clinical trial, including introducing the different phases of study, the approaches to data management for trials, interim analyses and adaptive clinical trials, sample size calculations for clinical trials, and issues of safety in trials. Students will have the opportunity to learn the process of designing, implementing, running and analyzing a clinical trial using real examples.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and (BST 571 [Min Grade: B] or BST 555 [Min Grade: C])

**BST 567 Statistical Collaboration 3.0 Credits**

This course introduces students to the fundamental aspects of statistical consulting and provides training on being an effective statistical consultant and collaborator. This course will provide strategies to help students translate their technical training and knowledge to the 'statistical expert' role often required/assumed in collaborative settings. Topics for the course will include, but are not limited to: understanding roles and responsibilities of biostatisticians in collaboration with scientists, practicing oral and written communication skills, understanding sample size and power calculations research, exploring how study design informs the statistical analytic plan, and developing strategies for helping researchers formulate scientific questions into quantifiable measures.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 560 [Min Grade: B] or BST 570 [Min Grade: B]

**BST 568 Nonparametric and Semiparametric Models 3.0 Credits**

The objective of this course is to introduce students to the fundamental concepts and applicable techniques of non-parametric and semi-parametric models, in particular, nonlinear functional relationships in regression analyses. Topics tentatively selected include: Density estimation, smoothing, non-parametric regression, additive models, semi-parametric mixed models, and generalized additive models.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 701 [Min Grade: B-]

**BST 569 Linear Statistical Models 4.0 Credits**

The objective of this course is to introduce students to linear regression models (computation, theoretical properties, model interpretation and application). Topics include: Review of basic concepts of matrix algebra that are particularly useful in linear regression, and basic R programming features; (weighted) least square estimation, inference and testing; regression diagnostics, outlier influence; and variable selection and robust regression. Knowledge of calculus 1, calculus 2, and linear algebra required.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is BIOS.

**BST 570 Generalized Linear Models 4.0 Credits**

The objective of this course is to introduce students to generalized linear regression models (theoretical properties, model interpretation and application). Topics include: 1) Review of categorical data and related sampling distributions; 2) Two/Three-way contingency tables; 3) logistic regression and Poisson regression; 4) loglinear models for contingency tables; 5) generalized linear mixed models for categorical responses; 6) principles of MLE in generalized linear model.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 569 [Min Grade: B]

**BST 571 Introduction to Biostatistics 3.0 Credits**

Introduction to Biostatistics provides students with an understanding of the methods of biostatistics, applicable to epidemiological and clinical studies. It emphasizes concepts and application of statistical and epidemiological thinking. Basic statistical theory, parametric statistics, correlation, regression, ANOVA, non-parametric statistics, and methods in discrete statistical analysis, along with other quantitative methods including screening tests, will be introduced. This course will emphasize hands-on experience in statistical analysis and interpretation of data from epidemiological studies.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**BST 604 Applied Bayesian Analysis 3.0 Credits**

The course provides a practical introduction to Bayesian statistical inference, which is now at the core of many advanced methods. The course will compare traditional frequentist estimation, which relies on maximization methods, to Bayesian estimation of the posterior distribution. Students will learn numerical integration methods, such as Markov chain Monte Carlo, to obtain these various distributions and ultimately make inference in a Bayesian framework. The course will also use the freely available statistical software packages, R (<http://cran.r-project.org/>) and WinBUGS (<https://www.mrc-bsu.cam.ac.uk/software/bugs/the-bugs-project-winbugs/>).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 569 [Min Grade: B] and MATH 510 [Min Grade: B]

**BST 620 Intermediate Biostatistics II 3.0 Credits**

The course builds on material from Intermediate Biostatistics I, introducing additional core biostatistical methods such as Poisson and negative binomial regression, random and mixed effects models, survival analysis techniques, and nonparametric methods. We will focus on exploratory data analysis, model building, model checking, and diagnostics, developing a flexible, critical approach to statistical data analysis.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 560 [Min Grade: B]

**BST 622 Advanced Clinical Trials 3.0 Credits**

This course builds on the knowledge gained in BST 561, in order to develop a more thorough understanding of the basic methodology behind important statistical concepts used in the design and analysis of large, randomized clinical trials. The class will involve discussions of publications dealing with current topics of interest in clinical trials. Each student will also be asked to conduct, summarize, and present a course project based on a more in-depth exploration of one of the topics BST 561.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (BST 651 [Min Grade: C] or BST 851 [Min Grade: C]) and BST 561 [Min Grade: C]

**BST 624 Advanced Bayesian Analysis 3.0 Credits**

The course provides an overview of the underlying theory of and some advanced applications of Bayesian statistical inference. In particular, the course will cover topics such as Bayesian model selection while emphasizing modern computing techniques. The course will use the freely available statistical software package, R (<http://cran.r-project.org/>).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (BST 551 [Min Grade: C] or BST 751 [Min Grade: C]) and (BST 651 [Min Grade: C] or BST 851 [Min Grade: C]) and (BST 604 [Min Grade: C] or BST 804 [Min Grade: C]) and BST 701 [Min Grade: C]

**BST 651 Statistical Inference II 4.0 Credits**

This course is a continuation of Biostatistics Theory I. The objective of this course is to introduce students to the fundamental concepts and methods of statistical inference. Topics include: point and interval estimation, methods of moments, maximum likelihood estimation, Bayes estimates, hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests and large sample approximation; Bayesian analysis.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 551 [Min Grade: C]

**BST 675 Statistical Collaboration Lab 3.0 Credits**

This course prepares students to collaborate as biostatisticians for public health and biomedical projects with non-statisticians. Students will learn the practical aspects of statistical collaboration through various hands-on experiences that facilitate student's understanding of the roles and responsibilities of biostatisticians in the context of collaborating with interdisciplinary scientists. Students will engage in stages of proposal development by refining quantitative aims for a grant proposal, developing the data management and analysis plans, and conducting the power analysis. They will also develop a scope of work and billing for the biostatistician's participation if/once the grant is funded. Students will be exposed to IRB, data use agreements, human protection training, and data privacy.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is BIOS or major is EPID.

**Prerequisites:** BST 555 [Min Grade: C] or BST 701 [Min Grade: C] or EPI 564 [Min Grade: C]

**Corequisite:** BST 567

**BST 698 Statistical Collaboration in Practice 3.0 Credits**

This course builds on the skillset and knowledge presented in BST 567/867 and BST 675/875 by creating an experience(s) that nurture critical thinking and interpersonal skills combined with understanding interdisciplinary content and applying statistical knowledge to excel as a biostatistician collaborator. Students will become members of the Biostatistics Scientific Collaboration Center (BSC) and work in close collaboration with BSC personnel and a non-statistician investigator. True to real-life experiences in interdisciplinary collaboration, types of student experiences (e.g. power analysis, development of analysis plan, execute analysis plan) will vary depending on the BSC deliverables for each investigator's project.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** BST 675 [Min Grade: CR]

**BST 699 Data Analysis Project 1.0-9.0 Credit**

Provides the student with experience completing a substantive data analysis in either an academic or applied setting. The project will be performed over a full term under the supervision of the advisor. Projects based in settings outside the Department are jointly-supervised by the advisor and a doctorally prepared host organization researcher.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**BST 701 Advanced Statistical Computing 3.0 Credits**

This course expands on computational methods used in biostatistics. It covers numerical techniques, programming, and simulations and will connect these to fundamental concepts in probability and statistics. The course will use the statistical software, R, to apply these concepts and enable the practical application of biostatistical models to real-world problems.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 551 [Min Grade: B] or BST 751 [Min Grade: B]

**BST 751 Statistical Inference I 3.0 Credits**

The objective of this course is to introduce students to the fundamental concepts and methods of statistical inference. Topics include: point and interval estimation, methods of moments, maximum likelihood estimation, Bayes estimates, hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests and large sample approximation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is PHD.

**BST 804 Applied Bayesian Analysis 3.0 Credits**

The course provides a practical introduction to Bayesian statistical inference, which is now at the core of many advanced methods. The course will compare traditional frequentist estimation, which relies on maximization methods, to Bayesian estimation of the posterior distribution. Students will learn numerical integration methods, such as Markov chain Monte Carlo, to obtain these various distributions and ultimately make inference in a Bayesian framework. The course will also use the freely available statistical software packages, R (<http://cran.r-project.org/>) and WinBUGS (<https://www.mrc-bsu.cam.ac.uk/software/bugs/the-bugs-project-winbugs/>).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (BST 569 [Min Grade: B] or BST 869 [Min Grade: B]) and MATH 510 [Min Grade: B]

**BST 819 Statistical Machine Learning for Biostatistics 3.0 Credits**

This course is a survey of statistical learning methods and will cover major techniques and concepts for both supervised and unsupervised learning. Topics include penalized regression and classification, support vector machines, kernel methods, model selection, clustering, boosting, CART and random forests, and ensemble learning. Students will learn how and when to apply statistical learning techniques, their comparative strengths and weaknesses, how to critically evaluate the performance of learning algorithms, and principles for appropriate application to health science problems. The statistical programming language R will be used throughout.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 701 [Min Grade: C]

**BST 820 Intermediate Biostatistics II 3.0 Credits**

The course builds on material from Intermediate Biostatistics I, introducing additional core biostatistical methods such as Poisson and negative binomial regression, random and mixed effects models, survival analysis techniques, and nonparametric methods. We will focus on exploratory data analysis, model building, model checking, and diagnostics, developing a flexible, critical approach to statistical data analysis.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 560 [Min Grade: B]

**BST 823 Theory of Generalized Linear and Mixed Models 3.0 Credits**

This course is an advanced doctoral course, intended to familiarize students with both the theory and applications of the generalized linear and mixed models. The first third of the course will be devoted to the study of the generalized linear model. The remainder of the course will be devoted to the study of models for correlated data; in particular, we will discuss the theory and applications of the linear mixed model. If time permits, generalized estimating equations (GEEs) and generalized linear mixed models (GLMM) will be introduced.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 651 [Min Grade: C], BST 851 [Min Grade: C] (Can be taken Concurrently) and (BST 570 [Min Grade: C] or BST 870 [Min Grade: C])

**BST 825 Probability Models and Stochastic Processes 3.0 Credits**

This course introduces basic concepts of stochastic processes. The focus of the course is on the principal stochastic or random processes most commonly used in applications as mathematical models of random phenomena that evolve over time. Topics tentatively selected include: Review of conditional probability, conditional expectation, and generating functions; Markov chains in discrete time; Poisson processes; renewal processes; Markov chains in continuous time; Brownian motion and Gaussian processes. These types of processes are fundamental to modeling time-dependent random phenomena in many areas of medical and health sciences. The emphasis will be on developing a sound understanding of the material, and many of the examples of the methods will be in the area of public health and bioinformatics.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 551 [Min Grade: C] or BST 751 [Min Grade: C]

**BST 826 Research Skills in Biostatistics I 1.0 Credit**

This course introduces doctoral students in Biostatistics to research skills necessary for writing and defending a dissertation, and more generally, for a career in research. The format and topics will vary from week-to-week. Students will be given assignments to reinforce skills presented in the class.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**BST 827 Research Skills in Biostatistics II 1.0 Credit**

This course introduces doctoral students in Biostatistics to research skills necessary for writing and defending a dissertation, and more generally, for a career in research. The format and topics will vary from week-to-week. Students will be given assignments to reinforce skills presented in the class.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 826 [Min Grade: CR]

**BST 828 Research Skills in Biostatistics III 1.0 Credit**

This course introduces doctoral students in Biostatistics to research skills necessary for writing and defending a dissertation, and more generally, for a career in research. The format and topics will vary from week-to-week. Students will be given assignments to reinforce skills presented in the class.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 827 [Min Grade: CR]

**BST 851 Statistical Inference II 4.0 Credits**

This course is a continuation of Biostatistics Theory I. The objective of this course is to introduce students to the fundamental concepts and methods of statistical inference. Topics include: point and interval estimation, methods of moments, maximum likelihood estimation, Bayes estimates, hypothesis testing, Neyman-Pearson lemma, likelihood ratio tests and large sample approximation; Bayesian analysis.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 551 [Min Grade: C] or BST 751 [Min Grade: C]

**BST 867 Statistical Collaboration 3.0 Credits**

This course introduces students to the fundamental aspects of statistical consulting and provides training on being an effective statistical consultant and collaborator. This course will provide strategies to help students translate their technical training and knowledge to the 'statistical expert' role often required/assumed in collaborative settings. Topics for the course will include, but are not limited to: understanding roles and responsibilities of biostatisticians in collaboration with scientists, practicing oral and written communication skills, understanding sample size and power calculations research, exploring how study design informs the statistical analytic plan, and developing strategies for helping researchers formulate scientific questions into quantifiable measures.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 701 [Min Grade: B-]

**BST 869 Linear Statistical Models 4.0 Credits**

The objective of this course is to introduce students to linear regression models (computation, theoretical properties, model interpretation and application). Topics include: Review of basic concepts of matrix algebra that are particularly useful in linear regression, and basic R programming features; (weighted) least square estimation, inference and testing; regression diagnostics, outlier influence; and variable selection and robust regression. Knowledge of calculus 1, calculus 2, and linear algebra required.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is BIOS.

**BST 870 Generalized Linear Models 4.0 Credits**

The objective of this course is to introduce students to generalized linear regression models (theoretical properties, model interpretation and application). Topics include: 1) Review of categorical data and related sampling distributions; 2) Two/Three-way contingency tables; 3) logistic regression and Poisson regression; 4) loglinear models for contingency tables; 5) generalized linear mixed models for categorical responses; 6) principles of MLE in generalized linear model.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 869 [Min Grade: B]

**BST 875 Statistical Collaboration Lab 3.0 Credits**

This course prepares students to collaborate as biostatisticians for public health and biomedical projects with non-statisticians. Students will learn the practical aspects of statistical collaboration through various hands-on experiences that facilitate student's understanding of the roles and responsibilities of biostatisticians in the context of collaborating with interdisciplinary scientists. Students will engage in stages of proposal development by refining quantitative aims for a grant proposal, developing the data management and analysis plans, and conducting the power analysis. They will also develop a scope of work and billing for the biostatistician's participation if/once the grant is funded. Students will be exposed to IRB, data use agreements, human protection training, and data privacy.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is BIOS or major is EPID and classification is PhD.

**Prerequisites:** BST 867 [Min Grade: B] (Can be taken Concurrently)

**BST 898 Statistical Collaboration in Practice 3.0 Credits**

This course builds on the skillset and knowledge presented in BST 567/867 and BST 675/875 by creating an experience(s) that nurture critical thinking and interpersonal skills combined with understanding interdisciplinary content and applying statistical knowledge to excel as a biostatistician collaborator. Students will become members of the Biostatistics Scientific Collaboration Center (BSC) and work in close collaboration with BSC personnel and a non-statistician investigator. True to real-life experiences in interdisciplinary collaboration, types of student experiences (e.g. power analysis, development of analysis plan, execute analysis plan) will vary depending on the BSC deliverables for each investigator's project.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** BST 875 [Min Grade: CR]

**BST 999 Biostatistics Thesis Research 1.0-9.0 Credit**

Directed guidance of dissertation research, preparation for presenting dissertation research to colleagues at the dissertation seminar and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**BST T580 Special Topics in Biostatistics 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit



**BST T680 Special Topics in Biostatistics 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**BST T780 Special Topics in Biostatistics 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**BST T880 Special Topics in Biostatistics 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**BST T980 Special Topics in Biostatistics 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

## Business Analytics

### Courses

**BSAN 601 Business Analytics for Managers 3.0 Credits**

Business Analytics is an interactive process of analyzing and exploring enterprise data, in order to understand the past, make predictions about the future, and guide decision-making. In this course, students will learn how to use analytics in their decision-making. Analytics through the methodology of problem framing, model building, analysis, and communicating insights is explored.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BSAN 615 Data Visualization & Analytics 3.0 Credits**

Graphical methods enable data and information to be presented in an easily consumable, insightful, and actionable manner. Descriptive, diagnostic, predictive, and prescriptive analytics all benefit from data visualization, through the use of infographics, interactive visualizations, dashboards, and more recently, augmented analytics. This course will focus on three main facets of data visualization: strategy and implementation, Interpretation and insights, and communication and storytelling.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 610 [Min Grade: C]

**BSAN 710 Business Analytics Capstone Project 3.0 Credits**

Contemporary business is embedded in a data-driven economy. Large datasets must be analyzed to understand the financial, economic, technological, societal, social, and environmental impacts of products, services, and policies. In this course, students execute a data-driven project in order to demonstrate their ability to meet this challenge. Projects draw on multiple quantitative skills: data management, mathematical modeling, and statistical analysis to support decision-making processes. Emphasis is also placed on ability to develop business insights from data and present findings to decision makers.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MIS 612 [Min Grade: C] and MIS 632 [Min Grade: C] and OPR 601 [Min Grade: C] and STAT 642 [Min Grade: C] and STAT 645 [Min Grade: C]

## Business Statistics

### Courses

**STAT 510 Introduction to Statistics for Business Analytics 2.0**

**Credits**

This course studies the basic principles and implementation techniques of descriptive statistics, sampling, hypothesis testing, one-way ANOVA, and regression analysis. In addition, this course will emphasize how these analytical tools can be used in business decision making.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**STAT 601 Business Statistics 3.0 Credits**

This course covers the basic principles and implementation techniques of descriptive statistics, sampling, statistical inference, analysis of variance, and regression analysis. An understanding of how these tools can support managerial decision making is emphasized.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**STAT 610 Statistics for Business Analytics 3.0 Credits**

This course covers the basic principles and implementation techniques of analysis of variance, simple and multiple regression analysis. An understanding of how these tools can support business analytics is emphasized. The course covers not just methods, but theory, too.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**STAT 628 Applied Regression Analysis 3.0 Credits**

Covers techniques used in simple and multiple regression analysis, including residual analysis, assumption violations, variable selection techniques, correlated independent variables, qualitative independent and dependent variables, polynomial and non-linear regression, regression with time-series data and forecasting. Applications related to business decision-making will be emphasized.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-]

**STAT 630 Multivariate Analysis 3.0 Credits**

An introduction to multivariate statistics that focuses on the use of statistical methods for exploring and discovering information in large business datasets. Topics will be drawn from clustering and discriminate analysis for classification, principle components analysis for data exploration and variable reduction, factor analysis for indentifying latent variables, and other traditional multivariate topics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C]

**STAT 632 Datamining for Managers 3.0 Credits**

Datamining focuses on extracting knowledge from large datasets. This course introduces the student to several key datamining concepts including classification, prediction, data reduction, model comparison and data exploration. Software and datasets are employed to illustrate the concepts.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: B-] or (STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-] or ECON 540 [Min Grade: B-] or BSAN 601 [Min Grade: B-])

**STAT 634 Quality & Six-Sigma 3.0 Credits**

This course covers the current theory and practice in quality, with a focus on Six-Sigma Implementation. Topics will include the dynamic nature of quality, the roles of management in planning and guiding quality efforts, as well as the fundamentals of statistical methods for quality monitoring and improvement.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-] or ECON 540 [Min Grade: B-] or BSAN 601 [Min Grade: B-]

**STAT 636 Experimental Design 3.0 Credits**

Introduces design of experiments. Covers topics including scientific approach to experimentation, completely randomized designs, randomized complete block designs, Latin square designs, factorial designs, two-factorial designs, fractional factorials, nested and split plot designs, response surfaces designs, and Taguchi methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: B-] or STAT 610 [Min Grade: B-] or STAT 510 [Min Grade: B-]

**STAT 638 Advanced Statistical Quality Control 3.0 Credits**

Covers advanced topics in statistical process control. Covers topics including cumulative sum (CUSUM) control charts, exponentially weighted moving average (EWMA) control charts, multivariate control charts, economic design and evaluation of control charts, performance specifications, process capability and improvement, and computer applications. Usually includes several guest speakers from service and manufacturing firms.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 634 [Min Grade: C]

**STAT 642 Data Mining for Business Analytics 3.0 Credits**

This course introduces students to the methods of data mining and how to apply them to business problems. Included are logistic regression, trees, neural networks, support vector machines, and marketbasket analysis. Data preparation, visualization, and feature selection also are addressed, as are boosting and random forests.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** STAT 610 [Min Grade: C]

**STAT 645 Time Series Forecasting 3.0 Credits**

This course provides a comprehensive introduction to the latest time series forecasting methods. Topics such as autocorrelation, forecast accuracy, seasonality, stationarity, decomposition, time series linear models, exponential smoothing, and ARIMA models are discussed.

The course provides a practical skillset to students interested in more accurately forecasting future energy usage, retail sales, crime, economic indicators, user engagement, or any data which is repeatedly measured over time. Knowledge of a statistical programming language is prerequisite.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 610 [Min Grade: C]

**STAT 920 Stochastic Processes I 3.0 Credits**

The focus of this course is on the construction of stochastic models for decision problems and the analysis of their properties. The course introduces Markov Chains and the classification of their convergence, and moves on to queuing models.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 931 [Min Grade: B-] or STAT 932 [Min Grade: B-]

**STAT 924 Multivariate Analysis I 3.0 Credits**

An introduction to multivariate statistics with topics that may include but are not limited to Matrix Algebra, the Multivariate Normal Distribution, Multivariate Analysis of Variance, Tests on Covariance Matrices, Discriminant Analysis, Multivariate Regression, Canonical Correlation, Principle Component Analysis, factor Analysis, and Cluster Analysis.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**STAT 925 Multivariate Analysis II 3.0 Credits**

This course is the sequel of STAT 924. STAT 924 discussed linear regression, PCA, EFA, CFA, cluster analysis, ANOVA, discriminant analysis, logit, canonical correlation, and MDS Using SAS. This course builds on that baseline by continuing into GLM models and then exploratory regression models.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 924 [Min Grade: B]

**STAT 931 Statistics for Economics 3.0 Credits**

This course will cover the traditional introductory statistics topics; descriptive statistics, probability theory, random variables, discrete and continuous probability distribution, sampling distributions, estimation, and hypothesis testing. Then we'll move on to a more advanced topic: regression analysis.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**STAT 932 Statistics for Behavioral Science 3.0 Credits**

This course provides a non-theoretical coverage of common statistics topics for students in the behavioral sciences. These may include, but are not limited to descriptive statistics, probability theory, random variables, discrete and continuous probability distributions, sampling distributions, estimation, hypothesis testing, analysis of variance, & regression.

Emphasis is put on and examples are of behavioral topics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**STAT 997 Research Activity for PhD Student in STAT 0.5-12.0 Credits**

PhD candidates in Decision Sciences and MIS in their second year undertake research activity with their advisor prior to defending their dissertation proposal. This course is designated to record that activity. The student is expected to conduct all major numerical studies and provide all theoretical support for their work, in the case of analytical modeling research, or to have built the model and started on the data collection, in the case of empirical research. It is expected that upon completion of this requirement, the student will make any final minor edits and submit the paper to a leading conference, preferably a referred one, by the end of the summer quarter.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT 998 Dissertation Research in Statistics 1.0-12.0 Credit**

Dissertation Research.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 12 times for 24 credits

**STAT I599 Independent Study in STAT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT I699 Independent Study in STAT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT I799 Independent Study in STAT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT I899 Independent Study in STAT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT I999 Independent Study in STAT 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**STAT T580 Special Topics in STAT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT T680 Special Topics in STAT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT T780 Special Topics in STAT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT T880 Special Topics in STAT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**STAT T980 Special Topics In STAT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Career Integrated Education

### Courses

**CIE 601 Graduate Career Integrated Education and Internship Comp 0.0-12.0 Credits**

This is the Masters equivalent of the career integrated experience. It is a companion course to supplement the internship/CIE F/T requirement.

**College/Department:** University Courses

**Repeat Status:** Can be repeated multiple times for credit

## Chemical Engineering

### Courses

**CHE 502 Mathematical Methods in Chemical Engineering 3.0 Credits**

Emphasizes formulation of ordinary and partial differential equations and their analytical and approximate solutions governing steady and unsteady chemical and biochemical engineering phenomena and processes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 513 Chemical Engineering Thermodynamics I 3.0 Credits**

Examines thermodynamic principles from a classical viewpoint, including properties of materials, equations of state of mixtures, and chemical and phase equilibria of complex mixtures.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 525 Transport Phenomena I 3.0 Credits**

Presents a unified treatment of the continuity of conserved qualities of momentum, energy, and mass, with emphasis on analytical and approximate solution methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 502 [Min Grade: B-]

**CHE 531 Fundamentals of Solar Cells 3.0 Credits**

Focuses on fundamentals of solar cells, covering semiconductor materials, basic semiconductor physics, optical and electronic phenomena, and case studies of crystalline silicon, thin film, and nanostructured photovoltaics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 532 Electrochemical Engineering 3.0 Credits**

Covers the principles and applications of electrochemical equilibria, kinetics, and transport processes with a focus on system operation and design, drawing examples and applications from topics that include batteries and fuel cells, electroanalytical chemistry, electroplating, and corrosion protection.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 533 Introduction to Rheology 3.0 Credits**

Introduces the concepts of how science defines and conceptualizes the behavior of "real" fluids. Covers concepts such as how to characterize, quantify, and simulate non-newtonian behavior in real fluids.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 543 Kinetics & Catalysis I 3.0 Credits**

Covers chemical reaction kinetics in chemical engineering, including gas and liquid phase reaction mechanisms, reaction rate theories, and heterogeneous kinetics and catalysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 502 [Min Grade: B-]

**CHE 554 Process Systems Engineering 3.0 Credits**

Covers basic concepts of the systems engineering approach to the design and operation of chemical engineering processes, including methods for developing process control strategies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 502 [Min Grade: B-]

**CHE 560 Transport Phenomena in Biological Systems 3.0 Credits**

Covers gas-liquid mass transfer in microbial systems, mass transfer in cells and biofilms, membrane transport, fluid mechanics of fermentation broth, power consumption in agitated vessels, heat transfer, and scale-up of mass transfer equipment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 561 Principles of Colloid Science 3.0 Credits**

Focuses on fundamental principles of colloid science from a biological perspective, covering surface active agents, thermodynamics of self-assembly of surfactants, surface chemistry and physics of monolayers and bilayers, microstructures and phase behavior, specific biological colloids (micelles, liposomes, and lipoproteins), and colloidal stability.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 562 Bioreactor Engineering 3.0 Credits**

Covers growth and product formation kinetics, batch and continuous stirred tank bioreactors, tower reactors, immobilized-cell reactors, and immobilized-enzyme reactors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 564 Unit Operations in Bioprocess Systems 3.0 Credits**

Covers liquid-liquid extraction, membrane separation, chromatographic separation, filtration, and centrifugation in bioprocessing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 571 Pharmaceutical & Medical Device Manufacturing I 3.0 Credits**

Covers engineering and regulatory processes in the manufacture of pharmaceutical, biopharmaceutical and medical devices, including Good Manufacturing Practice and Medical Device Regulations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 572 Pharmaceutical & Medical Device Manufacturing II 3.0 Credits**

Covers design of unit operations and critical systems used in the manufacture of pharmaceutical, biopharmaceutical and medical devices, and engineering design and validation of manufacturing facilities.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 571 [Min Grade: B-]

**CHE 581 Solutions to Climate Change 3.0 Credits**

Climate change will likely be the most important challenge of our time. Drawdown is the theoretical point in the future when greenhouse gas concentrations in the atmosphere peak and then begin to decline, reversing the trend of global warming. Can we get there? How? We will examine the potential impacts of dozens of top solutions to understand where our actions have the most leverage. Solutions range from technical (green energy, buildings, and transportation) to non-technical (food choices and education). The best solutions not only mitigate global warming but also lead to economic benefits and a more just and equitable society.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**CHE 590 Research Methods and Practices 3.0 Credits**

Introduces general process for scientific inquiry and engineering research, providing good practices for conducting and communicating scientific research, including approaches for effective technical writing and oral presentations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CHE 614 Chemical Engineering Thermodynamics II 3.0 Credits**

Covers theory and application of statistical mechanics, with emphasis on prediction of volumetric and thermal properties of pure fluids and mixtures, and phase equilibrium. Covers also non-equilibrium statistical mechanics, with emphasis on linear response theory for chemical kinetics. Introduces modern methods in applied statistical mechanics, including Monte Carlo and molecular dynamics simulations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 513 [Min Grade: B-]

**CHE 626 Transport Phenomena II 3.0 Credits**

Covers advanced analysis of transport phenomena involving mass, energy, and momentum transport, with emphasis on application of numerical methods for solving systems of nonlinear algebraic equations, initial value problems, and boundary value problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHE 525 [Min Grade: B-]

**CHE 897 Research 1.0-12.0 Credit**

Requires research in chemical engineering. Student is expected to conduct independent research, maintain high standards of ethical integrity, professionalism, self-motivation and curiosity, and comply with group, department and university safety policies. Student has prime responsibility for successful continuation/completion of research. Responsibilities include, but are not limited to, literature review, design & analysis of experiments/computations to ensure meaningful and unique contributions to the chosen field; regular communication with research advisor(s) to discuss results, analysis & next steps; dissemination via conference presentations and peer-reviewed publications; relevant equipment maintenance; working with peers, collaborators and mentoring undergraduate and junior PhD students.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CHE and classification is PhD.

**CHE 898 Master's Thesis 0.0-9.0 Credits**

Requires thesis research in chemical engineering. Student is expected to conduct independent research, maintain high standards of ethical integrity, professionalism, self-motivation and curiosity, and comply with group, department and university safety policies. Student has prime responsibility for successful continuation/completion of research. Responsibilities include, but are not limited to, literature review, design & analysis of experiments/computations to ensure meaningful and unique contributions to the chosen field; regular communication with research advisor(s) to discuss results, analysis & next steps; dissemination via conference presentations and peer-reviewed publications; relevant equipment maintenance; and working with peers, collaborators.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE 998 Ph.D. Dissertation 1.0-9.0 Credit**

Requires dissertation research in chemical engineering. Student is expected to conduct independent research, maintain high standards of ethical integrity, professionalism, self-motivation and curiosity, and comply with group, department and university safety policies. Student has prime responsibility for successful continuation/completion of research. Responsibilities include, but are not limited to, literature review, design & analysis of experiments/computations to ensure meaningful and unique contributions to the chosen field; regular communication with research advisor(s) to discuss results, analysis & next steps; dissemination via conference presentations and peer-reviewed publications; relevant equipment maintenance; working with peers, collaborators and mentoring undergraduate and junior PhD students.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE I599 Independent Study in CHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE I699 Independent Study in CHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE I799 Independent Study in CHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE I899 Independent Study in CHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE I999 Independent Study in CHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE T580 Special Topics in CHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE T680 Special Topics in CHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE T780 Special Topics in CHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE T880 Special Topics in CHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CHE T980 Special Topics in CHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Chemistry

## Courses

**CHEM 521 Inorganic Chemistry I 3.0 Credits**

Covers the principal models of inorganic chemistry: structure and bonding, interactions in the solid state, coordination compounds, complexation equilibria, and acid-base models.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 522 Inorganic Chemistry II 3.0 Credits**

Covers group theory in inorganic chemistry, including crystal field descriptions of transition metal chemistry and qualitative molecular orbital approach to and spectroscopic methods for inorganic molecules.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 521 [Min Grade: C]

**CHEM 523 Inorganic Chemistry III 3.0 Credits**

Covers constitutions and properties of organometallic compounds, including carbonyls and nitrosyls. Also covers kinetic properties of mononuclear and biometallic centers. Includes computer modeling/display of inorganic structures.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 522 [Min Grade: C]

**CHEM 530 Analytical Chemistry I 3.0 Credits**

Covers principles and techniques of optical methods of analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 531 Analytical Chemistry II 3.0 Credits**

Covers physical and chemical methods of separation, including distillation, solvent extraction, and chromatographic and ion-exchange techniques.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 541 Organic Chemistry I 3.0 Credits**

Covers spectroscopic methods for the determination of the structure of organic molecules.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 542 Organic Chemistry II 3.0 Credits**

Covers static and dynamic stereochemistry; conformational theory; relationships between structure and reactivity in organic reactions; and applications to asymmetric synthesis, physical measurements, and biochemical mechanisms.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 543 [Min Grade: C]

**CHEM 543 Organic Chemistry III 3.0 Credits**

Covers mechanisms of organic reactions and the techniques of studying them.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 554 Chemical Kinetics 3.0 Credits**

Focuses on experimental and theoretical consideration of chemical reaction rates.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 555 Quantum Chemistry Of Molecules I 3.0 Credits**

Covers general properties of operators; Schrodinger's equation and its solutions for a particle in a box; harmonic oscillator, tunneling problems, rigid rotor, and the hydrogen atom; approximation methods; and absorption of radiation and selection rules.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 557 Physical Chemistry I 3.0 Credits**

Schrodinger's equation and particle-wave duality, atomic structure and spectra, optical spectroscopy on molecules (rotational, vibrational and electronic spectra) molecular symmetry, design of modern spectrometers, magnetic resonance spectroscopy.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 558 Physical Chemistry II 3.0 Credits**

Covers statistical mechanics of distinguishable and indistinguishable particle systems, and thermodynamic functions for both systems and chemical equilibrium.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 561 Polymer Chemistry I 3.0 Credits**

Covers step growth, polymerization (including polyesters, polycarbonate, nylon, epoxies, urethanes, and formaldehyde-based polymers), step growth kinetics, molecular weight distributions, infinite networks and gelation, techniques of polymerization, ring opening polymerization, thermodynamics of polymer solutions, biological polymers, inorganic polymers, biomedical applications, and electrically conducting polymers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 562 Polymer Chemistry II 3.0 Credits**

Includes chain growth polymerization (free radical, ionic, coordination, group-transfer, radiation-induced, and electrochemical polymerizations), kinetics of chain growth polymerization, molecular weight distributions, polymerization/depolymerization equilibria, techniques of polymerization, kinetics of polymerization, reactions of polymers, degradation of polymers, chain conformation and configuration, rubber elasticity, and copolymerization.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 563 Polymer Chemistry III 3.0 Credits**

Covers polymer characterization and analysis; morphology; molecular weight determination, including end group analysis, and colligative properties (vapor pressure lowering, ebullometry, cryoscopy, osmometry); light scattering; viscosity; gel permeation chromatography; sedimentation; diffusion and permeation; polymer identification; plasticizers; x-ray diffraction; thermal behavior; and spectroscopic techniques.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 561 [Min Grade: B] or CHEM 562 [Min Grade: B]

**CHEM 571 Chemistry of Biomolecules 3.0 Credits**

This course is a chemistry-based approach to understanding the basic structure, chemical reactivity, and biological function of biomolecules – including amino acids, peptides, proteins, carbohydrates, nucleic acids, and lipids. A special emphasis will be given to topics in the frontiers of biomolecular research at the interface between chemistry and biology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 656 Quantum Chemistry of Molecules II 3.0 Credits**

Continues CHEM 555. Covers matrix theory and group theory, atomic structures, and self-consistent field methods including the Hartree-Fock theory. Introduces theory of chemical bonding.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 555 [Min Grade: C]

**CHEM 659 Physical Chemistry III 3.0 Credits**

Covers interaction of molecules with electromagnetic radiation, including internal quantum states and structure of atoms and simple molecules, applications of atomic and molecular spectroscopy, and lasers in chemistry.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 558 [Min Grade: C]

**CHEM 752 Biophysical Chemistry 3.0 Credits**

Thermodynamics and kinetics to aqueous biological systems. Properties and behavior of biological macromolecules.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 753 Chemical Instrumentation 0.0-5.0 Credits**

Provides hands-on training in the use of various spectroscopic (FT-IR, UV/VIS, fluorescence, AA), chromatographic (packed and capillary column GC, HPLC), and electrochemical (potentiometry, coulometry, polarography) techniques. Involves lectures with self-paced laboratory work.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

**CHEM 755 Mass Spectrometry 3.0 Credits**

Covers basic interpretive skills for organic and biochemical analysis; basic ion optics design using SIMON; survey of ionization methods, ion selection or separation techniques, and detectors; and applications in chemistry and biology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 767 Chemical Information Retrieval 3.0 Credits**

Examines methods for retrieving literature information, via standard tabulations, journals, and abstracts, using hard-copy and electronic sources. Includes techniques for online searching of databases such as Chemical Abstracts, Beilstein, and crystallographic depositories.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 771 Organometallic Chemistry 3.0 Credits**

Covers compounds with metal-carbon bonds, including molecular and electronic structures and bonding descriptions, constitutions, reactivities, and syntheses of main-group and transition metal carbonyl, alkene, alkyne, alkyl, and arene complexes and clusters.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHEM 521 [Min Grade: C]

**CHEM 773 The Solid State 3.0 Credits**

Covers types of bonding in solids, lattice specific heat, phonons, thermal conductivity, free electron gas, band theory of metals and semiconductors, intrinsic and extrinsic semiconductivity, and magnetic properties and superconductivity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 782 Electronics for Chemical Instrumentation 4.0 Credits**

Covers digital electronics for chemical instrumentation, including Boolean algebra and its applications to digital circuits, implementation of basic Boolean operations with solid-state devices, and applications of digital circuits to chemical instrumentation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 783 Electronics for Chemical Instrumentation II 3.0 Credits**

Instrument components such as temperature, pressure, and light radiance controllers, etc. will be designed in the lectures and built and tested in the laboratory on the test board built by the student. It contains regulated +15, -15 and 5 regulated power supplies. Same sided wire wrap sockets allow amplifiers and other circuit elements to be easily and reliably mounted and connected. The test board belongs to the student.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 789 Experimental Design and Statistics in Chemistry 3.0 Credits**

Covers descriptive statistics; single and multiple linear regression techniques for analytical calibration; analysis of variance methods; basic experimental design, including full and fractional factorial techniques; and experimental optimization using steepest ascent and simplex techniques.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CHEM 792 Advanced Organic Synthesis I 3.0-5.0 Credits**

Covers organic functional group transformation and manipulation. Includes oxidations, reductions, additions to pi bonds, substitution reactions including aromatic substitutions, and reactions of electron-deficient intermediates.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 862 Topics in Inorganic Chemistry 0.5-9.0 Credits**

Covers specialized principles of inorganic chemistry plus contemporary advances in the field. May be repeated for credit when topics vary.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 865 Chemistry Research Seminar 0.0-9.0 Credits**

Provides presentation and discussion of current research topics in chemistry.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 866 Topics in Polymer Chemistry 3.0 Credits**

Covers fundamental concepts in conductivity, magnetism and optical properties, or organic and polymeric materials; elements of the organic solid state; chemical and electrochemical synthesis; structure characterization; and properties and applications of these polymers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 868 Topics in Analytical Chemistry 0.0-5.0 Credits**

Surveys new or developing instrumental or chemical analysis techniques. Covers spectroscopic, chromatographic, and/or electrochemical techniques for analysis of solutions or surfaces.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 898 Master's Thesis 0.5-9.0 Credits**

M.S. thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 997 Research 1.0-12.0 Credit**

Requires students to select a topic for investigation and obtain the approval of the staff member in charge of the project. The hours and credits are determined for each individual.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CHEM.

**CHEM I599 Independent Study in CHEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM I699 Independent Study in CHEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM I799 Independent Study in CHEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM I899 Independent Study in CHEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM I999 Independent Study in CHEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM T580 Special Topics in Chemistry 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM T680 Special Topics in Chemistry 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM T780 Special Topics in Chemistry 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit



**CHEM T880 Special Topics in Chemistry 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CHEM T990 Special Topics in CHEM 0.0-9.0 Credits**

Special Topics in Chemistry.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Civil Engineering

### Courses

**CIVE 501 Model Analysis of Structures 3.0 Credits**

Open to advanced undergraduates. Covers application of models for the analysis and design of complex structures, including development of laws of similitude, methods of fabricating, and testing and instrumentation of models.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 510 Prestressed Concrete 3.0 Credits**

Open to advanced undergraduates. Covers definitions and general principles, anchorage systems, and loss of prestress; analysis and design of simple beams for flexure, shear, bond, and bearing; partial prestressed and post-tensioned reinforcement; and continuous beams.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 302 [Min Grade: D] and CIVE 303 [Min Grade: D]

**Corequisite:** CIVE 401

**CIVE 512 Wood and Timber Design 3.0 Credits**

Covers properties, species and grades of wood; definitions and general principles of wood and timber design including light wood frame construction and mass timber (CLT) construction; analysis and design of simple joists/beams and girders for flexure, shear, deflections, and bearing; analysis and design of compression and tension members, and beam-columns; shear walls and horizontal diaphragms; sustainability of mass timber construction; simple connections. The focus will be on the ASD method with a few examples using the LRFD method.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 302 [Min Grade: D] and CIVE 303 [Min Grade: D]

**CIVE 516 Geotechnical Site Investigation 3.0 Credits**

This course will cover best practices for the geotechnical characterization of subsurface conditions required for successful planning, design, construction, and operation of civil infrastructure. The course provides historical, theoretical, experimental, and empirical development of different insitu tests in geotechnical engineering. Practical applications and limitation of field testing devices will be studied. Interpretation of test results and measurements for geotechnical site characterization will be discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 518 Natural Hazards and Infrastructure 3.0 Credits**

Overview of natural hazards in the form of landslides, earthquakes, windstorms, tsunamis, hurricanes, floods, scour, subsidence, tornadoes, wildfires, etc. Covers processes and risk to civil infrastructure through case histories and post-disaster reconnaissance to improve our understanding of these hazards and how to help us mitigate the risk posed by these natural hazards.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 520 Advanced Concrete Technology 3.0 Credits**

This course covers the mechanical, physical and chemical properties of concrete: characteristics of concrete in the fresh, setting and hardening states; high performance concrete. Factors influencing the mechanical performance of concrete are discussed as well as field testing methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is EGeo.

**CIVE 530 Geotechnical Engineering for Highways 3.0 Credits**

Covers design of stable right-of-way, USDA classification, frost and swell expansion, capillary moisture retention, subgrade compaction, beam on elastic foundation pavement model, loads and resistance of buried pipes, subdrainage, basic slope stability and retaining structures.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 531 Advanced Foundation Engineering 3.0 Credits**

Covers design of shallow foundations (footing and mats), deep foundations (piles, augered, drilled shafts) and retaining structures for stability and deformation performance.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 540 Forensic Structural Engineering 3.0 Credits**

Investigation of structural failures which includes partial or total collapse or the inability of structures to function as intended. Using structural failure case studies and hypothetical failure scenarios, the course will cover the forensic engineering process, types and causes of structural failures, mechanisms and modes of structural failures, structural condition assessment, load testing, structural retrofitting, structural failure investigation and analysis. The technical, ethical and legal ramifications of structural failures and the role of the expert witness are also discussed, and students will be expected to prepare failure investigation reports.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 542 Incorporating Sustainability Principles in Design 3.0 Credits**

This course considers different approaches to green and sustainable design. It introduces the concept of regenerative design, which seeks to restore ecological balance and health in communities and ecosystems. Students will apply ecological engineering principles to design of resilient and sustainable built environments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 554 Traffic Flow Theory 3.0 Credits**

This course introduces topics and concepts of traffic flow theory and their applications, including models (single vehicle dynamics, car following models, lane-change models, etc.), data (sensing, data processing, model calibration and validation), and applications (microscopic traffic simulation, connected and automated vehicles).

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 560 Introduction to Coastal & Port Engineering 3.0 Credits**

Provides an overview of coastal engineering problems and their solution, including shoreline erosion, ocean waves and wave theories, wave generation, diffraction, refraction, harbor hydraulics, coastal currents, and tidal inlet hydraulics and sedimentation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 561 Introduction to Hydrology 3.0 Credits**

Covers climate and weather, precipitation, evaporation and transpiration, drainage basins, and hydrographs.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGEO 700 [Min Grade: C]

**CIVE 562 Introduction to Groundwater Hydrology 3.0 Credits**

Covers the fundamentals of fluid flow in porous media, groundwater supply, pollution problems, well and aquifer hydraulics, and groundwater flow modeling.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 564 Sustainable Water Resource Engineering 3.0 Credits**

Objective is to enable students to incorporate sustainability concepts into the planning, design, and management of water resources, accomplished through critique of historical agricultural, industrial, and urban water infrastructure in the context of their ecological, social justice, and economic impacts. Global case studies featured and discussed. Also involves a research/design project with an actual "class client".

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman or Sophomore

**CIVE 565 Urban Ecohydraulics 3.0 Credits**

Will enable students to incorporate an understanding of ecohydrologic patterns and processes into the design of built landscapes and engineered infrastructure. Students will be introduced to techniques for analyzing and modeling rainfall-runoff processes and will learn how to develop ecosystem water budgets in urban contexts. Case studies and field trips will expose students to both ecosystem restoration and green infrastructure projects in the mid-atlantic region.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 320 [Min Grade: D] and CIVE 330 [Min Grade: D] and CIVE 430 [Min Grade: D]

**CIVE 567 Watershed Analysis 3.0 Credits**

This course focuses on land use change (LUC) and the hydrologic cycle in agricultural and forest (non-urban) watersheds. Using climate, hydrology, and agricultural models, students will investigate how changes in hydroclimatology and landscape-scale land cover affect surface water flow, runoff, and water quality in selected watersheds. The course will explore emerging topics pertaining to water and energy that course through rural watersheds, with the goal of interpreting data output from models into an environmental life cycle assessment (LCA) framework. LCA is a systems analysis framework that feeds information on life cycle environmental damages/consequences back into design and decision making. This course focuses specifically on watershed analysis models and how their output feed into design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 320 [Min Grade: B-] and CIVE 330 [Min Grade: B-] and CIVE 240 [Min Grade: B-]

**CIVE 585 Transportation Planning and Capacity 3.0 Credits**

Open to undergraduates. Covers prediction of travel demand; principles of highway and transit capacity; level-of-service concepts; uninterrupted and interrupted flow; traffic characterization by volume, speed, and density; operational analysis and design of freeways, highways, and urban streets; intermodal systems, intelligent transportation systems (its), and mass transit.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 605 Advanced Mechanics of Materials 3.0 Credits**

Open to advanced undergraduates. Covers shear flow and shear center, unsymmetrical bending, torsion of non-circular and open sections, bending of curved beams, stress at a point, and failure theories.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Senior.

**CIVE 615 Infrastructure Condition Evaluation 3.0 Credits**

This course covers the tools necessary for the inspection and evaluation of infrastructure. Non-destructive testing (NDT) techniques are introduced and applications and limitations of NDT techniques for a variety of structures are illustrated. Also covered are the policies for determining the physical condition and maintenance needs for highway bridges.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is EGEO.

**Prerequisites:** CIVE 250 [Min Grade: D] and CIVE 520 [Min Grade: C]

**CIVE 632 Advanced Soil Mechanics 3.0 Credits**

Consolidation magnitude and time rate of settlement, secondary compression, mitigating settlement problems, shear strength of cohesive and non-cohesive soils, critical state soil mechanics, undrained pore pressure response, SHANSEP undrained strength.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 633 Lateral Earth Pressures and Retaining Structures 3.0 Credits**

In this course, students will learn classical and modern lateral earth pressure theories, effects of wall friction and external loads (including earthquakes). Geotechnical design, including computer applications, of retaining structures including rigid and flexible retaining walls; Deadman anchors, sheet pile walls, mechanically stabilized soil reinforcement systems, and excavation bracing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 635 Slope Stability and Landslides 3.0 Credits**

Slope process and mass wasting; landslide characteristics, features and terminology; limit equilibrium slope stability analysis, including Bishop, Janbu, Spenser, Morgenstern-Price methods; effects of water on slope stability; dynamic (earthquake) stability analysis methods; introduction to rock slopes, slope stability investigations, and design and repair.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 636 Engineering Ground Improvement 3.0 Credits**

This course covers the improvement of soil properties to meet project requirements, including surface and in situ technologies: compaction, densification, precompression, stabilization with admixtures, grouting and dewatering.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 637 Seepage and Consolidation 3.0 Credits**

Covers permeability of soils, seepage and drainage, seepage analysis of geotechnical problem such as dams, sheet piles, excavations. Classical one-dimensional consolidation theories, analysis and interpretation of laboratory and field tests. Extended consolidation theories to include 3D consolidation, nonlinear finite strain, etc. Course covers numerical methods applied to seepage and consolidation geotechnical problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 640 Environmental Geotechnics 3.0 Credits**

This course covers the analysis and control of subsurface exploration, groundwater remediation, pollutant-soil interaction and waste containment barriers and drains.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 650 Geosynthetics in Civil Infrastructure 3.0 Credits**

An overview of geosynthetics used in civil infrastructure applications, including geotextiles, geogrids, geocomposites, plastic pipes and geofabric. Covers testing and design based on the primary application function such as separation, filtration, drainage, reinforcement in roadways, soil consolidation, and retaining structures. Analyze failure criteria and determine the long-term engineering design values.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Senior.

**CIVE 651 Geosynthetics in Waste Containment 3.0 Credits**

An overview of each category of geosynthetics. Covers testing and design based on primary application function: separation, reinforcement, filtration, drainage, barrier, and combined in landfills (liner and cover systems), surface impoundments, floating covers, and mining. Analyze failure criteria and determine the long-term engineering design values.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 650 [Min Grade: C]

**CIVE 652 Geosynthetics III 3.0 Credits**

Continues CIVE 651. Covers design and testing of geosynthetic clay liners as a hydraulic/gas barrier and geopipes as drainage materials in numerous application. Presents geocomposites in separation, reinforcement, filtration, drainage, and barrier applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 651 [Min Grade: C]

**CIVE 660 Hydrology-Stream Flow 3.0 Credits**

Covers precipitation, runoff, evaporation and transpiration, streamflow, floodflow, and minimum flow. Pays special attention to factors affecting water supply and quality.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Senior.

**Prerequisites:** CIVE 561 [Min Grade: C]

**CIVE 663 Hydrodynamics II 3.0 Credits**

Extends the theory of perfect fluids to cover fluid forces and moments on bodies, free streamline theory, and extension of vorticity theory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 662 [Min Grade: C]

**CIVE 664 Open Channel Hydraulics 3.0 Credits**

Covers principles of flow in open channels, conservation laws, uniform flow, critical flow, gradually varied flow, backwater computations, channel design, and numerical computation of flows having a free surface.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Senior.

**CIVE 665 Computational Hydraulics I 3.0 Credits**

This course continues CIVE 664 to cover the application of mathematical and numerical techniques to model complex open channel hydraulic processes. At each stage the fundamental hydraulic principles are reviewed to assure proper construction of a modeling algorithm and to assist in interpretation of results.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIVE.

**Prerequisites:** CIVE 664 [Min Grade: C] and CIVE 330 [Min Grade: D] and (CIVE 341 [Min Grade: D] or ENVE 416 [Min Grade: D]) and CIVE 430 [Min Grade: D]

**CIVE 701 Advanced Structural Analysis I 3.0 Credits**

Covers basic principles of structural analysis, including elastic deflection; elastic analysis of statically indeterminate structures by methods of virtual work, Castigliano's theorems, and moment distribution; and the Muller-Breslau principle and application to influence lines for continuous members and frames. Introduces numerical techniques.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Corequisite:** CIVE 400

**CIVE 702 Advanced Structural Analysis II 3.0 Credits**

Covers matrix analysis of structures using finite elements, including elastic analysis of structures by influence coefficients, Argyris force method, direct stiffness method, and the displacement method. Introduces the finite-element method for planar structures.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 701 [Min Grade: C]

**CIVE 703 Advanced Structural Analysis III 3.0 Credits**

Covers development of stiffness functions for planar and three-dimensional finite elements, and application to frame, plate, shell, and massive structures. Introduces the general application of finite elements to continuum problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 702 [Min Grade: C]

**CIVE 704 Behavior and Stability of Structural Members I 3.0 Credits**

Covers development of the basic differential equations of member behavior, including second-order effects, in-plane beam-column behavior, column buckling, elastic and inelastic behavior, energy methods, and approximate methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 705 Behavior and Stability of Structural Members II 3.0 Credits**

Covers general torsion of thin-walled open, closed, and combined open-and-closed cross-sections; lateral torsional buckling; biaxial bending; elastic and inelastic behavior; approximate methods; and frame buckling.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 704 [Min Grade: C]

**CIVE 708 Fundamentals of Structural Dynamics 3.0 Credits**

Covers formulation of equations of motion, free vibration response, undamped and damped systems, harmonic analysis, resonance and vibration isolation, response to periodic loading, impulsive loading, response to general dynamic loading, shock and response spectra. Introduces multi-degree-of-freedom systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 710 Design and Structure of Integrity Building Systems 3.0 Credits**

Covers integration of design and building cycle, building envelope, structural morphology, composite structures, thermal and moisture design, fire and smoke, sound and vibration, building failure, and repair and restoration.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 711 Engineered Masonry I 3.0 Credits**

Covers masonry materials, structural behavior of masonry assemblages, and deformational characteristics of brick and block masonry; performance of load-bearing wall systems and design of unreinforced masonry elements; and special design and construction topics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 712 Engineered Masonry II 3.0 Credits**

Covers fundamental concepts of reinforced masonry, reinforced wall design, column and pilaster design, seismic resistance of masonry structures, prestressed masonry, and applied design of low-and high-rise buildings.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 714 Behavior of Concrete Structures I 3.0 Credits**

Covers reinforced concrete members; relationship between results of research and current specifications for design of members subjected to axial loads, flexure, combined axial load and flexure, combined shear and flexure, long columns, bond and anchorage, and limit design; application to design of determinate and indeterminate reinforced concrete frames; and development of current code provisions for design of floor slabs in buildings.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 715 Behavior of Concrete Structures II 3.0 Credits**

Continues CIVE 714.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 714 [Min Grade: C]

**CIVE 717 Behavior of Metal Structures I 3.0 Credits**

Covers load and resistance factor design, including tension, bolted and welded connections, block-shear, compression, built-up compression members, lateral-torsional instability, light-gauge metal buckling and post-buckling strength, and behavior.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 605 [Min Grade: C]

**CIVE 718 Behavior of Metal Structures II 3.0 Credits**

Covers load and resistance factor design, including design and behavior of metal structural members and connections, flexural members including plate girders, bracing and lateral-torsional buckling resistance, torsion and other combined loading, and composite beams and columns.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 717 [Min Grade: C]



**CIVE 719 Behavior of Metal Structures III 3.0 Credits**

Covers load and resistance factor design, including idealization and design of structures and their connections, frame bracing and sway, frame design philosophy, optimization, fatigue, and fracture.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 718 [Min Grade: C]

**CIVE 730 Experimental Soil Mechanics I 3.0 Credits**

Covers methods and techniques of soil testing, including interpretation and evaluation of test data, and fundamentals of soil behavior.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 632 [Min Grade: D]

**CIVE 731 Experimental Soil Mechanics II 3.0 Credits**

Continues CIVE 730.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 632 [Min Grade: C]

**CIVE 732 Experimental Soil Mechanics III 3.0 Credits**

Continues CIVE 731.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 731 [Min Grade: C]

**CIVE 737 Seismic Geotechnics 3.0 Credits**

Introduction to earthquake hazards and seismology; strong ground motion parameters, deterministic and probabilistic seismic hazard analysis, influence of subsurface conditions and topography and ground motion, soil liquefaction, and brief coverage of seismic slope stability, design of retaining structures, and soil-structure interaction.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 632 [Min Grade: C]

**CIVE 754 Properties and Processes of Polymeric Construction Materials 3.0 Credits**

This course focuses on the uses and characteristics of polymeric materials used in civil and architectural engineering infrastructure. Also covered are micro-structure, physical and chemical properties and mechanical behavior, and the effects of manufacturing on the properties of the products.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AE or major is CIVE or major is MATE.

**Prerequisites:** CIVE 250 [Min Grade: D] and TDEC 211 [Min Grade: D]

**CIVE 755 Durability of Polymeric Construction Materials 3.0 Credits**

This is a continuation of CIVE 754 and concentrates on protecting and predicting service lifetimes. It covers physical aging, mechanical stabilization and chemical degradation of polymeric materials and the products in which they are incorporated for field use. Covered in this course is the fundamental degradation mechanisms of different polymeric materials commonly used in Civil Engineering practice. Also covered are test methods and extrapolation methodologies for predicting long-term performance.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 754 [Min Grade: C]

**CIVE 756 Evaluation of Polymeric Construction Materials 3.0 Credits**

This lab course is designed to integrate and extend the coverage of CIVE 754 and 755 so that students have a full concept of the behavior of polymeric construction materials. A series of thermal analysis and physical, chemical, and mechanical tests are included. The stress relaxation, stress cracking, oxidation, and applications of test results in infrastructure and environmental applications are discussed, including problems in comparative analysis of test results and their implications in design and specification.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 754 [Min Grade: D] and CIVE 755 [Min Grade: D]

**CIVE 801 Dynamics of Structures I 3.0 Credits**

Covers formulation of equations of motion, including generalized single-degree-of-freedom systems, free vibration response, undamped and damped systems, harmonic analysis, resonance and vibration isolation, response to periodic loading, impulsive loading, response to general dynamic loading, non-linear structural response, and Rayleigh's method and other variational techniques. Introduces multi-degree-of-freedom systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 802 Dynamics of Structures II 3.0 Credits**

Covers formulation of multi-degree-of-freedom equations of motion, including evaluation of structural property matrices; elastic properties, mass properties, damping, and external loading; geometric stiffness; undamped free vibrations; analysis of dynamic response; practical vibration analysis; Stodola method; Holzer method; reduction of degrees of freedom; matrix iteration and other techniques; analysis of non-linear systems; variational formulation of the equations of motion; partial differential equations of motion; and free vibrations of beams.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 801 [Min Grade: C]

**CIVE 803 Dynamics of Structures III 3.0 Credits**

Covers distributed parameter dynamic systems, equations of motion, free and forced vibrations, analysis of structural response to earthquakes, seismological background, deterministic analysis of single-degree-of-freedom and multi-degree systems, multi-degree-of-freedom and distributive parameter systems, soil-structure interaction, non-linear response to earthquakes and current design code requirements, dynamics of complex structures, modeling, and use of large computer codes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 811 Plates and Shells I 3.0 Credits**

Covers analysis of circular, rectangular, and continuous plates by classical and approximate methods, including the folded plate theory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 831 Deep Foundations 3.0 Credits**

Covers topics including mat foundation design using plate theory, continuous beam design using beam-on-elastic foundation theory, and pile design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 838 Soil Behavior 3.0 Credits**

Particle-scale behavior of soil and assemblages; clay mineralogy; soil formation, composition, structure and properties; soil water interaction; clay-water-electrolyte systems, adsorption-desorption and ion exchange; conduction phenomena; micromechanics; volume change behavior; strength and deformation behavior.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 632 [Min Grade: C]

**CIVE 839 Geomechanics Modeling 3.0 Credits**

This course covers constitutive laws in geomechanics, including linear elastic, quasi-linear (hyperbolic) elastic, linear elastic-perfectly plastic and elasto-plastic models based on critical state soil mechanics. The finite element method is used to solve geotechnical boundary value problems incorporating different constitutive models.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 632 [Min Grade: C]

**CIVE 898 Master's Thesis 0.5-20.0 Credits**

Involves investigation of an approved topic. Required of full-time master's degree students.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CIVE 997 Research 1.0-12.0 Credit**

Research.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE 998 Ph.D. Dissertation 1.0-12.0 Credit**

Involves investigation of an approved topic. Required of Ph.D. students.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE I599 Independent Study in Civil Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE I699 Independent Study in Civil Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE I799 Independent Study in Civil Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE I899 Independent Study in Civil Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE I999 Independent Study in Civil Engineering 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE T580 Special Topics in Civil Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE T680 Special Topics in Civil Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE T780 Special Topics in Civil Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE T880 Special Topics in Civil Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**CIVE T980 Special Topics in Civil Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Civil, Architectural & Environmental Engineering

## Courses

### CAEE 501 Community-Based Design 3.0 Credits

This course evaluates the weight of evidence for community-based design practices as related to peacebuilding, conflict management and sustainable development. A case-study-based approach will enable students to study participatory theory, informed design and adaptive management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

# Communication

## Courses

### COM 500 Reading & Research in Communication 3.0 Credits

This course introduces students to basic research concepts and methodologies used in social science research as they are applied to communication research. Through different readings, students will learn to analyze, understand and evaluate scholarly research in communication studies. Lastly, students will learn to communicate scope, method and result of the existing body of research to the professional community.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 516 Campaigns for Health and Environment 3.0 Credits

This seminar-style course, which includes a significant amount of reading and writing, explores theories and practical aspects of environmental information campaigns and community-based social marketing campaigns. The theories and frameworks presented in this course apply to health issues as well as environmental issues. This course has a strong applied component.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 518 Communicating Health and Risk in a 'Fake News' World 3.0 Credits

People need to be able to understand health risks in order to make basic life decisions. Whether the issue is climate change, vaccines, toxins, etc., we need to be informed to take appropriate action. Studies show that most people learn about science and health from the media. We know that the general public score low in science literacy. The cloud of "fake news" and propaganda obstructs understanding and informed decision making. For those of us who are charged with communicating about these topics to the general public, knowing how to sift through these various agendas and present clear information can be a challenge. In this course, we will start with health and risk communication theories, use case studies to look at the process of scientific obfuscation, and discuss approaches to effective communication.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 520 Science Writing 3.0 Credits

Scientists contribute to the world with new insights and secure credibility for them largely through writing. This course will guide you in understanding the conventions of the various genres of scientific writing. In particular, you will learn to distinguish one genre from another and how the design of each genre contributes to the effective communication of science to professional and lay audiences. Once you understand the conventions of science writing, you will explore them in your own area of scientific interest and develop your own writing skills.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 525 Document Design and Usability 3.0 Credits

This course introduces students to the principles and practice of document design as well as strategies for collecting, analyzing and presenting data. Students will also learn about usability testing to measure the effectiveness of their documents with the intended audience.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 533 Modern Desktop Publishing 3.0 Credits

Using accessible modern software programs and a personal computer, desktop publishing facilitates the creation of professional-quality promotional materials by non-designers. Emphasis is on applying copywriting techniques and theoretical design principles of color, typography and composition to create audience-specific business cards, posters, advertisements, and brochures. These are essential skills for those entering into the fields of event planning, public relations, nonprofit communication and social media management.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 535 Digital Publishing 3.0 Credits

This course provides students with applied and theoretical knowledge of the current state of digital publishing by examining the technical disruption to, and the current state of, the book and magazine publishing industries. Students then become digital publishers themselves by choosing a niche topic aimed at a target audience and learning how to write and optimize long-form content and integrate images to create and publish a professional, branded and visually appealing blog or website using an accessible and free blogging platform. Students will consider issues of credibility, SEO, promotion, monetization and web usability. The ethical issues of digital publishing, such as influencer/sponsored content and sources for copyright free photo/image use are explored.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### COM 536 Strategic Social Media Communication 3.0 Credits

Students learn research-based best practices for developing strategic social media programs and campaigns, then assess how influential brands and organizations are or are not using them for platforms, content, authentic engagement, crisis response and influencer marketing. Students will produce a campaign and content calendar for an organization of their choosing and prepare for and earn an industry-recognized, real-life social media certification through this course.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 538 Copy Editing 3.0 Credits**

Every aspect of communication, whether public relations, social media, technical or scientific writing, needs to be copy edited before it is released to the public. Copy editing does not just examine spelling and punctuation, but also takes into account the flow and length of the text. Copy editors are also routinely asked to write compelling headlines and accompanying captions for photographs and graphics. In this class, students will look at the mechanics of proper writing, delve deeply into AP style, and will learn to be critical readers who ask questions about the purpose and content of written communication. Students will learn best practices for copy editing different texts.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 541 Foundations of Public Relations 3.0 Credits**

This introductory course is designed for students who are new to public relations. It introduces students to the basic theories, strategies, tactics and skills that form the foundation of public relations practice. Students learn about public relations as a professional field, and the importance of ethical public relations as a strategic tool to interact with internal and external audiences. The course covers important strategies such as corporate social responsibility and reputation management, and provides students with basic skills related to public relations research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 542 Public Relations Writing 3.0 Credits**

This course teaches students the preparation of public relations materials such as news releases, media advisories, press statements, backgrounders, facts sheets, features, opinion pieces and other related communication materials. It covers the preparation of materials for different outlets (e.g. writing for print/websites as opposed to writing for radio and TV). This course also provides a brief introduction to speech writing. This is a workshop-oriented class with a focus on persuasive writing.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** COM 541 [Min Grade: B]

**COM 543 Public Relations Planning 3.0 Credits**

This graduate level course will enable students to put into practice the theoretical knowledge, research skills, interpersonal and group skills, writing skills, and creative problem solving abilities developed throughout their public relations studies. This course will help students approach public relations strategically so they will be able to apply public relations techniques and theories to the creation, execution and management of public relations plans and campaigns.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** COM 541 [Min Grade: B]

**COM 544 Media Relations in a Digital Age 3.0 Credits**

While traditional media outlets may be shrinking their newsrooms and their staff, and there is an increasing PR emphasis on social media strategy and influencer marketing, the value of earned media is still very much present. There are millions of digital news sites, all looking to break the story of the day or tell the best feature. With less full-time journalists and more freelancers, it has become increasingly difficult for brands and companies to get their voice into the media. Those that succeed are ones with good media relations strategies. This course will focus on media relations strategy and how brands can consistently win earned media. In doing so, it highlights strategies for getting the attention of journalists, freelancers and prominent bloggers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** COM 561 [Min Grade: B]

**COM 545 Crisis Communication 3.0 Credits**

This course provides students with an understanding of the frameworks and practical tools necessary to successfully manage a variety of crisis situations from a communications standpoint. Following the crisis management process (prevention, preparation, response, and revision), students will learn the theories, principles, and best practices associated with crisis communication and management. Using real-world case studies, crisis communication theories and ethics, and role-playing activities, students will develop the ability to think strategically, make recommendations to address crisis-related challenges, and develop proactive crisis communication plans to assist organizations during challenging times.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** COM 541 [Min Grade: B]

**COM 551 Creative Content Production 3.0 Credits**

This course explores content creation for digital media, including websites, social media, newsletters, video and blogs through both theory and execution. Learn topics and concepts that are essential for those in or entering into the fields of marketing, advertising, communications and social media management: content development; audience engagement; brand identity and archetypes; concepts in digital design; visual storytelling through social media and strategic methods in marketing content. Students will also learn how to glean relevant information from data and information and create visually stimulating and engaging infographics and slide decks.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 561 Fundamentals of Journalism & Newswriting 3.0 Credits**

This is an introductory course which introduces students to the fundamentals of journalism, various forms of newswriting and, in this context, explores and applies mass media effects theory. Students will learn to distinguish news and opinion pieces, and will get a basic understanding of the media and journalism industry, the role and impact of advertising and PR, and the implications of media law and ethics. Students will also learn to write clear and accurate stories, including concise leads and informative yet attention-grabbing headlines. In this context, students will be introduced to basic concepts of editing and journalistic style, including AP conventions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit



**COM 562 International Negotiations 3.0 Credits**

This course examines theoretical and practical elements of international negotiations. Students are taken into the work of diplomats, policymakers, and corporate leaders negotiating agreements and are guided through psychological, sociological, and political dimensions of the talks process. By the end of this course students will be able to analyze negotiations scientifically and professionally.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 563 Event Planning 3.0 Credits**

This course will provide the student with the theoretical and practical fundamentals in understanding the complexities of producing special events across different industries. Students will learn to research, design, plan, coordinate and evaluate special events, including virtual events attended remotely.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 574 Organizational Communication in Project Management 3.0 Credits**

Organizational communication is relevant for all types of sectors and institutions be it governmental, healthcare, for-profit or not-for-profit. In this context, project management is a required skill to accomplish team goals. Whether you are the leader of the team or a contributor - effective organizational communication is the number one skill needed by all team members. In this course, we will explore how to properly communicate with leaders, team members, stakeholders and more while exploring best practices for various types of project communication - including daily briefings, email updates, demos, executive summaries and more.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 575 Grant Writing 3.0 Credits**

Students develop the skills needed to write an effective grant proposal. Topics include idea development, analyzing a team's capabilities to complete a project, developing a clear plan of attack, locating funding sources, honing research skills, and effectively using graphic elements in proposal design.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 576 Nonprofit Communication 3.0 Credits**

The nonprofit sector is vital to today's complex society, uniquely supporting education, social services, advocacy and activism, political engagement, medical services, and much more. Studying this dynamic sector and its organizations through a communication perspective can help us gain deeper insights for more effective nonprofit work. This course introduces students to the strategic ways nonprofits communicate with a broad range of audiences and stakeholders, as well as the ways researchers have examined these practices. Through a combination of scholarly readings, case studies, interviews, and volunteer work for nonprofit organizations, students will study and practice effective nonprofit communication strategies and skills across many nonprofit contexts.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 577 Communication for Civic Engagement 3.0 Credits**

Extremist rhetoric and divisive politics seem to go hand-in-hand in today's public deliberations. The media so often pair the word rhetoric itself with the pejorative adjectives mere, empty, and deceptive, that anything rhetorical becomes vilified. This course draws from the ancient accounts of rhetoric and the contemporary studies on rhetoric to rehabilitate it as a way to inform our efforts towards a more civil public discourse. This course also will host guest speakers from local civic and political organizations who engage in rhetorical practices in the service of civic engagement, which includes the discourse both of people who exercise political power and of citizens who debate over public policies and cultural identity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 578 Focus Groups 3.0 Credits**

This qualitative research methods course will discuss the use of focus groups to collect data for social science inquiry from both an academic and a consumer research perspective. We will take an in-depth look at how to plan, implement, and analyze data collected through a focus group process, including: purposes and uses of focus group interviews, human subjects research considerations, participant recruitment, sampling, question design, facilitation techniques, recording options, transcription, analysis, and reporting of data.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 586 Strategic International Communication 3.0 Credits**

The course will explain the significance of strategic international communication in the contemporary globalized and digitized world. Mostly we communicate with the representatives of different nations on the basis of preconceived images of them. Those images are formed by objective forces as well as by active image shapers/manipulators. To a large extent, nations are brands and the images of those brands are strategically shaped by different agents – private and political interests, as well as state and business actors. Students will explore this process of strategic international image formation through the historical context, theoretical concepts, and economic and structural aspects of strategic international communication.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 600 Graduate Seminar in Communication 3.0 Credits**

This is an upper-level graduate seminar in various topics in Communication, including but not limited to Public Relations, Journalism, and Non-profit Communication. Students will undertake an in-depth examination of critical texts or themes in Communication. The course is intended for graduate students in the MS Communication program and can be repeated for credit with a different topic. This course is open to all students at the graduate-level.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 4 times for 15 credits

**COM 610 Theories of Communication and Persuasion 3.0 Credits**

This course examines theories and models of communication and persuasion. It thereby focuses on theories underlying persuasive communication and issues informing the discipline, drawing readings from the field of communication and related disciplines.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 613 Ethics for Professional Communication 3.0 Credits**

Professional communicators confront conflicting interests throughout their time at work. Their professional aspirations and their duties to their employer inevitably affect their efforts to make ethical decisions. This course is about ethical decisions in professional communication settings, which include: journalism, public relations and advertising, science and health communication, and digital and social media. Through the analysis of case studies and the examination of ethical frameworks this course will explore ethical issues in such topics as: Ethics of social media usage in crisis situations; Ethical behaviors among social media influencers, etc.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 614 Social Media Concepts that Matter 3.0 Credits**

Social media platforms are volatile. With online users producing more data, this course illustrates concepts relevant for changing social media platforms such as interactivity, convergence and big data, and explores challenges and opportunities that social media face. The course focuses on the different values that social media holds for media companies and their users. Students will evaluate social media through a social media audit to distinguish between social media logics and user-centered logics. They will also discuss how to integrate user-centric and organization-centric logics to fulfill the needs of social media users. Students will examine different implementations of social media information infrastructure and social media affordances through concepts such as attention economy and platformization.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 615 Media Environments in a Digital World 3.0 Credits**

This course examines theories of media environments and the application of those theories to our experiences living in a densely mediated world. We will examine media as media ecologists, focusing on how human thought and action are shaped through interactions with our media environments. We will define media in the broadest possible definition, including but not limited to communication, technology, literacy, the arts, and education.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 651 Media and Communication Policy in a Digitized World 3.0 Credits**

Understanding the foundations of the policies, laws and regulations that govern media and communication has become a necessity in the everyday lives of consumers and citizens and crucial knowledge for communication professionals. Issues like 'Net neutrality', 'breaking up big tech', 'algorithmic privacy breaches' and 'trust in (public) media' reflect the increasingly complex communications patterns and industries. This course offers an overview of media and communication policy, law and regulation from a critical perspective. We interrogate the regulatory and judicial systems that administer and interpret media policies, and the public policy apparatus those relationships create. Drawing on academic research and case studies, we assess American media law and policy in light of 'the public interest'.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM 660 Investigative Journalism 3.0 Credits**

An intensive hands-on course in researching and writing investigative news stories. Students will select and cover beats and submit a series of in-depth articles on deadline.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** COM 561 [Min Grade: B]

**COM 698 Managing Communication Professionals' Identities in a Digital Age 3.0 Credits**

In this course, students will explore literature regarding the professional identities of communication professionals. Students will learn how to manage one's professional identity and reputation across various digital platforms and social media. Students will then draw from this body of research to create a professional identity package, including a digital portfolio, based on the work they have completed in the MS program as well as in their own areas of professional expertise. This professional package will demonstrate their aptitude, performance, and compatibility to succeed in their target career.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**COM I599 Independent Study in COM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**COM I699 Independent Study in COM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**COM T580 Special Topics in Communication 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**COM T680 Special Topics in Communication 0.0-6.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Communication, Culture and Media

### Courses

**CCM 510 Introduction to Cultural Studies 3.0 Credits**

This course is an introduction to cultural studies and theory. We will discuss current trends and discussions in cultural studies, and raise questions about culture, politics, subalternity, sexuality, gender, feminism, urban studies, revolutions, ethnicity, and multiculturalism, among others. Students will apply the theoretical approaches and methodologies of cultural studies to the analysis of various aspects of material culture found in contemporary society from products to media.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 555 Ethnography of Communication 3.0 Credits**

Following an examination of theories about interaction in speech, the course provides an in-depth look at qualitative communication studies. Both transcripts of talk in natural settings and videos of actual interactions will be used. Considers such topics as story telling (narrative), self-presentation in talk (performance and identity), the construction of gender in communication, literacy, and cross-cultural approaches to politeness.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 701 Contemporary Social Theory 3.0 Credits**

This course familiarizes beginning graduate students with original works by major theorists of the late 19th century to the present. Students will especially examine the production of social theory as an ongoing conversation about the predicaments of modernity and post-modernity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 702 Communication Theory I: Persuasion and Media Effects 3.0 Credits**

This course is an introduction to the study of persuasion and media effects. Readings include elements of persuasion and compliance seeking, as well as how persuasion takes effect through mass media. Course draws liberally from contemporary research in communication literature.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 703 Communication Theory II: Discourse and Semiotics 3.0 Credits**

Through readings of major theoretical ideas and voices, and occasional case examples, this course introduces students to theories of discourse and semiotics. Major concepts include theories of the sign, and of genre, and the role(s) that language plays in social construction, structuralism and post-structuralism, discourse and post-modernity, and language ideology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 704 Research Methods in Communication, Culture and Media 3.0 Credits**

This course familiarizes students with various quantitative research methods in communication research including analysis, survey research and experiments. Each stage of the research process will be explored from hypotheses to defining and operationalizing variables, including effective sampling, analysis, and write up. Also introduces students to a wide range of original research studies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 705 Data Analysis in Communication 3.0 Credits**

Students are introduced to statistics for communication research, including quantitative analysis techniques for survey data and content analysis. Causal models, sampling and basic ideas of correlation and regression are discussed. Course is a hands-on approach with equal attention to technique and theoretical understanding, using SPSS software.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 710 Mass Communication and American Social Thought 3.0 Credits**

Mass communication has been at the center of most of the hopes and anxieties of the 20th Century. Would mass communication promote democracy or totalitarianism, support the powers-that-be or challenge them, make us smarter or dumber, enhance real life or distort it, etc.? In the end, what do we want mass communication to be and do in the 21st Century? In this course we will examine these questions historically, while learning about the development of "media studies."

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 720 Critical Theory 3.0 Credits**

This course provides an overview of critical theory. It starts with the creation of the critical Frankfurt School, and reviews the works of Gramsci, Adorno, Horkheimer and Marcuse. It then focuses on the expansion of critical theory by Jurgen Habermas through consideration of his theory of communicative action.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 725 Political Communication 3.0 Credits**

This course introduces students to the background concepts and literature in multiple areas of political communication. Material ranges from rhetoric and public relations to mass communication theory. The course objective is to equip students with the skills so that they can go on to pursue scholarly research in these areas on their own. Among other things, students will learn how to write and analyze speeches; evaluate more and less adroit responses to questions; and to assess media coverage of political affairs.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 735 Material Culture 3.0 Credits**

Stuff. Things. Goods. Possessions. This course explores the relationship between human beings and the material objects that surround us. Drawing from literature in anthropology, archaeology, cultural studies, communications, and science and technology studies, we will be exploring the cultural and social life of things: how they move across borders and through our lives, how they accumulate and disperse, how they define the difference between social groups and classes, and, most of all, how they lend our lives weight and meaning. We will also be exploring the status of things in the digital age, emergent notions of materiality, and cutting edge work in "new materialism" studies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 740 Consumer Culture 3.0 Credits**

This course will engage with the rise of mass consumerism in the United States over the course of the 20th and early 21st centuries, and trace critical approaches to it using interdisciplinary approaches from the fields of history, media studies and communication, and cultural studies. Specifically, we will discuss the birth of critiques of capitalism, the rise of mass production and advertising, the role of consumerism in shaping conceptions of identity, citizenship, and taste, and contemporary trends in consumer culture.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 745 Digital Subjectivities 3.0 Credits**

By asking about the mass media as an imaginative resource, this course will examine theoretical frameworks to understand types of self and subjectivity facilitated by new media. Through a survey of contemporary social thought on the subject of "the subject," as well as recent work on virtual subjectivity, we will explore the very meaning of "being digital," its cultural implications, its structural limitations, and its ontological consequences.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 750 Political Economy of Media 3.0 Credits**

The political economy of media links media and communications systems to the workings of economic and political power. After a general introduction to approaches to political economy, students will concentrate on analysis of selected features of news media and social media in terms of their relation to commercial business interests, political power and the framing of public discourse.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 760 The Body Digital: Biopolitics and Media 3.0 Credits**

Students explore how the political economies of digital media and data permeate institutions, such as the life sciences, medicine, border control, public health, and other related institutions of biopolitical governance. In particular, we consider how the body, mostly human, but sometimes other, becomes a medium, an interface and a commodity in surveillance biocapitalism, as well as a site for mediated experimentation in arts, science and film.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 777 Communication Network Analysis 3.0 Credits**

This course introduces communication network analysis to graduate students, emphasizing its theoretical, substantive, and methodological foundations. The main objective of this course is to allow students to acquire a sufficient grasp of both the classical and the contemporary network literature to enable them to pursue independent advanced study, and ultimately, to contribute original research results to their disciplines. The course covers key network concepts and principles; examines data collection, measurement, and computer analysis techniques; and investigates applications in social sciences, communication, media studies, information science, public health, organizational studies, and related disciplines.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CCM 801 Seminar in Contemporary Theory 3.0 Credits**

This is a special topics seminar course that will introduce students to different currents in contemporary social theory, especially through in-depth reading and discussion of a single major theorist, theoretical school, or theoretical concept. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**CCM 802 Seminar in Discourse and Semiotics 3.0 Credits**

This is a special topics seminar course that will explore in-depth a particular theoretical or research approach to the study of language, discourse, and signs. Students will work with major theoretical approaches as well as recent research in the area. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**CCM 803 Seminar in Structural and Cultural Dynamics 3.0 Credits**

Through in-depth exploration of a specific research topic, this seminar course will introduce students to what is called the sociological imagination. The course examines special topics that will illuminate such broad sociological approaches as political economy, cultural analysis, neo-institutionalism or post-modernism. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**CCM 804 Seminar in Research Methodology 3.0 Credits**

This course focuses on a single research method. The course takes students through the inception of research ideas, research design, implementation and data-analysis/write up as the mean to understanding the limitations and possibilities of the research process according to methodology. Course paper involves student research design practicum. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**CCM 805 Seminar in Communication Ethics 3.0 Credits**

By in-depth examination of a single issue in research ethics, this course develops student awareness of ethical issues in processes like peer review, human subjects research evaluation, and public consumption of knowledge generated by scholarly investigation. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**CCM 998 PhD Dissertation Research in Communication, Culture & Media 1.0-12.0 Credit**

Requires supervised research, including literature research, data collection, and writing of doctoral thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CCM I699 Independent Study in Communication, Culture & Media 1.0-12.0 Credit**

Self-directed research, reading or other study; intermittent consultation with a designated instructor required.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CCM I899 Independent Study in Communication, Culture & Media 1.0-12.0 Credit**

Self-directed research, reading or other study; intermittent consultation with a designated instructor required.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit



**CCM T580 Special Topics in Communication, Culture and Media  
0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Community Health and Prevention

### Courses

**CHP 500 Behavior and Social Change Theories 3.0 Credits**

This course introduces students to theories, principles, scientific methods, and research issues in community health and prevention. Major theoretical approaches to community health are discussed. An ecological model of health is presented, with an emphasis on behavioral and social determinants of health. Key public health issues are studied and placed in the context of theoretical approaches to community health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 501 Community Engagement in Public Health Practice & Research 3.0 Credits**

This course seeks to orient students to a type of public health practice and research designed to build the capacities of groups and institutions within multidimensional and often complex systems. This course is grounded in social justice, community participation, and capacity building with a focus on the self-identified needs and strengths of stakeholder groups we work with. Through readings, in-class discussion, and field work, students will be introduced to the roles public health professionals may play while engaging in community organization activities; developing public health programs, interventions, and policy; systems building; and public health/program evaluation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 503 Multi-Method Data Analysis in Community Health & Prevention 3.0 Credits**

In this course, students will apply multiple research methods to understand the impact of individual, social, and structural factors on community health. In this applied course, students will utilize qualitative, quantitative, and mixed method data analysis skills using real-world data sets common in behavioral and social science research to answer specific conceptually grounded research questions. Course assignments will focus on organizing, interpreting data and preparing data briefs for diverse audiences.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 516 History of Public Health 3.0 Credits**

This course considers the origins of contemporary public health by examining major currents in the history of public health in the US from colonial times to the present, with an emphasis on the 20th century. The course introduces students to historical methods in public health research; examines how the changing nature of medical knowledge influences how we treat both the underlying illness and populations and individuals with disease; seeks to understand factors that make populations healthy; examines roots of contemporary health disparities; understands the relationship between agriculture and public health; and, finally, looks at major achievements of public health practice during the 20th century in order to better understand the challenges that might lay ahead for public health in the 21st century.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 517 Overview of Maternal and Child Health 3.0 Credits**

This course covers key principles and methods of maternal and child health (MCH) using a public health lens. This course will look at key points in the reproductive cycle, to include family planning, prenatal health, birth and the postpartum period; and then explore child health, to include infant and child morbidity and mortality, child development, LGBT health issues, and children and youth with special health care needs. The course will introduce common environmental and occupational exposures of women, fetuses, infants and children and discuss exposure prevention interventions.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 518 Global Issues in Maternal and Child Health 3.0 Credits**

This course covers maternal and child health (MCH) disparities using the life course perspective. Health disparities will be explored across geopolitical boundaries. Material will stem from three main pedagogical principles: 1) MCH issues outside the US are sometimes very similar to domestic issues; 2) MCH issues outside the US are sometimes drastically different than domestic issues; and 3) MCH is not only about women and children, but also about men, as well external factors beyond the individual and interpersonal levels of the social ecological model. Throughout the course, an emphasis will be placed on providing practice-based evidence of MCH disparities from around the world and evidence-based practice examples for prevention, intervention, and ultimately the reduction of global MCH health disparities.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 519 Methodology and Methods for Health Equity Research: The Health of Black Communities 3.0 Credits**

This course teaches students how to leverage theories of structural marginalization to inform methodological approaches to and design of health equity research and practice. Focusing on health inequities in the Black community as a case study, the course first discusses the state of evidence with a lens towards challenges in successful translation into action. Next, we distinguish between methodology and methods in order to focus on the use of two frameworks of structural marginalization used to generate this evidence base: critical race theory and structural racism. The course concludes by having students apply their understanding of theory and foundational frameworks to critique current methodological approaches to addressing a select Black Health issue.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 522 Health and Human Rights Research Methods 3.0 Credits**

This seminar focuses on the application of human rights norms and tools to public health and particular challenges within public health. Building upon human rights frameworks, we will discuss current debates about the usefulness of a “human rights approach” to health, the methods and ethics of health-related human rights research, and case studies of human rights investigations and advocacy. The case studies are intended to examine how human rights abuses, including violations of economic and social rights and civil and political rights, can be understood as determinants of health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 530 Arts for Community Health and Wellbeing 3.0 Credits**

This course brings together a focus on the arts and community health and wellbeing and covers five major learning areas. 1. Arts, Resilience, and Healing; 2. Arts and Social Connectedness; 3. Arts and Community/ Neighborhood Development; 4. Arts and Social Justice; 5. Arts-based Research. It builds on the World Health Organization’s (WHO) holistic definition of health and applies a social ecological lens through which to view the arts and human flourishing at multiple levels: the individual, the interpersonal, the community and society. The course engages students via in-class and on-line discussions of assigned weekly readings, videos, guest lectures, presentations, and media from the growing arts and health movement and includes an array of community-based activities and assignments.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 531 Community-Engaged Practice in Arts and Community Health 3.0 Credits**

This course is designed to be an action-oriented exploration and synthesis of the evidence-based literature applied to arts in health program planning, evaluation, community engagement, outreach, social media and/ or research methods.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 560 Design and Grant Writing for Community Health Programs 3.0 Credits**

This course is an interdisciplinary course of the Master of Public Health (MPH) Program required for Community Health and Prevention majors. It is designed to provide students with the knowledge and skills essential to the development, implementation, and evaluation of comprehensive health promotion programs. The course will also introduce students to the grant application process. Students will demonstrate an understanding and mastery of the principles of program development, implementation, and evaluation via the development and presentation of a competitive grant proposal addressing a public health issue of relevance today.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 561 Overview of Issues in Global Health 3.0 Credits**

This introductory course will cover the major issues and considerations involved in global health. It is a survey course that is designed to familiarize students with the major health issues across the globe, including general concepts such as determinants of health, the measurements of health status, as well as demographic and other global trends and their impact on the global burden of the disease. The course will also address specific health issues that affect much of the world’s population such as communicable diseases, malnutrition, water and sanitation, chronic diseases, injuries and environmental health challenges, as well as the factors that threaten reproductive and child health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 605 Outcomes and Impact Evaluation 3.0 Credits**

This course will provide students with theoretical and practical aspects of health evaluation. Much of public health is about developing programs and policies to impact individual and population health. Therefore, public health practitioners must be able to measure the impact on health of these initiatives. This course helps students understand what they can say with confidence about how health programs and policies perform.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 607 Public Health Ethics 3.0 Credits**

This course will explore the basics of ‘public health ethics’: its historical emergence; the theories and approaches used in this discipline; and key ethical issues in contemporary public health. Emphasis will be placed on developing critical thinking skills to guide students in ethical problem-solving. During the first third of the course, we will consider theoretical issues in public health ethics, including the nature and definition of ‘health’, the boundaries of the field, key theoretical approaches, and critical thinking skills. In the following weeks, we will apply these ethical concepts, principles and theories to a number of specific topics and cases in public health. This course is demanding in both reading and writing; students should be prepared to engage in serious dialogue each week in class.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 650 Drug Use and Public Health 3.0 Credits**

In the past several decades drug use has emerged as a major public health issue. The course will focus on biological, psychological, social, and cultural aspects of key licit and illicit substances. Additionally, students will learn relevant public health aspects of drug use, including prevention, intervention, and policy.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 660 Global Health Ethics 1.5 Credit**

Global health ethics is an emerging discipline, rooted in bioethics, but often recognizing the challenges of globalization, cultural diversity, social and economic inequities, and the broad scope of global health concerns. Often, global health ethics is considered a field of applied ethics, inquiry, and practice engaged in interprofessional, transdisciplinary and transcultural dialogue, rigorous analysis, and normative guidance. Global health ethics also engages with human rights discourses in analyzing the responsibilities and actions of both state and non-state actors.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHP 607 [Min Grade: C] (Can be taken Concurrently)

**CHP 661 Monitoring and Evaluation in Global Health Programs and Advocacy 1.5 Credit**

This course focuses upon program monitoring and evaluation (M&E) challenges and considerations in a global health setting. The course presents a series of case studies and requires students to engage in considering how M&E systems in these settings can be developed using the CART principles, which seek to ensure that M&E data is credible, actionable, responsible (feasible and cost-effective), and transportable (generalizable). The course also presents the challenge of M&E in the context of advocacy campaigns.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHP 673 [Min Grade: C] (Can be taken Concurrently)

**CHP 670 Multicultural Competence in Community Health and Prevention 3.0 Credits**

This course aims to heighten our capacity designing initiatives responsive to the priorities and context of specific communities, including methods for bridging cultural, ethnic, racial, social, and class differences among others. Implicit in cultural competency is a set of congruent behaviors, attitudes, beliefs, and values facilitating engagement with peoples whose backgrounds and experiences may differ from our own. This concept also assumes awareness of one's cultural identity, self-acceptance, skill walking in others' shoes, & one's ability capitalizing on human differences to advance population health. Principles & practices that acknowledge equality in rights & dignity will be applied to gain knowledge & understanding of peoples' antecedents while increasing our self-knowledge & self-assessment skills.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 671 Community Organizing and Community Assessment for Health and Wellness 3.0 Credits**

This course introduces students to community health and wellness through the lenses of community organizing, community assessment and building equitable partnerships. It is a conceptual and practice-based course that focuses on models, principles, concepts and methods, including Action-Oriented Community Diagnosis (AOCD), a multi-step framework for community assessment that is a foundational step of Community-based Participatory Research (CBPR). It also focuses on the role of the public health professional and ethical considerations when working with communities. The course provides an integrated approach to learning that includes activities in and outside of the classroom.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 672 Theory and Practice in Health Communication 3.0 Credits**

This course introduces students to the theory, principles, and practical applications of the ever-changing dynamics of health communication. Communication is viewed as an important tool to develop, maintain, and enhance relationships between individuals, families, community organizations and members, health professionals and consumers, government agencies and the general public, and all members of our society. Students will discover, analyze, and practice the steps to develop, implement, and evaluate health communication interventions. Emphasis will be on the use of a systematic and strategic process including a conceptual framework, audience research, strategic design, message development, pretesting, materials production, developing and implementing a dissemination plan, monitoring, and evaluation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 673 Process Monitoring and Outcomes Evaluation for Community Health Programs 3.0 Credits**

This course is designed to review the principles of identifying short-term, mid-term and long-term outcomes and how these are linked to program goals, objectives, mission and vision. Topics include selecting outcomes in conjunction with the community, and strategies for design, data collection, analysis and interpretation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 681 Research with Rare, Stigmatized and Hidden Populations 3.0 Credits**

Target audience for this course is those intending to conduct research or evaluate programs designed for rare, stigmatized and/or hidden populations and for consumers of such programs. The course seeks to help students understand the ethics of research/evaluation in such programs, analyze health outcome measures and appropriately store data collected.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 683 Intersectional Perspectives 3.0 Credits**

This course is designed to introduce public health students to the burgeoning scholarship on intersectionality within the social sciences, with a specific focus on the public health field. We will examine how the intersection of social identities including race, ethnicity, sex, gender, socio-economic status, mental, or physical disabilities, among others, results in different health implications and outcomes for different populations as a consequence of social discrimination based on the noted interlocking identities.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 684 Sexual Orientations And Health 3.0 Credits**

This course is intended as a first survey course that covers various health concerns and disparities associated with sexual orientations (focusing on the concerns of sexual minorities), ranging from mental health to HIV/AIDS to intimate partner violence. The paradigm that we will adopt as the foundation for our weekly discussions will emphasize how behaviors and outcomes are related to stress and stigma and other social determinants that sexual minorities experience as marginalized communities.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 685 Genders And Sexes And Health 3.0 Credits**

This course is intended as a first survey course that covers various health concerns and disparities associated with sexes and genders (focusing on the concerns of gender minorities), ranging from violence to substance abuse to access to care. The paradigm that we will adopt as the foundation for our weekly discussions will emphasize how behaviors and outcomes are related to stress and stigma and other social determinants that gender minorities experience as marginalized communities.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 691 Public Health Practice in and with Latino Communities 3.0 Credits**

The goal of this course is to prepare students for genuine engagement in a culturally diverse experience in the service of Latino populations within the United States using interdisciplinary approaches to learn about public health practice. Attention will be given to the major Latino subgroups living in the US and the role of applied knowledge about ways to work with these varied populations across their lifespan. This course seeks to help students better understand the multiple forces that impinge on one's health, and the role of social determinants – where we live, where we work, where we socialize, and the role of stress on our physical health and mental well-being.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 692 Migration and Health 3.0 Credits**

This course will provide students with an overview of the health issues experienced by immigrant and migrant populations. The course starts with a global approach, but focuses on Latino im/migrants in the US as a case study. We will cover historical and current migration trends, demographic, and economic aspects of international migration, and theoretical frameworks to identify priority health issues and individual, socio-cultural, and structural health determinants across different migration phases. We will also cover strategies and interventions to address the health needs of immigrant and mobile populations. Students will gain an understanding of migration and health theories, methodological approaches, data resources, and intervention approaches to do research on and/or work with these populations.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 705 Religion, Spirituality, and Health 3.0 Credits**

This course focuses on the emerging field of Religion, Spirituality and Public Health. It explores many dimensions of religion, spirituality, and health to promote individual and community wellbeing in the United States. Course content focuses on research, practice, advocacy and successful models for working with faith-based communities and religious leaders and emphasizes the importance of building working partnerships among health systems, public agencies and faith-based organizations for social justice. The course also provides an opportunity for students to explore topics of personal interest linking spirituality, science and health, including belonging, compassion, empathy, meaning-making and gratitude.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 750 Integrative Learning Experience in Community Health & Prevention I 3.0 Credits**

The ILE is organized as a 6-credit project over two quarters in year two. Students will work with their advisor to develop and implement a practice-based project designed to enhance students' interests and engage with community partner(s) or be of direct relevance to community stakeholders. Although practice-based, the ILE is to be rooted in the research literature and/or apply research methods to elevate the work wherever it lies within a planning and research cycle, such as the Institute of Medicine's Framework for Collaborative Public Health Action in Communities (2003). Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product at the end of the experience, ideally of benefit to both academic and community audiences.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 751 Integrative Learning Experience in Community Health & Prevention II 3.0 Credits**

The ILE is organized as a 6-credit project over two quarters in year two. Students will work with their advisor to develop and implement a practice-based project designed to enhance students' interests and engage with community partner(s) or be of direct relevance to community stakeholders. Although practice-based, the ILE is to be rooted in the research literature and/or apply research methods to elevate their work wherever it lies within a planning and research cycle. Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product at the end of the experience, ideally of benefit to both academic and community audiences. This is the second course in the sequence, which will focus on analysis and completion of deliverables.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 752 Global Health Integrative Learning Experience: Capstone Course I 1.5 Credit**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year and part-time third-year MPH students majoring in Global Health. Organized as a 3-credit project over two quarters, students engage in an Assessment, Evaluation or Research Project that emphasizes practical applications of concepts and skill development. Students will engage in discussion and peer mentoring throughout the two-course sequence providing support and feedback to their peers via an online classroom. This project will primarily be self-directed learning. Students are required to complete a high-quality written product and presentation at the end of the experience. This is the first course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit



**CHP 753 Global Health Integrative Learning Experience: Capstone Course II 1.5 Credit**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year and part-time third-year MPH students majoring in Global Health. Organized as a 3-credit project over two quarters, students engage in an Assessment, Evaluation or Research Project that emphasizes practical applications of concepts and skill development. Students will engage in discussion and peer mentoring throughout the two-course sequence providing support and feedback to their peers via an online classroom. This project will primarily be self-directed learning. Students are required to complete a high-quality written product and presentation at the end of the experience. This is the second course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 801 Theory & Practice of Community Health & Prevention I 3.0 Credits**

This course introduces students to theories, scientific methods, and research issues in community health and prevention. Major theoretical approaches to community health are discussed, including behavioral, social, cultural and communication –based approaches. An ecological model of health is presented, with an emphasis on behavioral and social determinants of health. Key public health concerns are studied and placed in the context of theoretical approaches to community health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CHP and program is PHD.

**CHP 802 Theory & Practice of Community Health and Prevention II 3.0 Credits**

This course focuses on public health interventions, specifically how theory and research intersect in public health programming. It discusses individual and social theories of change to design interventions across several socio-ecological domains, from the intrapersonal to the global level. Process evaluation and outcome assessment of interventions are covered.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CHP and program is PHD.

**CHP 803 Research Methods for Community Health and Prevention 3.0 Credits**

Public health leaders must understand and use diverse research methods to make significant contributions to community health and prevention. This course integrates foundations of research methodology with use of appropriate statistical procedures to prepare students to apply rigorous scientific methods to understand and solve major public health problems.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CHP and program is PHD.

**CHP 804 Qualitative Research in Community Health 3.0 Credits**

This course is designed both for those who plan to engage in qualitative research and for those who want to become familiar with how qualitative researchers produce knowledge. Through lectures, group discussions, hands-on skills practice, and written reflections, this course provides students with an overview of the theoretical and practical tools of qualitative research. Students will study and use a variety of qualitative methods suited for public health practice and research. Methods include case study analysis, individual interviews, focus groups, ethnography, and observation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 805 Outcomes and Impact Evaluation 3.0 Credits**

This course will provide students with theoretical and practical aspects of health evaluation. Much of public health is about developing programs and policies to impact individual and population health. Therefore, public health practitioners must be able to measure the impact on health of these initiatives. This course helps students understand what they can say with confidence about how health programs and policies perform.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 806 Community Based Participatory Research 3.0 Credits**

Participatory Action Research acknowledges that every human being has the capacity to be a change agent. This is accomplished through an alternate view of the research world in which collaboration is emphasized. This course provides theory and skills necessary to plan, implement and evaluate community-based Participatory Action Research initiatives.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 807 Public Health Ethics 3.0 Credits**

This course will explore the basics of 'public health ethics': its historical emergence; the theories and approaches used in this discipline; and key ethical issues in contemporary public health. Emphasis will be placed on developing critical thinking skills to guide students in ethical problem-solving. During the first third of the course, we will consider theoretical issues in public health ethics, including the nature and definition of 'health', the boundaries of the field, key theoretical approaches, and critical thinking skills. In the following weeks, we will apply these ethical concepts, principles and theories to a number of specific topics and cases in public health. This course is demanding in both reading and writing; students should be prepared to engage in serious dialogue each week in class.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 808 Measuring Health 3.0 Credits**

This course is for students using health measurement scales, and constructing measures of health for evaluation, research, population monitoring, or policy purposes. Methods will be explored for measuring health in individuals and populations. We will review fundamental theories of measurement including classical test theory, item response theory, and qualitative and quantitative approaches. We will explore existing measures of health and what is known about their validity and reliability. We will examine how existing scales have been used to learn about the health of people and communities and to measure health disparities. We will then explore how to create scales when none exist or existing scales are inadequate for the desired purposes.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 810 Practicum in Community Health and Prevention 3.0 Credits**

Practicum in Community Health and Prevention. 360 hours of supervised experience applying concepts and methods to ongoing community health programs or policy development.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHP 801 [Min Grade: B]

**CHP 813 Theory and Practice of Health Communication 3.0 Credits**

This course introduces students to the theory, principles, and practical applications of the ever-changing dynamics of health communication. Communication is viewed as an important tool to develop, maintain, and enhance relationships between individuals, families, community organizations and members, health professionals and consumers, government agencies and the general public, and all members of our society. Students will discover, analyze, and practice the steps to develop, implement, and evaluate health communication interventions. Emphasis will be on the use of a systematic and strategic process including a conceptual framework, audience research, strategic design, message development, pretesting, materials production, developing and implementing a dissemination plan, monitoring, and evaluation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 815 Advanced Topics in Qualitative Analysis & Manuscript Development 3.0 Credits**

This course teaches students how to analyze an existing qualitative dataset. The course is structured in a seminar/workshop format. A key feature of the course involves students reviewing and critiquing each other's manuscripts. Students may be first author on their manuscript and will be expected to submit their manuscript to a peer-review journal.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 901 Dissertation Seminar I 3.0 Credits**

This is a required doctoral course to develop the doctoral dissertation proposal. Class participants will select their dissertation topic, identify specific aims, complete a critical analysis of literature, and select appropriate research methods. The course will include self-assessment of dissertation proposal development and peer critiques of dissertation proposals.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 902 Dissertation Seminar II 3.0 Credits**

This is a required doctoral course to revise and refine the dissertation proposal. During this course, students will meet individually with their supervising professor to advance all aspects of the dissertation proposal, including the Drexel University Internal Review Board (IRB) protocol for their research and the oral defense of the proposal.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CHP 901 [Min Grade: B]

**CHP 903 Advanced Proposal Development 3.0 Credits**

This course will support the continued refinement of the student's plan of research, and completion of the thesis proposal. Students will have the opportunity to hear from students at further stages of the dissertation process, examine theses from previous DSPH students, and consider the choice of the single monograph versus three manuscript thesis options. Students will also be supported in the development of one or more applications for funding to external sources to provide support for their thesis research. Other professional development content will focus on how to ask for and manage feedback from multiple committee members to optimize quality of a proposal or thesis, data ownership and authorship, reference and citation rules and procedures, and other dissertation related topics.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**CHP 904 Doctoral Seminar in Community Health and Prevention 1.0 Credit**

This is a required doctoral seminar in which all first and second year doctoral students in CHP will participate, on an ongoing basis, across their first two years in the program. One goal of the seminar is to expose students to the range and diversity of research activities conducted by CHP faculty and other social and behavioral scientists in the Drexel community and elsewhere. The second goal is to give students the opportunity to present their own research, or research on which they collaborate in a supportive but rigorous setting and receive feedback. The third goal is to expose students to key skills or professional development knowledge that is not contained in any CHP course or thesis-related activity and prepare them for key milestones.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 7 credits

**Restrictions:** Can enroll if major is CHP and program is PHD.

**CHP 998 Dissertation Guidance 1.0-12.0 Credit**

Directed guidance of dissertation research including base-building and consent, data collection and intervention, analysis and interpretation of data and implications for future research, policy and practice. Guidance will include preparation for presenting dissertation research and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CHP 901 [Min Grade: B] and CHP 902 [Min Grade: B]

**CHP 999 Dissertation Guidance 1.0-9.0 Credit**

Directed guidance of dissertation research including base-building and consent, data collection and intervention, analysis and interpretation of data and implications for future research, policy and practice. Guidance will include preparation for presenting dissertation research and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CHP 901 [Min Grade: B]

**CHP T580 Special Topics in Community Health & Prevention 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**CHP T680 Special Topics in Community Health & Prevention 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**CHP T780 Special Topics in Community Health & Prevention 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**CHP T880 Special Topics in Community Health & Prevention 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**CHP T980 Special Topics in Community Health & Prevention 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

## Complement & Integrative Therapy

### Courses

**CIT 501 Foundations of Phytotherapy 3.0 Credits**

This course serves as a foundation for the safe, effective and rational approach to using some of the most commonly known herbs in clinical practice. Includes a review of primary uses, active constituents, pharmacological actions, known contraindications, drug interactions, potential side effects, and review of the clinical research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 502 Foundations of Complementary and Integrative Therapies 3.0 Credits**

This course provides an overview of the history of medicine and reviews the theoretical foundations of selected Complementary and Integrative Therapies, including botanical medicine, clinical aromatherapy, homeopathy, mind-body therapy, energy therapy, and humor. It introduces a holistic approach to health, and offers strategies for integration of the best of conventional and complementary practices for optimal health and wellness across the spectrum of care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 503 Holistic Living For The Caregiver 3.0 Credits**

This course is designed to take students on an experiential journey toward a holistic way of living that emphasizes a mind-body-spirit approach.

Emphasizes development of healthy, nutritious eating, effective exercise, and guidelines for incorporating basic supplementation. Students stress reduction and management techniques including breathing, walking and music. Integrates spiritual concepts.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 511 Spirituality, Health and Healing 3.0 Credits**

Spirituality is an essential aspect of one's identity. For some, spirituality is expressed in terms of religious concepts while for others it is less formalized yet no less significant in contributing meaning and purpose to their lives. Health, illness, and healing are three major life experiences impacted upon by one's spirituality.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 513 Yoga for the Enlightened Practitioner 3.0 Credits**

This course provides a framework for understanding and experiencing the holistic practice of yoga. It addresses yoga's ancient philosophy of universal wisdom and this philosophy's increasing relevance to humankind today. The eight limbs of yoga are incorporated for study throughout the course content modules to promote self awareness and conscious action in daily life experience. Holistic yoga application as a medical modality is reviewed based on evidence based practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 534 Witches, Wise Women and Women Healers 3.0 Credits**

This course provides a chronicle of women healers throughout history from ancient to modern times--those who have served as priestesses, witches, wise women, and ultimately the healers who have helped to shape and form healthcare as we know it today. It examines the influence of religion, misogyny, science, politics, economics, and sexuality on the creation of the female archetype and the lasting impression that has influenced her role in healing practices. Students will also look at the role of modern healers and the evolving model of integrative healthcare in healing practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 552 Integrative Advanced Relaxation Techniques (I-ART) 3.0 Credits**

Integrative Advanced Relaxation Techniques is a whole-person approach to stress management and healthy living that integrates evidence based modalities to promote relaxation and well-being. We will explore the science of the stress response and its impact on the physical, emotional, cognitive, and spiritual domains of health. Students will conduct assessments, evaluate modalities, and develop individualized relaxation strategies to reduce stress, increase positive outlook and improve health.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 553 Health Coaching for Lifestyle and Behavior Change 3.0 Credits**

This course explores the core tenets of integrative health and wellness coaching in diverse health care settings. Coaching elements include developing the coaching partnership; assessing lifestyle factors, strengths and life satisfaction; using motivational interviewing to determine values and actionable health goals; and identifying barriers and resources. The course presents the evidence base on the impact of healthy lifestyle practices and the mind-body-spirit connection on positive health; and introduces tools and strategies rooted in the theory, research and practice of health and wellness coaching to obtain optimal and sustainable health and well-being.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 502 [Min Grade: B] and CIT 503 [Min Grade: B]

**CIT 600 Foundations in Clinical Aromatherapy 3.0 Credits**

This course provides a strong foundation for the safe and effective use of 20 therapeutic essential oils. Includes the clinical application of each essential oil, basic essential oil organic chemistry, safety, dosages and known contraindications. Reviews essential oil biosynthesis, specific plant morphological structures, extraction methodologies, primary avenues of absorption, and an overview of the history of aromatherapy. This course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 602 Women's Integrative Health 3.0 Credits**

This course presents an Integrative Mind-Body approach for supporting various states of health imbalance specific to women's health. Applied integrative strategies highlight the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities. Takes into account the eastern philosophy of anatomy energetics, the integration of the physical and the spiritual, psyche and soma, into a harmonious whole for addressing specific women's health conditions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 618 Principles of Holistic Nursing 3.0 Credits**

This course provides a foundation of holistic nursing knowledge, understanding and insight, including holistic nursing theories, ethics, and beliefs. The course will focus on the American Holistic Nurses Association's Scope and Standards of practice, as well as the Holistic Nursing Core Values. Students will explore the concept of healing, evaluate current local and national trends and environmental conditions that affect health, and identify ways to incorporate the concepts of holistic nursing into professional practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 619 Principles of Bioenergy Therapies 3.0 Credits**

Principles of Bioenergy Therapies examines the concept of human bioenergy fields and the healing modalities known as energy therapies that rebalance the bioenergy field to promote healing. The history and research into energy therapies is covered as students explore the paradigm shift in treatment of individuals in Western medicine.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 621 Principles of Hospice and Palliative Care 3.0 Credits**

This course presents clinical practice guidelines and evidence base knowledge in addressing the physical, psychological, social, and spiritual needs of patients living with serious illness. Tools necessary to provide compassionate whole person care that acknowledges and supports individual goals, values, wishes, are presented with techniques for essential collaboration of the patient, family, and an interdisciplinary health care team. This course will examine the ancient texts of death and dying, the unique energy of the ancient hospices in Europe, and the modern hospice and palliative care movement in the United States to model care delivery that enhances quality of life in the presence of serious illness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 622 Integrative Therapies in Hospice and Palliative Care 3.0 Credits**

This course introduces health care professionals to the use of complementary and integrative therapies (CIT) used in hospice and palliative care. The current use of proven modalities in palliative care will be discussed, as well as the potential for expanding current practice. This course provides students with evidence-based knowledge and skill to translate these modalities into clinical practice. A holistic approach allows for a more complete and effective serious illness plan of care, ultimately demonstrating that death may be embraced as a sacred and empowering life event, like the amazing moment of birth.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**CIT 623 Cultural Perspectives in Hospice and Palliative Care 3.0 Credits**

Culture plays an important role in an individual's view of death and in a health care provider's provision of care at the end of life. This course will explore culture, the learned behaviors, beliefs, and values that define an individual's experience, affecting their views of health, illness, dying, and life after death. The health care provider will develop skills necessary to recognize, assess, and address the psychological, social/religious perspectives, and cultural taboos realizing that different cultures may require significantly different approaches, ultimately, providing a meaningful context for dying.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 624 Foundations of Integrative Addiction Therapies 3.0 Credits**

This course introduces the principles of integrative addictions treatment, and explores evidence based complementary and integrative therapies to enhance sustainable recovery from substance abuse disorders. Students will explore the impact of neurobiological changes, adverse events, and poor nutrition, as well as other factors that contribute to continued use. Recovery will be viewed from many disciplines, promoting a whole person approach that addresses the physical, emotional, cognitive and spiritual aspects of healing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 625 Spirituality, Empowerment, and Transformation 3.0 Credits**

This course is appropriate for clinicians within the helping professions seeking to support others on their unique paths towards wellness. Starting with the self, the student experiences integrative approaches on their own wellness journey. These techniques form an integrative approach to assist others. Theories and techniques of behavior change include positive psychology, cognitive behavioral processes, and spiritual intelligence. Complimentary and integrative approaches explored include guided visualization and imagery, journaling, meditation, mindfulness, music, and prayer.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 626 Translational Research in Complementary and Integrative Health 3.0 Credits**

This course provides a comprehensive overview of research methods in Complementary and Integrative Health (CIH). Students are introduced to methods for assessing and conducting research specific to Complementary and Integrative Therapies. Each student develops a research design to address a contemporary health care issue through the lens of CIH, focusing on a synthesis of current knowledge, gaps in the literature, implications for practice and potential for future inquiry.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIT.

**Prerequisites:** CIT 656 [Min Grade: B] or NURS 656 [Min Grade: B]

**CIT 631 Introduction to Nutritional Neuroscience 3.0 Credits**

This course explores the emerging interdisciplinary field of nutritional neuroscience that relates directly to many healthcare and quality-of-life issues at the forefront of modern society, including mood, cognition, addictions, and brain disorders (i.e. Brain Injury, Autism Spectrum Disorder, and Alzheimer's Disease). Students will review physiological foundational neuroscience and the neuronutritional models to address conditions. This course examines specific neuronutritional agents that can be used as part of an integrative approach to promote optimal neurochemistry and brain function and to slow or reverse the progression of conditions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 656 Traditional Healing Systems 3.0 Credits**

This course provides a survey of ancient and contemporary Traditional Healing Systems that form the foundation of health care around the world. Without exception, these systems feature a holistic approach to diagnosis and healing, the mind-body-spirit connection, and the importance of community and environment for health and well-being. We explore Traditional Chinese Medicine, Ayurveda, and African Medicine, as well as Unani, Native North American healing and Latin American Curanderismo, to better understand the roots of medical practices in the U. S. and around the globe, and to expand our respect for culture and diversity in modern health care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 502 [Min Grade: B] or NURS 539 [Min Grade: B]

**CIT 657 Functional Approach to Clinical Nutrition 3.0 Credits**

This course introduces an evidence-based, functional medicine model of clinical nutrition, a science-based field of healthcare that examines core clinical imbalances that underpin specific conditions and associated symptoms. A functional approach to nutrition analyzes the multiple roles of various nutrients and focuses on how these key life-sustaining substances support health throughout the different systems of the body, as well as providing a broader perspective on deficiency symptoms and how to ameliorate them.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIT.

**CIT 658 Advanced Women's Integrative Health 3.0 Credits**

This course continues in the presentation of women's integrative health strategies that incorporate a holistic Mind-Body-Spirit approach for addressing specific women's health conditions. Applied integrative health protocols will focus on the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities for supporting various states of health imbalance.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CIT 690 Independent Study 3.0 Credits**

The student works under the guidance of a faculty member to study in depth a topic related to his or her program of study. Independent study courses may be undertaken when there is no specific formal coursework available to support the student's program of study. Specific objectives and requirements are negotiated individually and students will sign an Independent Study Contract. This course may be repeated three times for credit as topics vary from term to term.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**CIT 696 Integrative Health Strategies I 3.0 Credits**

This course focuses on the application of evidence based integrative health modalities that include preventative, non-invasive and natural approaches to specific health conditions. Dietary and lifestyle modifications, nutritional supplementation, phytomedicines, mind-body stress reduction techniques, and other complementary therapies are evaluated for inclusion in individualized, holistic and comprehensive health plans. Students explore the characteristics of a successful health partnership, rooted in mindful presence, collaboration, empowerment to achieve health goals, and respect for the mind-body-spirit connection.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 502 [Min Grade: B] or NURS 529 [Min Grade: B]

**CIT 697 Integrative Health Strategies II 3.0 Credits**

This course expands on Integrative Health Strategies I by further exploring evidence based integrative health strategies that include preventative, non-invasive and holistic treatment approaches that can be utilized as supportive therapies for specific health conditions. Students are introduced to contemporary issues in the field, and develop professional skills to become leaders in the art and science of complementary and integrative health.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 696 [Min Grade: B]

**CIT 698 Graduate Seminar 3.0 Credits**

In this course, students begin the process of translating research into practice by assessing a health care need or problem within an organization and exploring the scientific literature to determine a Complementary and Integrative Health modality to improve outcomes or organizational function. The primary focus of Seminar is to develop a White Paper proposal for an organization of the student's choice to address the integration of the selected CIH modality into service delivery, workplace function, or community practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 697 [Min Grade: B] (Can be taken Concurrently)

# Computer Science

## Courses

**CS 500 Fundamentals of Databases 3.0 Credits**

This course gives an introduction to data management at scale. Covered topics include ER and relational modeling, SQL, database application development, query processing, and data management on distributed platforms.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 501 Introduction to Programming 3.0 Credits**

Develops an understanding of the principles, knowledge, and skills in the practice of programming. For both students with no programming experience and those with a small amount of programming experience, this course will bring them up to speed and prepare them for graduate study in Computer Science.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CS 502 Data Structures and Algorithms 3.0 Credits**

An introduction to classical algorithms with a focus on implementation and applications. Covers both analysis and implementation of algorithms. Algorithms include searching, sorting, and shortest path. Data Structures and their analysis is also covered. Data Structures include trees and graphs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 501 [Min Grade: C]

**CS 503 Systems Basics 3.0 Credits**

This course will introduce fundamental concepts of computer architecture and operating systems, covering the Unix environment from the perspective of an application developer and a systems programmer. Topics include scripting, languages and tools that are part of the Unix environment, as well as introduction to system programming topics, including OS processes and threads, memory management, concurrency, inter-process communication and networking.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 501 [Min Grade: C] (Can be taken Concurrently)

**CS 504 Introduction to Software Design 3.0 Credits**

This course features hands-on and project-based approaches to object-oriented design, covering abstraction, modularization, inheritance, polymorphism, encapsulation, design principles, design patterns, as well as design modeling languages. Basic concepts of software architecture and database will also be introduced.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 502 [Min Grade: C] (Can be taken Concurrently) and CS 503 [Min Grade: C]

**CS 510 Introduction to Artificial Intelligence 3.0 Credits**

Well-formed problems; state spaces and search spaces; Lisp and functional programming; uninformed search; heuristic search; stochastic search; knowledge representation; propositional logic; first order logic; predicate calculus; planning; partial order planning; hierarchical planning.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 511 Robot Laboratory 3.0 Credits**

Building and programming machines built out of construction pieces, a micro-controller, actuators, motors, sensors, that interact with the world using limited computational resources. Issues in mechanics, physics, electronics, real-time control, uncertainty, map building, path planning, and other topics in introductory robotics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 510 [Min Grade: C] or CS 583 [Min Grade: C]

**CS 521 Data Structures and Algorithms I 3.0 Credits**

Techniques for analyzing algorithms: asymptotic notation, recurrences, and correctness of algorithms; divide and conquer: quick sort, merge sort, median and order statistics; elementary data structures: hashing, binary heaps, binary search trees, balanced search trees; graph algorithms: Depth and Breadth first searches, connected components, minimum spanning trees, shortest paths in graphs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 522 Data Structures and Algorithms II 3.0 Credits**

Discussion of algorithm design techniques, augmented data structures including Binomial and Fibonacci heaps and Splay tree; Amortized analysis of data structures, topics in pattern and string matching, network flow problem, matching in bipartite graphs, and topics in complexity theory including reduction and NP-completeness, and approximation algorithms.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 521 [Min Grade: C]

**CS 523 Cryptography 3.0 Credits**

Covers the underlying algorithms behind symmetric key and public key cryptography. Students will learn the underlying mathematics behind the algorithms and the necessary issues involved when implementing these algorithms. A variety of cryptosystems and methods of attack will be implemented and analyzed. Assumes knowledge of linear algebra and discrete math.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 502 [Min Grade: B]

**CS 525 Theory of Computation 3.0 Credits**

Theory of computation introduces basic mathematical models of computation and the finite representation of infinite objects. These topics covered in the course include: finite automata and regular languages, context free languages, Turing machines, Partial recursive functions, Church's Thesis, undecidability, reducibility and completeness, and time complexity.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 530 Developing User Interfaces 3.0 Credits**

This course examines the implementation of multimodal user interfaces within the context of interface design and evaluation. The course involves both practice implementing interfaces using current technologies and study of topical issues such as rapid prototyping, advanced input, and assistive technology.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 536 Computer Graphics 3.0 Credits**

An introduction to the basic concepts of computer graphics, with a special emphasis on the mathematical representations of 3D objects (lines, curves, surfaces and solids), as well as the algorithms used to evaluate these objects. Topics such as drawing, clipping, color, viewing, rendering and animation will also be covered.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 537 Interactive Computer Graphics 3.0 Credits**

This is a project-oriented class that covers the concepts and programming details of interactive computer graphics. These include graphics primitives, display lists, picking, shading, rendering buffers and transformations. Students will learn an industry-standard graphics system by implementing weekly programming assignments. The course culminates with a student-defined project.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 540 High Performance Computing 3.0 Credits**

Covers the design, evaluation and use of high-performance processors, including instruction set architecture, pipelining, superscalar execution, instruction level parallelism, vector instructions, memory hierarchy, parallel computing including multi-core and GPU, and high-performance I/O. Special attention is given to the effective utilization of these features, including automated techniques, in the design and optimization of performance-driven software.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 543 Operating Systems 3.0 Credits**

Covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 544 Computer Networks 3.0 Credits**

To examine computer networks using networking models (TCP/IP, OSI and ATM) and break down computer networking, examine each layer and its duties and responsibilities. To analyze networking protocols and understand the design. To use the Internet and other example protocols to illustrate the theory and operation of each layer.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 550 Programming Languages 3.0 Credits**

Covers basic concepts of the design and implementation of programming languages, including data representation and types, functions, sequence control, environments, block structure, subroutines and coroutines, storage management. Emphasizes language features and implementation, not mastery of any particular languages.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 551 Compiler Construction 3.0 Credits**

Provides a thorough study of modern compiler techniques. Topics include scanners, parsers with emphasis on LR parsing, and syntax-directed translation. Requires students to use a parser generator to write a compiler for a non-trivial language. Examines several advanced topics in depth, such as automatic code generation, error recovery, and optimization techniques.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 525 [Min Grade: C]

**CS 555 Computational Network Neuroscience 3.0 Credits**

This course provides a broad introduction to computational network neuroscience, also known as connectomics, which is an interdisciplinary field between medicine, neuroscience, machine learning, and graph theory to students coming from a computing background. Processing of neuroimaging data to obtain brain networks, its analysis using basic statistical methods as well as advanced machine learning techniques, with applications on healthy and various patient populations will be covered. After taking the course, the student will become prepared for a postgraduate level research experience in the burgeoning field of connectomics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 501 [Min Grade: C] or CS 570 [Min Grade: C] or BMES 546 [Min Grade: C] or BMES 550 [Min Grade: C] or BIO 534 [Min Grade: C]

**CS 558 Game Engine Programming 3.0 Credits**

Introduces the general principles and techniques required to build a game engine from scratch. We will cover basic programming techniques for games, but without focusing on any specific programming language nor platform. Topics will include game engine architecture, game loops, real-time 2D and 3D rendering, collision detection, input handling, networking, animation, scripting, Game AI, and 2D and 3D physics simulation.

Additionally, students will also gain knowledge of existing game engines, such as OGRE.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 567 Applied Symbolic Computation 3.0 Credits**

For users of symbolic computation (maple, mathematica, derive, macsyma) who wish to gain an understanding of fundamental symbolic mathematical methods. Includes introduction to a symbolic mathematical computation system and application to problems from mathematics, science and engineering. Also includes programming and problems specific to symbolic computation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 570 Programming Foundations 3.0 Credits**

Develops an understanding of the principles behind and skill in the practice of programming. For both students with no programming experience and those with a small amount of programming experience, this course will bring them up to speed and prepare them for graduate study in Computer Science.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CS 583 Introduction to Computer Vision 3.0 Credits**

Theoretical and algorithmic foundation and applications of computer vision. Covered topics include image formation, image sensing, image filtering, lightness, radiometry, motion, image registration, stereo, photometric stereo, shape-from-shading, and recognition with an emphasis on the underlying mathematics and computational models and complexity as well as computational implementation of representative applications through multiple programming assignments.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 589 Responsible Machine Learning 3.0 Credits**

With the rapid deployment of machine learning models in domains such as lending, sentencing, and hiring, it is essential to understand the ethical aspects and negative consequences of such models. In this course, we focus on three of these aspects: fairness, explainability, and recourse.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]



**CS 590 Privacy 3.0 Credits**

This course will motivate the need for privacy protection and introduce basic privacy properties such as anonymity, unlinkability or unobservability. Students will discuss how these properties can be formalized, modeled and measured. The course will provide a broad overview of the state-of-the-art in privacy technologies, explain the main issues that these technologies address, what the current solutions are able to achieve, and the remaining open problems.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 591 Artificial Intelligence and Machine Learning Capstone I 3.0 Credits**

This course explores artificial intelligence (AI) and machine learning (ML) in practice as an open-ended team activity. Initiates an in-depth multi-term capstone study applying computing and informatics knowledge in an AI/ML project. Teams work to develop a significant product with advisors from industry and/or academia. Explores AI/ML-related issues and challenges involved in the application domain of the team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, and documentation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (CS 510 [Min Grade: C] and CS 613 [Min Grade: C] and CS 615 [Min Grade: C]) or (CS 614 [Min Grade: C] and INFO 629 [Min Grade: C])

**CS 592 Artificial Intelligence and Machine Learning Capstone II 3.0 Credits**

This course explores artificial intelligence (AI) and machine learning (ML) in practice as an open-ended team activity. Completes an in-depth multi-term capstone study applying computing and informatics knowledge in an AI/ML project. Teams work to develop a significant product with advisors from industry and/or academia. Explores AI/ML-related issues and challenges involved in the application domain of the team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, and documentation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 591 [Min Grade: C]

**CS 610 Advanced Artificial Intelligence 3.0 Credits**

Representation, reasoning, and decision-making under uncertainty; dealing with large, real world data sets, learning; and solving problems with time-varying properties; how to apply AI techniques toward building intelligent machines that interact with dynamic, uncertain worlds.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 510 [Min Grade: C]

**CS 611 Game Artificial Intelligence 3.0 Credits**

This course focuses on artificial intelligence (AI) techniques for computer games. Students will learn both basic and advanced AI techniques that are used in a variety of game genres including first-person shooters, driving games, strategy games, platformers, etc. The course will emphasize the difference between traditional AI and game AI, the latter having a strong design component, focusing on creating games that are "fun to play." Specifically, the topics we will cover in class are basic AI techniques, algorithms, and data structures used for character movement, pathfinding, decision-making, strategy and machine learning in games.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 510 [Min Grade: C]

**CS 612 Knowledge-based Agents 3.0 Credits**

Fundamentals of agent-based computing; distributed AI; representations; agent communication languages; reasoning (expert, rule-based, case-based, production systems); network communication protocols; emergent behavior; swarm intelligence.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 510 [Min Grade: C]

**CS 613 Machine Learning 3.0 Credits**

This course studies modern statistical machine learning with emphasis on Bayesian modeling and inference. Covered topics include fundamentals of probabilities and decision theory, regression, classification, graphical models, mixture models, clustering, expectation maximization, hidden Markov models, Kalman filtering, and linear dynamical systems.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 614 Applications of Machine Learning 3.0 Credits**

Machine learning (ML) learns concepts from data to perform complex tasks to solve a variety of challenging problems. With the growth and abundance of data sources and types, ML methods become more sophisticated and give rise to applications in new areas accomplishing tasks perceived as impractical or not feasible before. This course educates students to recognize the relevant factors in applying ML methods and architectures to different application problems in various application domains. The focus on specific application domains, tasks, and areas may vary depending on students' interest but will cover the essential problem areas of artificial intelligence such as vision, natural language, recommender systems, and applications in the biomedical field.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 629 [Min Grade: C], CS 613 [Min Grade: C], DSCI 631 [Min Grade: C] (Can be taken Concurrently)

**CS 615 Deep Learning 3.0 Credits**

Introduces a machine learning technique called deep learning and its applications, as well as core machine learning concepts such as data set, evaluation, overfitting, regularization and more. Covers neural network building blocks: linear and logistic regression, followed by shallow artificial neural networks and a variety of deep networks algorithms and their derivations. Includes implementation of algorithms and usage of existing machine learning libraries. Explores the usage of deep learning on a variety of problems including image classification, speech recognition, and natural language processing. Concludes with student-chosen project demonstrations accompanied by a conference-style paper.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 613 [Min Grade: C]

**CS 616 Robust Deep Learning 3.0 Credits**

This course features hands-on and project-based approaches to the understanding of the robustness and vulnerability of current state-of-the-art deep learning systems, particularly in the context of realworld security applications. Lectures will cover the theoretical foundation and algorithmic details of white/black-box adversarial attacks, data poisoning attacks, and appropriate defenses for multiple machine learning tasks, including image classification, object detection, natural language processing, graph neural networks, etc. More generally, the idea of adversarial machine learning is crucial for expanding learning capabilities, ensuring trustworthy decision-making, and enhancing the generalizability of deep learning methods.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 613 [Min Grade: C]

**CS 618 Algorithmic Game Theory 3.0 Credits**

This course explores, from an algorithmic perspective, problems that arise at the interface of economics and computer science. After a short introduction to game theory, the focus will be on understanding how the incentives of strategic agents may affect these agents' decisions, and on designing mechanisms aiming to improve the outcomes of the interactions among the agents. The topics covered include the design of auctions, matching markets, online advertising markets, fair division, selfish routing, social choice, and preference aggregation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 521 [Min Grade: C] or CS 522 [Min Grade: C]

**CS 621 Approximation Algorithms 3.0 Credits**

Study of techniques for designing approximation solution to NP-hard problems. Classification of problems into different categories based on the difficulty of finding approximately sub-optimal solutions for them. The techniques will include greedy algorithms, sequential algorithms, local search, linear and integer programming, primal-dual method, randomized algorithms, and heuristic methods.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 522 [Min Grade: C]

**CS 623 Computational Geometry 3.0 Credits**

Introduction to algorithms and Data Structures for computational problems in discrete geometry (for points, lines and polygons) primarily in finite dimensions. Topics include triangulation and planar subdivisions, geometric search and intersections, convex hulls, Voronoi diagram, Delaunay triangulation, line arrangements, visibility, and motion planning.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 521 [Min Grade: C]

**CS 629 Software Defined Radio Laboratory 3.0 Credits**

This laboratory course takes a Software-Defined Radio (SDR) implementation approach to learn about modern analog and digital communication systems. Software defined radio uses general purpose radio hardware that can be programmed in software to implement different communication standards. We will begin by discussing the basic principles of wireless radio frequency transmissions and leverage this knowledge to build analog and digital communication systems. Knowledge of these techniques and systems will provide a platform that can be used in the class project for further exploration of wireless networking topics such as cybersecurity, cognitive radio, smart cities, and the Internet of Things.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 630 Cognitive Systems 3.0 Credits**

This course explores the principles of cognition and intelligence in human beings and machines, focusing in how to build computational models that, in essence, think and act like people. The course reviews existing frameworks for such models, studies model development within one particular framework, and discusses how models can be employed in real-world domains.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 510 [Min Grade: C] or CS 530 [Min Grade: C]

**CS 634 Advanced Computer Vision 3.0 Credits**

A research-intensive course on advanced topics that reflect the state-of-the-art of current research activities in computer vision. The course alternates between lectures on the fundamentals of, and paper presentations by the students on, selected topics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 583 [Min Grade: C]

**CS 636 Advanced Computer Graphics 3.0 Credits**

Rendering techniques (ray tracing, phong, radiosity, photon mapping); texture and bump mapping; particle systems; hierarchical models; photorealism; non-photorealistic rendering; mathematical structures for graphics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 536 [Min Grade: C] or CS 537 [Min Grade: C]

**CS 643 Advanced Operating Systems 3.0 Credits**

In-depth examination of operating systems issues expanding on topics covered in CS 543 (Operating Systems) including: Kernel services, memory management, input/output, file systems, interprocess communication, networking, device drivers, system initialization. Included discussion of production systems such as BSD Unix and Microsoft Windows.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 543 [Min Grade: C]

**CS 645 Network Security 3.0 Credits**

The purpose of this course is to cover the principles and practice of cryptography and network security. The first half of the course covers cryptography and network security techniques. The second part deals with the practice of network security, i.e. with the processes and application that have to be in place to provide security.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 503 [Min Grade: C]

**CS 647 Distributed Systems Software 3.0 Credits**

In-depth discussion of fundamental concepts of distributed computer systems. Covers development techniques and runtime challenges, with a focus on reliability and system validation techniques. Subjects discussed include: interprocess communication, remote procedure calls and method invocation, middleware, distributed services, coordination, transactions, replication and weak data consistency models. Significant system-building term project in Java or similar language.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 650 Program Generation and Optimization 3.0 Credits**

This course introduces the student to the foundations and state-of-the-art techniques in high performance software development for numeric libraries and other important kernels. Topics include: 1) fundamental tools in algorithm theory, 2) optimizing compilers, 3) effective utilization of the memory hierarchy and other architectural features, 4) how to use special instruction sets, and 5) an introduction to the concepts of self-adaptable software and program generators.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 550 [Min Grade: C] and CS 540 [Min Grade: C]

**CS 660 Data Analysis at Scale 3.0 Credits**

Focuses on systems and algorithms for scalable processing of large complex datasets. Consists of four thematic units: data preparation, including data cleaning and integration# distributed computation on MapReduce and Apache Spark# analysis of graph, network and spatiotemporal data# and analysis of streaming data.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**CS 661 Responsible Data Analysis 3.0 Credits**

Focuses on ethical aspects of data science, namely: on fairness, accountability and transparency in data collection, integration, analysis and result interpretation. Covers the following technical topics: algorithmic fairness# data transparency and algorithmic transparency# data protection# Interpretability, verification and auditing.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CS 668 Computer Algebra 3.0 Credits**

Introduction to Foundations of Symbolic Computation. Typical topics : Arithmetic with large integers, rational numbers, polynomials, modular arithmetic, greatest common divisors, chinese remainder algorithm.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 521 [Min Grade: C]

**CS 676 Parallel Programming 3.0 Credits**

Covers a variety of paradigms and languages for programming parallel computers. Several tools for debugging and measuring the performance of parallel programs will be introduced. Issues related to writing correct and efficient parallel programs will be emphasized. Students will have ample opportunity to write and experiment with parallel programs using a variety of parallel programming environments.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 521 [Min Grade: C] and CS 543 [Min Grade: C]

**CS 695 Research Rotations in Cybersecurity 1.0-12.0 Credit**

The research rotation course allows students to gain exposure to cybersecurity-related research that cuts across conventional departmental barriers and traditional research groups, prior to identifying and focusing on a specific interdisciplinary project or thesis topic. Students selecting to participate in research rotations would participate in the research activities of two labs for each three credits of research rotation they undertake.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS 741 Computer Networks II 3.0 Credits**

Continues CS 740.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 544 [Min Grade: C]

**CS 751 Database Theory 3.0 Credits**

Covers topics in database theory and implementation, varying yearly. May include physical data organization, transaction management, concurrency, distributed data-bases, and semantics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 500 [Min Grade: C]

**CS 759 Complexity Theory 3.0 Credits**

Introduces formal models of computation, including inherent difficulty of various problems, lower bound theory, polynomial reducibility among problems, Cook's theorem, NP-completeness, and approximation strategies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 525 [Min Grade: C]

**CS 760 Theory Reading Group 0.0-3.0 Credits**

This class covers a wide variety of special topics in theoretical computer science and mathematics, including advanced techniques for the design and analysis of algorithms, algorithmic game theory, approximation algorithms, randomized algorithms, computational complexity, and discrete mathematics.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CS 521 [Min Grade: C]

**CS 770 Topics in Artificial Intelligence 3.0 Credits**

Covers issues in robotics, vision, and pattern recognition.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CS 610 [Min Grade: C]

**CS 898 Master's Thesis 1.0-12.0 Credit**

Master's thesis.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CS 997 Research in Computer Science 1.0-12.0 Credit**

Research.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS 998 Ph.D. Dissertation 1.0-12.0 Credit**

Hours and credits to be arranged.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 20 times for 45 credits

**CS 1599 Independent Study in Computer Science 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS 1699 Independent Study in Computer Science 1.0-6.0 Credit**

Independent study in computer science under faculty supervision. After finding a willing Computer Science Department faculty supervisor and working out the term of study, students obtain approval to take this course from the department's graduate advisor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 3 times for 18 credits

**CS 1799 Independent Study in Computer Science 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS 1899 Independent Study in Computer Science 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS 1999 Independent Study in Computer Science 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS T580 Special Topics in Computer Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS T680 Special Topics in Computer Science 0.0-12.0 Credits**

Special Topics Covers topics of special interest to students and faculty.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS T780 Special Topics in Computer Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS T880 Special Topics in Computer Science 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**CS T980 Special Topics in Computer Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

## Computing & Security Technology

### Courses

## Computing Technology

### Courses

**CT 500 Introduction to the Digital Environment 3.0 Credits**

Examines the digital environment and the technology within it. Topics include: Digitization, cognitive technologies, software, agile management processes, leading in the digital environment, and digital innovation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CT 600 Cloud Technology 3.0 Credits**

Covers the many technologies all part of cloud computing. Topics include: virtual machines, application development, storage, databases, security, monitoring, analytics, solution design and case studies about businesses leveraging cloud technologies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CT 500 [Min Grade: C]



**CT 605 Cloud Security and Virtual Environments 3.0 Credits**

Covers the elements that form cloud computing and virtualization technologies used in digital environments. Offers ways to determine which cloud computing and virtualization technologies to use given business and organizational needs. Provides methodologies to evaluate threats and vulnerabilities on these technologies. Provides methods to select and evaluate protections to secure cloud computing and virtualization technologies while ensuring business needs are met.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 517 [Min Grade: C]

**CT 610 Disaster Recovery, Continuity Planning and Digital Risk Assessment 3.0 Credits**

This course addresses Disaster Recovery & Continuity Planning specific to Emergency Recovery Procedures by incorporating digital risk assessment based on assets valuation, vulnerability and threats. Techniques for development of disaster recovery plans, procedures and testing methods. Strategies used by businesses to assure that sensitive data will not be lost in the event of a disaster. Risk migration methods that security professional use to protect valuable digital assets will also be studied. Issues, designed to foster critical thinking, are explored, as well as the standardized approaches to digital risk management.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CT 500 [Min Grade: C]

**CT 620 Security, Policy and Governance 3.0 Credits**

Covers the many techniques and practices for leading security governance of digital assets and for leading the policies that protect digital assets. Provides an understanding of the need for security governance and security policies for ensuring the protection of availability, confidentiality and integrity in the digital environment.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**CT 630 Application Software Construction and Operation 3.0 Credits**

Presents a management perspective on current issues and trends affecting development and production operation of software systems. Explores implications of composing software systems from existing parts and only writing new code where necessary. Examines the automation of the software development, release packaging, and operation workflow. Current topics include: composition of software systems, software reuse, open source software, software as a service, DevOps and automated operations, VMs and containers.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

## Construction Management

### Courses

**CMGT 501 Leadership in Construction 3.0 Credits**

This course is intended to introduce students to value-based, effective leadership principles and practices across the construction industry. Topics include prevailing theory, leadership traits & styles, emotional intelligence, motivation, collaborative environs and alliances, and change.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 505 Construction Accounting and Financial Management 3.0 Credits**

This course presents the principles of accounting for construction projects. Topics include techniques of cost accounting and financial analysis employed by the construction practitioners. Specific topics include accounting principles to track and manage labor, material, equipment, overhead and other construction resources. Topics specific to construction include contract revenue, financial reporting, and tax considerations for conductors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 510 Construction Control Techniques 3.0 Credits**

This course addresses the knowledge and skill sets required to successfully plan and control complex construction projects. Topics include procurement and contracts, pre-bid planning, contract budgets and cash flow, and planning case studies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 512 Cost Estimating and Bidding Strategies 3.0 Credits**

This is an advanced course in construction estimating addressing competitive bidding strategies. Topics include profit objectives, analyzing the competition, and determining optimum combo of price, cost and volume.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 515 Risk Management in Construction 3.0 Credits**

This course presents risk management techniques and practices specific to construction projects. Students will gain an understanding of the risks stemming from technical and business sources related to the construction process, and to identify, quantify, and develop the appropriate response strategies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 525 Applied Construction Project Management 3.0 Credits**

This course presents the knowledge and skills required to successfully manage complex construction projects. Topics include the project management hard skills such as estimating and budgeting, time management, and planning.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 528 Construction Contract Administration 3.0 Credits**

This course introduces the managerial and legal aspects of construction contract administration. The student is introduced to basic concepts of contract law employed in construction and the rules of interpretation. Topics include changes and change orders, disputes, differing site conditions, and defective documents.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 530 Equipment Applications and Economy 3.0 Credits**

This course provides an in-depth treatment of heavy construction equipment applications and covers the associated management practices. The application topics include techniques used to analyze and estimate equipment productivity, equipment selection, and optimization. The course includes a strong emphasis in equipment economics including owning and operating costs.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 532 International Construction Practices 3.0 Credits**

This course provides an introduction to the strategic issues relating to the business of construction on a global scale. The course is intended to provide students with the knowledge of current best practices by construction organizations in America, Europe and Asia.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 535 Community Impact Analysis 3.0 Credits**

This course provides an overview of community impact assessment, including the benefits of conducting such an assessment. It also provides general guidelines for conducting a community impact assessment, including types of impacts that should be addressed during the process and related issues.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 538 Strategic Management in Construction 3.0 Credits**

This course presents concepts in strategic management within construction organizations. Topics include clients/constructors/competencies, portfolio management, and marketing strategies for construction firms.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 540 Schedule Impact Analysis 3.0 Credits**

This is an advanced course that deals with the legal aspects of construction schedules. Topics include time impact analysis, applying CPM techniques to contract claims, and calculating delay damages.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CMGT 510 [Min Grade: C]

**CMGT 545 Sustainable Principles & Practices 3.0 Credits**

This course addresses the fundamentals of green building concepts and practices underlying sustainable construction from the perspective of the LEED Green Building rating system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 546 Sustainable Technologies 3.0 Credits**

This course addresses sustainable technologies in the built environment and is presented as a whole building design system. The course is organized into three major categories-Design Guidance, Project Management, and Operations & Maintenance.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 547 LEED Concepts 3.0 Credits**

This course addresses the fundamental concepts and practices underlying the LEED green building rating system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 548 Quality Management and Construction Performance 3.0 Credits**

This course covers quality management of construction processes. Topics include designing and implementing quality management plans, establishing a quality management system and Information technology in quality management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 550 Productivity Analysis and Improvement 3.0 Credits**

The focus of this course is construction productivity measurement and improvement. Topics include roles of the individual stakeholders, quantifying labor and equipment productivity, and techniques to improve job site productivity.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 558 Community Sustainability 3.0 Credits**

This course provides clear direction to students how to design cities and developments that are sustainable and reduce environmental harm.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 696 Capstone Project in Construction Management I 3.0 Credits**

The capstone project is completed independently over two quarters under the direction of full-time Construction Management faculty and is intended to reinforce the knowledge and skills acquired through graduate study.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**CMGT 697 Capstone Project in Construction Management II 3.0 Credits**

The capstone project is completed independently over two quarters under the direction of full-time Construction Management faculty and is intended to reinforce the knowledge and skills acquired through graduate study.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CMGT 696 [Min Grade: C]

**CMGT T580 Special Topics in Construction Management 3.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 2 times for 9 credits

# Cooperative Management

## Courses

### **COOP 500 Career Management and Professional Development for Master's Degree Students 1.0 Credit**

Prepares master's degree students enrolled in the co-op program to achieve success, personally and academically, in their cooperative education experience. Topics covered include career exploration, resume development, interview techniques, job search strategies, success in the workplace, and professionalism.

**College/Department:** University Courses

**Repeat Status:** Not repeatable for credit

### **COOP 501 Co-op Experience for Master's Degree Students 9.0 Credits**

Cooperative Education program for master's degree students in select majors.

**College/Department:** University Courses

**Repeat Status:** Can be repeated 1 times for 18 credits

### **COOP 995 Graduate CO-OP Companion Course 1.0-9.0 Credit**

A non-billable course that is paired with CO-OP 501 or CO-OP 601 to reflect the true commitment to experiential learning expected in those two courses. Applies to Master's Level Co-Op Programs in LeBow College of Business, College of Engineering; School of Biomedical Engineering, Information Science, and Health Systems.

**College/Department:** University Courses

**Repeat Status:** Can be repeated multiple times for credit

# Counseling & Family Therapy

## Courses

### **CFTX 501 Introduction to Family Therapy Models I 3.0 Credits**

The purpose of this course is to introduce the student to major family therapy theories and their relationship to general systems theory and cybernetics.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 500 [Min Grade: B]

### **CFTX 530 Clinical Practicum Supervision I 3.0 Credits**

The purpose of the first year practicum is for students to develop the foundational skills necessary for the practice of couple and family therapy. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite supervisor, who is an AAMFT Approved Supervisor or AAMFT Approved Supervisor Candidate. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Corequisite:** CFTP 539

### **CFTX 531 Clinical Practicum Supervision II 1.0 Credit**

The purpose of the first year practicum is for students to develop the foundational skills necessary for the practice of couple and family therapy. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite supervisor, who is an AAMFT Approved Supervisor or AAMFT Approved Supervisor Candidate. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 530 [Min Grade: CR]

### **CFTX 532 Clinical Practicum Supervision III 1.0 Credit**

The purpose of the first year practicum is for students to develop the foundational skills necessary for the practice of couple and family therapy. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite supervisor, who is an AAMFT Approved Supervisor or AAMFT Approved Supervisor Candidate. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 531 [Min Grade: CR]

### **CFTX 533 Clinical Practicum Supervision IV 1.0 Credit**

The purpose of second year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite and group supervisors, who are AAMFT Approved Supervisors or AAMFT Approved Supervisor Candidates. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 532 [Min Grade: CR]

### **CFTX 534 Clinical Practicum Supervision V 1.0 Credit**

The purpose of second year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite and group supervisors, who are AAMFT Approved Supervisors or AAMFT Approved Supervisor Candidates. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 533 [Min Grade: CR]

**CFTX 535 Clinical Practicum Supervision VI 1.0 Credit**

The purpose of second year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite and group supervisors, who are AAMFT Approved Supervisors or AAMFT Approved Supervisor Candidates. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 534 [Min Grade: CR]

**CFTX 536 Clinical Practicum Supervision VII 1.0 Credit**

The purpose of second year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to meet weekly with their onsite supervisor (who is a licensed mental health practitioner but may be a non-AAMFT Approved Supervisor); and weekly with their offsite and group supervisors, who are AAMFT Approved Supervisors or AAMFT Approved Supervisor Candidates. An average of 16-20 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 535 [Min Grade: CR]

**CFTX 573 Group Therapy: Theoretical Models and Practice 2.0 Credits**

Students in this course will gain knowledge of group psychotherapy theoretical models and practices for developing and running group psychotherapies. All types of group processes will be examined, including structured and unstructured, and topic-specific modalities. Strategies for maintaining a systemic perspective will be emphasized, along with a focus on diversity and experience. Experiential learning activities and implementation-based projects will be a primary evaluation method.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTX 601 Advanced Theory and Practice II 3.0 Credits**

This course is designed to advance student understanding of clinical practice through in-depth exposure to an evidenced-based model of treatment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

## Couple & Family Therapy

### Courses

**CFTP 500 Introduction to Systems Theory 4.0 Credits**

This course will present an overview of systems theory, particularly general systems theory and cybernetics. This course will include a critique of system theory from a feminist and cross-cultural perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 502 Introduction to Family Therapy II 3.0 Credits**

This course will include contemporary and evidence based family therapy models. Students must have successfully completed Systems Theory and Introduction to Family Therapy I prior to enrolling in this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTX 501 [Min Grade: C] and CFTP 500 [Min Grade: C]

**CFTP 503 Historical and Sociocultural Influences 4.0 Credits**

This course will introduce students to an examination of the family in a broader social cultural context. This class will explore how sociocultural concepts define and affect social, interpersonal and professional interactions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 504 Sociocultural Influences II 3.0 Credits**

This course will teach students how to develop culturally competent couple and family therapy models. Special attention to issues of power, privilege and oppression will be infused throughout the course. Students must successfully complete Sociocultural Influences I prior to enrolling in this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTP 503 [Min Grade: C]

**CFTP 506 Contextual Theory and Therapy 4.0 Credits**

This course introduces students to present the basic tenets of Contextual Therapy and Clinical applications.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 509 Couples Therapy 4.0 Credits**

This course will introduce students to the theory and practice of couple therapy. Couple theories, research, clinical practice and techniques will be studied and critiqued.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 510 Sex Therapy 4.0 Credits**

This course will introduce students to the theory and practice of sex therapy. Sexual disorders and sexuality will be addressed from the perspective of the individual, couple and family or origin.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTP 509 [Min Grade: C] (Can be taken Concurrently)

**CFTP 513 DSM I: Adult Psychopathology 3.0 Credits**

This is a survey of the major categories of adult psychopathological disturbance in the DSM-TR classification system. This course emphasizes the dynamics of diagnosis and biological treatment in relational therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**CFTP 514 DSM II: Child Psychopathology 3.0 Credits**

This is a survey of the major categories of child psychopathological disturbances in the DSM-TR classification system. This course emphasizes the dynamics of diagnosis and biological treatments in relational therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 513 [Min Grade: C]

**CFTP 515 Introduction to Psychopharmacology 4.0 Credits**

This course is designed to present a history and the most current trends in biological treatments in psychiatric disorders. While it focuses on biological treatments the students concurrently will be exposed to historical and contemporary trends in the philosophy and practice of psychopharmacology in the profession.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 516 Behavioral/Process Addictions 4.0 Credits**

The process of behavioral addiction will be examined in the context of the family and the larger social system. Process addictions such as sex, gambling, food, exercise, spending, and shopping will be covered in this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 517 Addictions in The Family 4.0 Credits**

The process of addiction will be examined in the context of the family and the larger social system. A wide exposure to theory and treatment models will be utilized to aid students' assessment and intervention skills in treating families with substance abuse issues.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 518 Medical Family Therapy 4.0 Credits**

This course is designed to prepare family therapists and other health professionals to work collaboratively in addressing the unique psychosocial problems of individuals, couples and families with acute and chronic medically related concerns.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 520 Family Life Cycle 4.0 Credits**

This course integrates the interface of individual development with the social structure of coupling and family in family life cycle framework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 521 Human Development 4.0 Credits**

This course will introduce students to the foundations of human development. It is designed to engage students in discussions of both traditional and contemporary human development models.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 522 Legal and Ethical Implications in Couple and Family Therapy Practice 4.0 Credits**

This course will introduce students to ethical and legal issues that may arise in couple and family therapy treatment including confidentiality and its limits, record keeping, custody cases, abuse, privilege, licensure and informed consent.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 524 Family Assessment and Evaluation 3.0 Credits**

This course focuses on issues in the clinical assessment of individuals, couples, and families. Assessment will be considered through a multi-method approach that includes: qualitative interview, observational, clinician-rated or global rating scales, and self report inventories.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 525 Research in Couple and Family Therapy 4.0 Credits**

This course focuses on research methods for couple and family therapy, and is designed to review contemporary family research methods through a multi-method approach. Issues in the clinical assessment of individuals, couples, and families will be explored from diverse contextual variables.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 526 Person of the Therapist Experience I 2.0 Credits**

Students will use the Person of the Therapist Training Model to actively explore self of the therapist development. This course is designed to help students develop an awareness of the self within one's own family of origin.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTP 530 [Min Grade: C] (Can be taken Concurrently)

**CFTP 527 Person of the Therapist Experience II 2.0 Credits**

This course is a continuation of Therapist Experience I: Person of the Therapist Training. Students will use the Person of the Therapist Training Model to actively explore self of the therapist development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTP 526 [Min Grade: C]

**CFTP 528 Person of the Therapist Experience III 2.0 Credits**

This course is a continuation of Therapist Experience I & II: Person of the Therapist Training. Students will use the Person of the Therapist Training Model to actively explore self of the therapist development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Prerequisites:** CFTP 526 [Min Grade: C] and CFTP 527 [Min Grade: C]

**CFTP 529 Family Policy 4.0 Credits**

The purpose of this course is to enhance student's awareness of policies that affect families in society. It will focus on policy development and process, and the role of policy in addressing family problems. Critical issues in family policy, particularly as it relates to diverse family structures and culture will also be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 530 Clinical Practicum/Supervision I 0.0-2.0 Credits**

The purpose of the first-year practicum is for the students to develop foundational skills necessary for the practice of couple and family therapy. Students are expected to spend one hour weekly in on-site supervision (which may be a non-AAMFT-approved supervisor); in addition, students spend one hour weekly in off-site supervision, and/or 2 hours weekly in group supervision (with an AAMFT-approved supervisor). An average of 8-10 client contact hours is expected each week for MFT students, with 10-12 client contact hours each week for PMC students. Students must successfully complete practicum orientation in order to enroll in this course and subsequently complete each practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**Corequisite:** CFTP 539

**CFTP 539 Clinical Readiness Seminar 3.0 Credits**

The purpose of this first-year course is to develop foundational clinical skills in couple and family therapy necessary to prepare a student to achieve proficiency in clinical readiness and intake assessment that support their initial clinical placement. Students must successfully demonstrate their knowledge and skills in each of these areas, through successful completion of course assignments, to pass the course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**CFTP 540 Child Therapy in Couple and Family Therapy 3.0 Credits**

This course provides students with an expanded exposure to working with children, individually and in the context of family or social group. It examines a variety of conceptual bases for working with children and adolescents, considers the expression of different diagnostic categories, and examines therapist strategies for the different diagnoses, based on the therapist conceptual base. Issues of client development, family situation, and cultural context will be examined in relation to possible therapeutic strategies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**CFTP 541 Live Supervision Group 2.0 Credits**

This course serves as an integrative link between theory and practice for the graduate student who is engaged in meeting the practicum requirements of the program. CFT interns will carry a case load in the CFT clinical practices. It allows students immediate feedback from a program supervisor concerning the many situations encountered in the process of training to be couple and family therapists. In addition, issues of therapist self-care and ethical practice remain on the forefront throughout the clinical experience.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 4 credits

**CFTP 542 Professional Development Seminar 1.0 Credit**

This course addresses professional expectations and resources students can expect to find as they graduate from the program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 543 Capstone Project 1.0 Credit**

This course provides a forum for students to present the capstone projects that they have been developing throughout the program, integrating the principles of self-of-therapist, respect for diversity, and commitment to social justice in a personal reflective statement.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 5 credits

**CFTP 544 Clinical Practicum/Supervision VIII 1.0-9.0 Credit**

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 18 credits

**Prerequisites:** CFTX 536 [Min Grade: CR]

**CFTP 545 Clinical Practicum/Supervision IX 1.0-9.0 Credit**

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 544 [Min Grade: CR]

**CFTP 546 Clinical Practicum/Supervision X 1.0-9.0 Credit**

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 545 [Min Grade: CR]

**CFTP 547 Clinical Practicum/Supervision XI 1.0-9.0 Credit**

The purpose of the second year Practicum is for the student to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 18 credits

**Prerequisites:** CFTP 546 [Min Grade: CR]

**CFTP 548 Clinical Practicum/Supervision XII 1.0-9.0 Credit**

This directed course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTX 536 [Min Grade: CR]

**CFTP 549 Clinical Practicum/Supervision XIII 1.0-9.0 Credit**

This directed course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 539 [Min Grade: CR]

**CFTP 550 Clinical Practicum/Supervision XIV 1.0-9.0 Credit**

This clinical directed study course may be offered when a student wishes to pursue a particular personal goal, or when remedial action needs to be taken, based on a student's past clinical performance. The directed study will be designed by the Director of Clinical Training, with input from the student, and in consultation with the Director of the Program and the student's clinical supervisors.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 539 [Min Grade: CR]

**CFTP 561 Group Supervision Practicum I 2.0 Credits**

The purpose of second-year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend two hours weekly in group supervision with an AAMFT-Approved Supervisor or AAMFT-Approved Supervisor Candidate. An average of 8-10 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 562 Group Supervision Practicum II 2.0 Credits**

The purpose of second-year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend two hours weekly in group supervision with an AAMFT-Approved Supervisor or AAMFT-Approved Supervisor Candidate. An average of 8-10 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 561 [Min Grade: CR]

**CFTP 563 Group Supervision Practicum III 2.0 Credits**

The purpose of second year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend two hours weekly in group supervision with an AAMFT-Approved Supervisor or AAMFT-Approved Supervisor Candidate. An average of 8-10 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 562 [Min Grade: CR]

**CFTP 564 Group Supervision Practicum IV 2.0 Credits**

The purpose of second-year practicum is for students to show integration of theory and practice, develop their own style of practice, and globally demonstrate comfort and competency in the role and functions of a couple and family therapist. Students are expected to spend two hours weekly in group supervision with an AAMFT-Approved Supervisor or AAMFT-Approved Supervisor Candidate. An average of 8-10 client contact hours is expected each week for MFT students.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 563 [Min Grade: CR]

**CFTP 568 Addictions in the Family System 3.0 Credits**

The process of addiction will be examined in the context of the family and larger social systems. The course includes broad exposure to theoretical and treatment models to aid students' clinical assessment and intervention skills in treating families impacted by substance abuse issues.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX or major is FATX.

**CFTP 570 Foundational Elements of Trauma Care 2.0 Credits**

Assessment of the impact of both acute and chronic trauma on family members and the response of the family system. Both internal trauma (domestic violence) and external trauma investigated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 571 Human Development and Family Life Cycles 4.0 Credits**

This course will introduce students to the foundations of human development. The course integrates the interface of individual development with the social structure of coupling and family in the family life cycle framework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 572 Diversity and Contextual Factors in Clinical Practice 4.0 Credits**

This course will introduce students to an examination of the family in a broader social cultural context. This class will explore how sociocultural concepts define and affect social, interpersonal and professional interactions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 573 Group Therapy: Theory and Practice Models 1.0 Credit**

Students in this course will gain knowledge of the theory and practice of developing and running group psychotherapies. All types of group processes will be examined, including structured and unstructured, and topic-specific modalities. Strategies for maintaining a systemic perspective will be emphasized, along with a focus on diversity and experience. Experiential learning activities and implementation-based projects will be a primary evaluation method.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 574 Intersections of Trauma and Families Across Contexts 4.0 Credits**

Application of trauma care models across various populations.  
Assessment and treatment modalities across family systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 570 [Min Grade: B]

**CFTP 575 Foundational Elements of Addiction 2.0 Credits**

This course is an introduction into addictions which includes an overview of definitions, conceptual frameworks, and classical methods used; the effects and consequences of addiction on family and community, and the familial processes associated with substance use and abuse.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 576 Couples and Attachment 3.0 Credits**

This course builds on CFTP 509 and will provide an in-depth exploration of the role of attachment in couple relationships. This course will explore the role of attachment in couple relationships and provide an overview of the adult attachment literature and attachment-informed couples therapy models.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 509 [Min Grade: B]

**CFTP 577 Self of the Therapist 2.0 Credits**

Students will be introduced to multiple self-of-the-therapist models for use in clinical practice. This course is designed to help students develop an awareness of the self in the context of their roles as therapists.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 578 Couples and Sex Therapy 4.0 Credits**

This course will introduce students to systemic approaches to working couples in therapy, including differences between family therapy and couple therapy, issues of joining, assessment, and intervention, and types of problems typically brought to therapy. Students will be exposed to foundational concepts of human sexuality, as well as the assessment and treatment protocols related to sexual issues and disorders in couple therapy. Contextual issues and self-of-the-therapist issues will also be integrated in the course content.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 600 Advanced Theory and Practice I 3.0 Credits**

This course is designed to advance student understanding of clinical practice through in-depth exposure to an evidenced-based and/or a modern or postmodern model of treatment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 601 Advanced Theory and Practice II 4.0 Credits**

This course is designed to advance student knowledge and clinical practice through in-depth exposure to a modern or postmodern family therapy model(s) of treatment. The organization of the course includes presentations of theory, including assessment and clinical intervention techniques, skills training exercises, and discussion of clinical case material and issues.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 602 Advanced Theory and Practice III 3.0 Credits**

This course is designed to advance student knowledge of clinical practice through in-depth exposure to an evidenced-based model of treatment. The organization of the course includes presentations of theory, including assessment and clinical intervention techniques, skills training exercises, and discussion of clinical case material and issues.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 603 Professional Development Capstone 4.0 Credits**

This course will provide a forum for students to complete and present their capstone project. The capstone project will integrate principles of person-of-the-therapist and demonstrate students' ability to identify, critically analyze, and integrate the family therapy theories and models that inform their clinical practice. Students will complete a Mock License Examination and will learn about professional resources, requirements, and opportunities that will be available after graduating from the program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 606 Contextual Family Therapy 3.0 Credits**

This course introduces students to the basic tenets and clinical implications of Contextual Therapy including but not limited to assessment, intervention, and treatment implications.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 610 Sex Therapy 3.0 Credits**

This course introduces students to the theory and practice of sex therapy. Sexual disorders and sexuality will be addressed from the perspective of the individual, couple, and family of origin.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 509 [Min Grade: C] (Can be taken Concurrently)

**CFTP 710 Advanced Legal and Ethical Implications in Couple and Family Therapy 4.0 Credits**

This course builds on foundational knowledge of couple and family therapy professional ethics through an in-depth examination of: 1) the AAMFT Code of Ethics and related state and federal laws, 2) ethical reasoning and decision-making, and 3) key current ethical and legal issues relevant to advanced clinical practice, clinical administration and supervision, and clinical education.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**CFTP 713 Introduction to CFT Clinical Research 3.0 Credits**

This course provides an overview of seminal and current couple and family therapy clinical research. This course will review debates around the value, training and dissemination of empirically supported treatments and philosophical underpinnings of the scientific enterprise. We will also examine research from the perspective of culture, race and gender and how these sociopolitical issues impact the interpretation of science. The significance of the research process and empirical evidence to couple and family therapy practice will be explored, with reference to “common factors” and evidence-based research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 716 Advanced Family Therapy Theory and Practice 3.0 Credits**

Advanced comparative analysis of historical and contemporary approaches to family therapy theory and their practical application, with particular reference to social context implications.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 718 Professional Development Seminar II 2.0 Credits**

Self of the therapist and issues in the development of PhD-level professionals. Preparation of presentations and publications for submission to professional conferences and journals.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 720 Couple Therapy Theory & Practice 3.0 Credits**

Advanced comparative analysis of historical and contemporary approaches to couple therapy theory and their practical application, with particular reference to social context implications.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 721 Critical Theory in Couple and Family Therapy 3.0 Credits**

Comparative analysis of postmodern critical theories (e.g., critical race theory, feminist theory, queer theory) of family interaction and development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 724 Multicultural Approach to Couple and Family Therapy 4.0 Credits**

Develops cultural awareness and competency in working with families around issues of race and class.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 725 Trauma and Families 4.0 Credits**

Assessment of the impact of both acute and chronic trauma on family members and the response of the family system. Both internal trauma (domestic violence) and external trauma investigated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 729 Diverse Families and Communities: Intervention Strategies 3.0 Credits**

This course will increase student's knowledge about social context impact clinical interventions and clinical research. Students will examine the importance of research with culturally diverse populations and consider how contextual issues influence CFT clinical practice and research. Specifically, students will examine how contextual variables such as gender, class, sexual orientation, immigration, religion, race, ethnicity, and are considered in the context of clinical practice and research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 730 Gender and Sexual Orientation 4.0 Credits**

This course covers gender and sexual orientation with special attention given to the intersection of race, class, culture, ethnicity, religion, age, and ability.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 734 Supervision in Couple and Family Therapy 4.0 Credits**

Preparation for supervising trainees in couple and family therapy, from a systemic perspective. Exploration of supervision models and modalities; development of a personal model of supervision.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 735 Family Healthcare Policy 3.0 Credits**

This course examines historical and contemporary trends in family healthcare policy, emphasizing healthcare disparities and the socio-political implications for families in different social positions while examining the intervene role of family therapy in larger eco-systemic issues. Furthermore, this course will explore individual and family health, specifically across the contexts of gender, race, and class. Factors influencing health policy (e.g., politics, media, interests groups, religion, think tanks) will additionally be explored, along with health disparities and health equality in the American health care system.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 736 Professional Development Seminar VI 2.0 Credits**

Self of the therapist issues in the development in PhD-level professionals. Ethics in CFT supervision and teaching.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 740 Systemic Approaches to Addiction 3.0 Credits**

This course will provide an in-depth exploration of the effects and consequences of addiction across multiple systems including family, community, and society. Its purpose in the program of study is to support the application and advancement of family therapy theory and practice in the prevention, treatment and recovery support for families impacted by substance use and addiction.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 742 Couples Sexual Therapy 3.0 Credits**

Explores the definition of "normal" sexual functioning, and the assessment and treatment of sexual dysfunction in couples therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 743 Trauma Theory and Models with Vulnerable Populations 3.0 Credits**

This course reviews models of trauma and the various ways that trauma may intersect with various aspects of social location and identity, as well as therapeutic models for the provision of trauma-informed and socially just mental healthcare services.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 750 Professional Development and Leadership 3.0 Credits**

This course prepares doctoral students for leadership roles in the field of couple and family therapy, with a focus on administrative skills and roles. Course content areas include leadership styles and theories, navigating the job application process, licensure and certification, and key skills for leadership and administration in clinical organizations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 757 Attachment, Emotions and Psychotherapy 3.0 Credits**

This course examines attachment theory and theories of emotional development and their implications for therapeutic work with individuals, couples, and families. This course provides an in-depth understanding of the importance of parent child attachment and the role it plays in the development of emotion regulation skills across the lifespan. Students will learn how attachment theory and emotion regulation can inform therapeutic work with individuals, couples, and families. Students will study issues related to contextual variables, diverse culture, and attachment theory.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 758 Dyadic Analysis and Longitudinal Causal Modeling in CFT 3.0 Credits**

The purpose of this course is to introduce students to causal/structural equation modeling (SEM) in the field of family therapy for dyadic analysis issues. This course will illustrate the uses of structural equation models for dyadic, cross-sectional, longitudinal, and experimental data analysis. Major activities include a combination of lectures, group discussions, and software applications and interpretations. The course will cover an introduction to SEM with an emphasis on dyadic analysis, building, specifying, estimating, and testing models, confirmatory factor analysis, invariance testing, full SEM models and related techniques. The course is organized to take students through each of the cumulative steps in the analysis: 1) deciding which type of model is appropriate; 2) setting up the data file and cod.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 759 Psychotherapy Outcome and Process Research 3.0 Credits**

This course examines the methodological foundations of psychotherapy outcome and process research, specifically related to family based interventions. The course will define and demonstrate methods pertaining to efficacy, effectiveness, and dissemination/implementation science.

The course will focus sample selection, sample size and statistical power, assessment, random assignment, study design, comparison groups, and treatment fidelity. The first five weeks focus will focus on randomized clinical trials; the second five weeks will focus on processes research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 760 Teaching Practicum 2.0 Credits**

This teaching practicum course will include a teaching experience such as guest lecturing or an extended teaching opportunity at Drexel University. Students will develop learning activities and assignments, create student assessments to evaluate student performance, and participate in self and peer evaluation of teaching performance.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 761 Advanced Clinical Practicum/Supervision 2.0 Credits**

This course prepares doctoral students to develop advanced skills necessary for the practice of couple and family therapy. Students engage in one hour of on-site supervision, and 8-10 client contact hours each week for three terms. Students must successfully complete all compliance requirements in order to enroll in this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 6 credits

**CFTP 765 Grant Writing for Program Development 3.0 Credits**

This project-based course is designed to teach students about the importance of grant-writing in their role as a professional and leader in the field of the couple and family therapy. Students will gain the essential knowledge and skills to write and submit a competitive grant proposal for the purpose of program development to a foundation or government agency. This will include identification or creation of a fundable project in their content area, research and assessment of funding sources, collaboration with other professionals, writing a proposal that includes a budget, and completing a proposal package that is submitted to the funder of their choice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CFTP 770 Capstone Project I 2.0 Credits**

The Capstone Project facilitates the student's ability to articulate and demonstrate how the knowledge and skills of an advanced Couple and Family Therapist can be applied to a problem that affects a couple, family, or community. In this first of three capstone courses, the student works with a faculty mentor to conceptualize a problem and proposes an action plan.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Corequisite:** CFTP 801

**CFTP 771 Capstone Project II 2.0 Credits**

Capstone Project II facilitates the student's ability to implement an action plan as proposed in Capstone I and devise a mechanism for evaluating the outcome.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 770 [Min Grade: B]

**CFTP 772 Capstone Project III 2.0 Credits**

Capstone Project III facilitates the student's ability to evaluate the outcomes of the project as implemented in Capstone II and write a complete manuscript about the project.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 771 [Min Grade: B]

**Corequisite:** CFTP 801

**CFTP 797 Capstone Portfolio Development I 2.0 Credits**

The Capstone Portfolio Development I course is the first in a series of three courses which prepare students for the Capstone Portfolio I,II, and III courses. This course series provides students with instructor and peer support to 1) develop a feasible plan to meet key program capstone portfolio requirements, 2) initiate long-term capstone portfolio tasks, and 3) explore opportunities to align capstone portfolio tasks with their professional goals.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 798 Capstone Portfolio Development II 2.0 Credits**

The Capstone Portfolio Development II course is the second in a series of three courses which prepare students for the Capstone Portfolio I,II, and III courses. This course series provides students with instructor and peer support to 1) develop a feasible plan to meet key program capstone portfolio requirements, 2) initiate long-term capstone portfolio tasks, and 3) explore opportunities to align capstone portfolio tasks with their professional goals.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**Prerequisites:** CFTP 797 [Min Grade: B]

**CFTP 799 Capstone Portfolio Development III 2.0 Credits**

The Capstone Portfolio Development III course is the third in a series of three courses which prepare students for the Capstone Portfolio I,II, and III courses. This course series provides students with instructor and peer support to 1) develop a feasible plan to meet key program capstone portfolio requirements, 2) initiate long-term capstone portfolio tasks, and 3) explore opportunities to align capstone portfolio tasks with their professional goals.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**Prerequisites:** CFTP 797 [Min Grade: B] and CFTP 798 [Min Grade: B]

**CFTP 800 Portfolio Planning and Development 1.0 Credit**

The Portfolio Planning and Development course is intended to prepare students for Capstone I,II,II and ensure the student has support in 1) developing a feasible plan meet capstone portfolio requirements and 2) making progress on portfolio tasks that require long-term development across the first two years of the program and 3) tailoring their capstone portfolio to represent their professional goals. The capstone portfolio will represent professional development across four professional domains: 1) Scholarship, 2) Teaching, 3) Clinical Practice, and 4) Citizenship, Leadership, and Service.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 6 times for 7 credits

**CFTP 801 Couple and Family Therapy Internship 1.0-20.0 Credit**

Provides an advanced one-year full time supervised placement in a clinical, research, administrative or academic setting, as determined by the program director and student.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 802 Couple and Family Therapy Dissertation 1.0-20.0 Credit**

Supervised research, including establishing a topic directly related to family functioning or family therapy; developing a research question and methodology for investigating it, collecting, processing, and analyzing the data; and writing a scholarly description of the research project.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 803 Couple and Family Therapy Dissertation Defense 1.0 Credit**

The student should enroll for this only in the anticipated final quarter of enrollment, after all other credits for the PhD have been satisfied. This course may be repeated for a maximum of six (6) credits.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 3 credits

**Restrictions:** Can enroll if major is CFTX.

**CFTP 804 Registered for Degree Only 1.0 Credit**

The student should enroll for this only in the anticipated final quarter of enrollment, after all other credits for the PhD have been satisfied. This course may be repeated for a maximum of two credits.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 2 credits

**Restrictions:** Can enroll if major is CFTX.

**CFTP 805 Couple and Family Therapy Doctoral Internship I 3.0 Credits**

This is the first course in the sequence of required clinical internship courses for students in the Doctor of Couple and Family Therapy Program. Students will complete a supervised placement in a clinical setting providing individual and couple/family therapy services. Students who are fully licensed as a marriage and family therapist, prior to the start of this course, may complete a portion of their required internship hours in an administrative or academic domain, as determined by the Program Director.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CFTX.

**CFTP 806 Couple and Family Therapy Doctoral Internship II 3.0 Credits**

This is the second course in the sequence of required clinical internship courses for students in the Doctor of Couple and Family Therapy Program. Students will continue to build their clinical skills by completing a supervised placement in a clinical setting providing individual and couple/family therapy services. Students who are fully licensed as a marriage and family therapist, prior to the start of this course, may complete a portion of their required internship hours in an administrative or academic domain, as determined by the Program Director.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 805 [Min Grade: B]

**CFTP 807 Couple and Family Therapy Doctoral Internship III 3.0 Credits**

This is the third course in the sequence of required clinical internship courses in the Doctor of Couple and Family Therapy Program. Students will continue to build their clinical skills by completing a supervised placement in a clinical setting providing individual and couple/family therapy services. Students who are fully licensed as a marriage and family therapist, prior to the start of this course, may complete a portion of their required internship hours in an administrative or academic domain, as determined by the Program Director.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is CFTX.

**Prerequisites:** CFTP 806 [Min Grade: B]

**CFTP 810 Capstone Portfolio I 2.0 Credits**

The Capstone Portfolio course requires each student to create an electronic professional portfolio to synthesize and demonstrate key knowledge and professional accomplishments in the domains of 1) Scholarship, 2) Teaching, 3) Clinical Practice, and 4) Citizenship, Leadership, and Service. In this first of three Capstone Portfolio Courses, the student chooses two of the four portfolio professional development domains to focus on and will work on completing the tasks/subsections within each. The student will work closely with a faculty advisor throughout this process.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 800 [Min Grade: B] (Can be taken Concurrently)

**CFTP 811 Capstone Portfolio II 2.0 Credits**

The Capstone Portfolio course requires each student to create an electronic professional portfolio to synthesize and demonstrate key knowledge and professional accomplishments in the domains of 1) Scholarship, 2) Teaching, 3) Clinical Practice, and 4) Citizenship, Leadership, and Service. In this second of three Capstone Portfolio Courses, the student completes the two remaining portfolio professional development domains including the tasks/subsections within each. The student will work closely with a faculty advisor throughout this process.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 810 [Min Grade: B]

**CFTP 812 Capstone Portfolio III 2.0 Credits**

The Capstone Portfolio course requires each student to create an electronic professional portfolio to synthesize and demonstrate key knowledge and professional accomplishments in the domains of 1) Scholarship, 2) Teaching, 3) Clinical Practice, and 4) Citizenship, Leadership, and Service. In this third of the Capstone Portfolio Courses, the student will finalize their capstone portfolio, submit it for faculty review, and give a presentation on their portfolio accomplishments and experience. The student will work closely with a faculty advisor throughout this process.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CFTP 811 [Min Grade: B]

**CFTP I799 Independent Study in Couple and Family Therapy 1.0-8.0 Credit**

An Independent Study may be offered when a student needs a unique plan of study, either to pursue a particular personal goal, or when remedial action needs to be taken, based on student performance, or extenuating circumstances beyond the student's control. The Independent Study will be designed by the instructor, with input from the student, in consultation with the Director of the program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 16 credits

**Restrictions:** Can enroll if major is CFTX.

**CFTP T780 Special Topics in Couple and Family Therapy 1.0-6.0 Credit**

Special topics may be offered when several students share an interest in a particular subject matter related to couple and family therapy. This course may be repeated for a maximum of eight (8) credits.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 8 credits

**Restrictions:** Can enroll if major is CFTX.

## Creative Arts in Therapy

### Courses

**ARTS I899 Independent Study in Creative Arts Therapies 1.0-6.0 Credit**

This is a course in which a student can pursue additional work as suggested or recommended by the faculty for completion of program or course requirements and/or a course in which a student may choose to pursue in-depth and specialized study in an area relevant to their educational goals and research directions. This course must include close faculty advisement as agreed upon by the student and faculty member.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



# Creative Arts Therapies

## Courses

### **CATX 501 Foundations of Creative Arts Therapies 2.0 Credits**

This interdisciplinary experiential course covers theory and research that inform the roots and contemporary development of creative arts therapies as professional practices. These include multiple factors that derive from and/or intersect with human creativity such as social justice, early development, health and wellness, therapeutic change, and the representation of human experience through collaborative creative engagement.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

### **CATX 510 Principles and Practices in Music Therapy 2.0 Credits**

An introductory orientation to foundational principles and practices in the music therapy profession. This course will critically discuss the historical and foundational underpinnings of the profession, contemporary practices of defining music therapy, current scope of practice and state of the profession, and critical, artistic reflexivity to support an anti-oppressive lens.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **CATX 512 Music Therapy Across the Life Span 2.0 Credits**

This course provides an overview of theory and research pertaining to musical development and psychological aspects of musical experience across various domains, including perception, cognition, affective and neurological responses. Implications for practice are explored through applied methods and techniques in music therapy across the lifespan. Components of the course include social and cultural perspectives in musical development and theoretical approaches for varied therapeutic outcomes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **CATX 528 Systems, Community Practices, and Therapeutic Relationships 4.5 Credits**

This course examines the interactions between systems theories and the interrelated community and ethical practices for therapeutic relationship structure, ongoing assessment, and engagement. The principles and application of intersectional identities or lived context and development are applied to counseling approaches, such as building rapport for culturally responsive therapeutic relationships. The impacts of oppressed and privileged intersectional identities and views of health and pathology will be considered within systems perspectives.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

### **CATX 529 Family Systems for Assessment and Treatment Planning 4.5 Credits**

This course examines the interactions between family systems theory and current assessment and documentation practices with youth, adults, older adults, and families and/or caregivers. The impact and intersectionality of lived experiences, culture-bound views and values, and wellness and resilience of clients and their family systems, both present and absent, will be explored. Through experiential practice, client-centered session planning and intercultural and ethical counseling methods will be introduced and reinforced.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

### **CATX 531 Adults & Older Adults Assessment & Treatment Planning 3.0 Credits**

This course examines the interactions of theory and ethical art therapy and counseling practices with adults and older adults. From art therapy historical foundations to therapy as intermediary forces for social change, we will explore various systems of care and for particular client groups. The principles and application of artistic and psychological development in art therapy assessments, art media properties and clientele applications, art therapy treatment approaches, and dynamics within the therapeutic relationship will all be considered and applied. The impact of culture and views on health and pathology will be considered as well. Students will be introduced to treatment planning & clinical documentation wherein both written and concept skills will be reinforced through applied practice & reflection.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

### **CATX 532 Trauma, Crisis, and Community Care 3.0 Credits**

This course provides an overview of current approaches and frameworks in counseling for developing rapport and providing trauma-informed treatment for children, adolescents, adults, families, and communities. Current research will be introduced emphasizing differential diagnoses, systems theories of trauma effects, resilience and trauma recovery, and their interface with neuroscience and reflective, integrative practices.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

### **CATX 533 Child & Adolescent Assessment & Treatment Planning 3.0 Credits**

This course examines the interactions between theory and ethical art therapy and counseling practices with children and adolescents. The principles and application of artistic and psychological development in art therapy assessments, art media properties and clientele applications, art therapy treatment approaches, and dynamics within the therapeutic relationship are all studied and applied. The impact of culture and views on health and pathology will be considered as well. Students will be introduced to treatment planning and clinical documentation wherein both written and conceptualization skills will be reinforced through applied practice and reflection.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 534 Family Assessment and Treatment Planning 3.0 Credits**

This course will provide an introduction to family art therapy facilitation, family art therapy theory, and assessment and treatment planning. Art therapy approaches including system theories, multicultural principles and ethical practices, materials use, and adaptable assessment tools will be represented in readings and class discussions to illustrate how art making can aid therapeutic work with families and dynamically applied. Lecture, class discussion, case presentation, and art making will be used to study the role of family in art therapy, as well as the in-depth family art therapy assessment and treatment planning processes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 535 Creativity, Symbolism, and Metaphor in Art Therapy and Counseling 3.0 Credits**

This course will provide students with the opportunity to integrate an understanding of the historical antecedents and ongoing conceptual development of the field, an overview of approaches and theory from related fields, the continuum of art therapy practice, and the development of art therapy as a distinct therapeutic profession. Included is the opportunity to apply knowledge of creativity, symbolism, metaphor, and artistic language to the practice of art therapy. Readings, case examples, and discussions will address creativity, symbolism, and metaphor in the art therapy treatment of individuals, groups, and communities of diverse cultures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 536 Studio Art for Art Therapists 1.0 Credit**

This course emphasizes the importance of the art therapist's arts-based practice for informing clinical work. Studio work is focused on exploring the art therapist's use of her or his own creative capacities in the service of individuals who would benefit from engagement in artistic processes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 537 Art Therapy Group Supervision I 1.0 Credit**

Students will present, discuss, and evaluate client and practicum site specific material from their various clinical experiences. Cases are discussed in small group interactive format where students can begin to connect theory and practice with children, adolescent, adult, and older adult populations. Students will learn observational and attending skills and also learn essential actions, attitudes and values for being an engaged learner. Learning will be intentionally attentive to developing culturally appropriate, collaborative, and productive therapeutic relationships. The student will apply supervision learning to their clinical education and in turn, allow both experiences to inform (and sometimes disagree with) the knowledge, theoretical understanding of art therapy and counseling.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 538 Art Therapy Group Supervision II 1.0 Credit**

Students will present, discuss, and evaluate client & practicum site specific material from their various clinical experiences. Cases are discussed in small group interactive formats where students can begin to connect theory & practice with children, adolescent, and adult, older adult populations. Students will learn observational & attending skills and also learn essential actions, attitudes and values for being an engaged learner. Learning will be intentionally attentive to developing culturally appropriate, collaborative, & productive therapeutic relationships. The student will apply supervision learning to their clinical education and in turn, allow both experiences to inform (and sometimes disagree with) the knowledge, theoretical understanding of art therapy & counseling as provided in program courses.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 539 Art Therapy Group Supervision III 1.0 Credit**

In this course students will present, discuss, and evaluate client and practicum site specific material from their various clinical experiences. The cases are discussed in a small group interactive formats where students can begin to connect theory and practice with children, adolescent, and adult, older adult populations. Students will learn observational and attending skills and also learn essential actions, attitudes and values for being an engaged learner. Learning will be intentionally attentive to developing culturally appropriate, collaborative, and productive therapeutic relationships. The student will apply supervision learning to their clinical education and in turn, allow both experiences to inform (and sometimes disagree with) the knowledge, theoretical understanding of art therapy and counseling.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 540 Addictions and Recovery Art Therapy Approaches 3.0 Credits**

Alcoholism and other chemical dependencies and addiction are viewed as progressive and potentially fatal, if left untreated. Process addictions such as sexual, gambling, hoarding, and eating disorders are typically treated in terms of interrupting rigid coping strategies and recovery models being individualized to client needs. Art therapy uses creative processes to establish a clearer understanding of self-motivations and recovery frames such as the stages of change. Inherent in this process is the power of the image and processes of problem solving. Creative media can be used for individuals to explore and concretize thoughts, feelings, and conflicts and motivation to change and related recovery issues.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 541 Digital Media Use in Art Therapy and Counseling 2.0 Credits**

Digital media are tools, formats or platforms, and processes of creativity and expression that can be created, viewed, disseminated, modified, and/or preserved on personal to desktop computers as well as other digital devices, such as Smartphones, iPads, and iPods. This course is designed to inform the art therapist and counselor students regarding best practice capacities and strategies to ethically create, store, share, and transmit client art making products on digital drives or cloud-based formats; review and enact informed consent processes of using communicative and creative digital media with clients; develop digital literacy skills and strategies of how to assist clients in developing them; and deepen one's own digital media engagement.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 542 Mindfulness in Clinical Practice 2.0 Credits**

This didactic and experiential course will provide students with the opportunity to learn fundamental concepts of mindfulness and its intersection with effective clinical practice. Evidence-based research of mindful practices, neurobiological explanations of the effects of mindfulness on the sympathetic nervous system, and current applications of mindfulness in a variety of healthcare and clinical settings will be reviewed. Student practitioners in this course will also learn self-care practices incorporating movement, stillness, sensation, breath work, and artmaking to assist in stress reduction, increased awareness of the developing practitioner self, and increased compassion for self and others.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 4 credits

**Restrictions:** Can enroll if major is ATC.

**CATX 570 Clinical Musicianship I 2.5 Credits**

Provides methods for learning to accompany self and ensembles within music therapy applications. Additional emphasis is placed upon establishing a musical relationship through clinical improvisation methods for keyboards.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 571 Clinical Musicianship II 2.5 Credits**

Provides methods for accompanying self, ensembles, and individuals using guitar within clinical music therapy applications. Additional emphasis is placed upon improvisational guitar techniques that support the establishment of the musical relationship.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 572 Clinical Musicianship III 2.5 Credits**

Provides methods for developing clinical musical skills with emphasis upon piano, guitar, voice and percussion proficiencies in preparation for the second year internship. Students will further develop skills for working with musical responses of individuals and groups within a relational cultural framework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 573 Clinical Musical Improvisation 4.0 Credits**

Highly experiential course designed to introduce the student to: a) musical improvisation in general, and b) techniques used within a music therapy environment to develop therapeutic relationships with groups and individuals through the creative musical process. Established models of clinical musical improvisation will be included in readings and discussed in class, with exploration of the use of verbal processing in conjunction with the musical experience.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 575 Theories and Methods in Music Therapy with Children and Adolescents 4.5 Credits**

Linking theory and research to practice, this course includes an overview of literature pertaining to musical development and related psychological theories. Implications for practice are explored through methods and techniques as applied in music therapy and counseling with children and adolescents. Both theoretical and practical components of the course include social and cultural perspectives in musical development and clinical methods for various treatment populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 577 Theories and Methods in Music Therapy with Adults and Older Adults 4.5 Credits**

This course includes an overview of theory and research pertaining to psychological aspects of musical behavior and experience in various domains, including perception, cognition, affective and neurological responses. The experiential components of the course include methods and techniques as applied with adult populations, from early adulthood to advancing age, with a range of abilities and clinical need. Both theoretical and practical components of the course include social and cultural perspectives in musical development and clinical methods, including assessment and treatment planning for various treatment populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 578 Clinical Improvisation Skills 2.0 Credits**

An experiential course exploring music therapy improvisation. This course is designed to support the development of improvisatory techniques used within therapeutic relationships. Established models of clinical musical improvisation with individuals and groups and the use of verbal processing in conjunction with the musical experience will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 579 Technological Applications in Music Therapy 2.0 Credits**

This course will include various methods for incorporating music technology into clinical practice. Emphasis will be placed on basic recording and manipulation of digital audio, as well as audio / MIDI hardware setup and live usage.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 590 Clinical Musicianship I: Piano 2.0 Credits**

This course provides methods for learning to accompany self, individuals, and groups within music therapy applications. Additional emphasis is placed upon establishing a musical relationship through clinical improvisation methods for piano/keyboards.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 591 Clinical Musicianship II: Guitar 2.0 Credits**

This course provides methods for accompany self, individuals, and groups using guitar within music therapy applications. Additional emphasis is placed upon improvisational guitar techniques that support the establishment of the musical relationship.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 592 Clinical Musicianship II- Integrated Voice 2.0 Credits**

Provides methods for developing clinical musical skills with emphasis upon voice, piano, guitar, and percussion proficiencies in preparation for internship. Students will further develop skills for working with musical responses of individuals and groups within a culturally responsive and sustaining framework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 615 Community-Centered Processes in Music Therapy 2.0 Credits**

This course is designed to facilitate understanding of community-centered music therapy processes across medical, wellness and prevention, and community arts and health settings. Attention is given to anti-oppressive, ecological approaches to therapeutic care. Students explore culturally sustaining practice models, systems, and policies through interdisciplinary approaches to facilitate therapeutic care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 621 Culminating Project I 1.5 Credit**

The culminating project is the opportunity to integrate theory, research, and practice on a relevant counseling topic. In this course, the student selects an area of focus, then completes the literature review and the project proposal. The project may be conducted as a research study or in any of a number of other format options that are congruent with how knowledge can be discovered, developed, and communicated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CATX 622 Culminating Project II 1.5 Credit**

The Culminating Project II is an opportunity for the student to continue their concentration in and demonstration of exploration within a relevant topic area of counseling. It is designed as an independent project that builds on the previous Culminating Project I coursework. It includes completing a culminating project paper and a public presentation of their focused topic that further brings the student into community dialog.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**Prerequisites:** CATX 621 [Min Grade: B] (Can be taken Concurrently)

**CATX 623 Culminating Project in Dance/Movement Therapy I 1.5 Credit**

The culminating project is the opportunity to integrate theory, research and practice on a topic that is relevant to dance/movement therapy and counseling. In this course, the student selects an area of focus, then completes the literature review and the project proposal. The project may be conducted as a research study or in any of a number of other format options that are congruent with how knowledge is discovered, developed and communicated in the creative arts therapies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is DMTC.

**CATX 624 Culminating Project in Dance/Movement Therapy II 1.5 Credit**

The culminating project is the opportunity to integrate theory, research and practice on a topic that is relevant to dance/movement therapy and counseling. This course builds on Culminating Project I. In it, the student completes the planned project and presents it to program faculty and in a public forum. The project may be conducted as a research study or in any of a number of other format options that are congruent with how knowledge is discovered, developed and communicated in the creative arts therapies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is DMTC.

**Prerequisites:** CATX 623 [Min Grade: B] (Can be taken Concurrently)

**CATX 625 Culminating Project in Music Therapy I 1.5 Credit**

The culminating project is the opportunity to integrate theory, research and practice on a topic that is relevant to music therapy and counseling. In this course, the student selects an area of focus, then completes the literature review and the project proposal. The project may be conducted as a research study or in any of a number of other format options that are congruent with how knowledge is discovered, developed and communicated in the creative arts therapies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is MTC.

**CATX 626 Culminating Project in Music Therapy II 1.5 Credit**

The culminating project is the opportunity to integrate theory, research and practice on a topic that is relevant to music therapy and counseling. This course builds on Culminating Project I. In it, the student completes the planned project and presents it to program faculty and in a public forum. The project may be conducted as a research study or in any of a number of other format options that are congruent with how knowledge is discovered, developed and communicated in the creative arts therapies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 20 credits

**Restrictions:** Can enroll if major is MTC.

**Prerequisites:** CATX 625 [Min Grade: B] (Can be taken Concurrently)



**CATX 627 For Culminating Project Only 0.0 Credits**

This no-credit course is available to creative arts therapy students who have submitted the MA Culminating Project to the advisory committee. Students in this course are expected to defend the thesis, complete revisions and submit the final copy of the thesis or capstone project for binding during the quarter covered by this course registration.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 5 times for 0 credits

**CATX 631 Media, Materials and Process in Art Therapy 3.0 Credits**

The techniques of materials use and media facilitation in art therapy are explored through the direct experience of art making with a range of art materials and processes in studio, seminar, and group-based formats. Students will distinguish therapeutic benefits and challenges with a variety of art processes and media, as well as articulate media strategies and qualities and the adaptive interventions possible, with a variety of individuals and groups.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 637 Advanced Art Therapy Group Supervision I 1.0 Credit**

Students participate in group supervision through presenting, discussing, and evaluating clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups of no more than 8 students are guided by a credentialed art therapist to engage in interactive dialogue about art therapy and counseling cases with an emphasis on diagnosis, treatment planning, individual/group dynamics, and transference/countertransference. Art therapy program development, professional identity, and ethical issues are also addressed. Students are expected to connect art therapy and counseling theory with their internship experiences with children, adolescent and adult, older adult clinical populations and settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 638 Advanced Art Therapy Group Supervision II 1.0 Credit**

Building on the previous quarter of advanced group supervision, students will discuss & process how to remain engaged & present in sessions, how to address boundary issues, & how factors of burn out, compassion fatigue, and vicarious traumatization. As in previous supervision classes, students will continue to present, discuss, and evaluate clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups of no more than 8 students are guided by a credentialed art therapist to engage in interactive dialogue about art therapy & counseling cases with an emphasis on diagnosis, treatment planning, individual/group dynamics, & transference/countertransference. Art therapy program & future job development, professional identity, and ethical issues are also addressed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 2 credits

**Restrictions:** Can enroll if major is ATC.

**CATX 639 Advanced Art Therapy Group Supervision III 1.0 Credit**

Building on two previous quarter classes of advanced group supervision and in preparation of graduation, students will cultivate professional supervision goals for future work and identify, activate, and process the dynamics of closure with clients and other vital internship relationships. Students will continue to present, discuss, and evaluate clinical case material that they have co-facilitated and/or facilitated from their field experiences. Small groups are guided by a credentialed art therapist and licensed counselor to engage in interactive dialogue about art therapy and counseling cases with an emphasis on diagnosis, art media and processes, treatment planning relative to client goals and needs, individual/group dynamics as displayed in art imagery and forms, and transference/countertransference.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 645 Professional Identity & Contemporary Practices 3.0 Credits**

The fostering of professional identity is grounded in the interconnection between the values, lived experiences, ethical practices, and ever-developing worldview of the clinician. In this course, professional identity is reviewed through both the individualistic and collective lens. The requirements for professional state licensure and specialty board credentialing are reviewed, ethical codes are reinforced, and contemporary issues surrounding career development and entering the job market are explored. Ongoing professional development nurtured long term via supervision, professional affiliations, personal and creative development, and advocacy endeavors will be investigated and encouraged.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CATX 670 Music and Imagery Methods in Music Therapy 2.0 Credits**

Music and imagery approaches in counseling and therapy with individuals and groups are examined through experiential learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 673 Advanced Topics in Music Therapy and Counseling I: Music, Imagery and the Therapeutic Relationship 3.0 Credits**

Music and imagery approaches in counseling and therapy with individuals and groups are examined through experiential learning, relevant literature, and standardized patient lab. The therapeutic relationship is addressed through a lens of diversity, equity, and inclusion. Readings and discussion topics will include counseling theories informing receptive music therapy, as well as resource-oriented and music-centered music therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 674 Advanced Topics in Music Therapy and Counseling II: Integrative and Community Processes 3.0 Credits**

This advanced course is designed to facilitate understanding of psychological, physical, spiritual, and sociocultural effects of music therapy in medical, wellness and prevention, and community music therapy settings. Attention is paid to the integration of mind, body, and spirit during the music therapy process as students participate as leaders and members of simulated experiences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 676 Theories in Music Psychotherapy & Counseling 2.0 Credits**

Designed to provide an introductory overview of major theoretical models of psychotherapy as they apply to music therapy. Readings and discussion topics will include psychodynamic and humanistic perspectives, as well as resource-oriented and music-centered music therapy. Attention will be given to emergent literature addressing the integration of music therapy with other clinical orientations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 677 Advanced Music Therapy Skills: Integrative Methods 2.0 Credits**

Students will study music therapy within group and individual formats incorporating wellness and mind/body approaches. Students will participate as leaders and members of individual and group experiences to simulate a variety of clinical, caregiver and other non-clinical populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 678 Advanced Clinical Improvisation & Musical Analysis 4.0 Credits**

Advanced Clinical Improvisation and Musical Analysis includes exploration of intersubjectivity in the co-creation of the musical therapeutic relationship. Students will apply advanced musical skills in experiential formats, utilizing piano, guitar, percussion and voice. The musical analysis portion of the course includes methods of analysis of client musical expressions using developmental and interaction models. Approaches to post-analysis therapist response will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CATX 679 Advanced Clinical Improvisation and Analysis 2.0 Credits**

This course explores intersubjectivity in the co-creation of musical therapeutic relationships and application of advanced musical skills in experiential formats utilizing piano, guitar, percussion, and voice. Client musical expressions are explored through developmental, multi-relational, and intersectional analysis. Approaches to post-analysis therapist response will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 685 Professional Identity & Contemporary Practices in Music Therapy 2.0 Credits**

A culminating course exploring professional identity and contemporary practice issues in music therapy. This course provides in-depth discussion of professional entry as it relates emerging discourse on the therapeutic relationship and professional practice, requirements for professional licensure and credentialing, and career entry and development. Post graduate professional development, supervisory roles and processes, professional affiliations, personal and creative development, and advocacy will be explored to support student entry into the music therapy profession.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 703 Interdisciplinary Seminar I 3.0 Credits**

This course is one in a series of three seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the CATs. The seminar is also to be viewed as a venue for identifying knowledge gaps in the CATs and generating original research topics. This seminar addresses the study of the interface between aesthetics, creativity and narrative and related implications for the CATs.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**CATX 704 Interdisciplinary Seminar II 3.0 Credits**

This course is one in a series of three seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the creative arts therapies (CAT). This seminar addresses the intersection between psychology, biology, and neuroscience and the CATs. The implications of study in these bodies of knowledge are considered for development of epistemology, theory and practice in the CATs.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**Prerequisites:** CATX 703 [Min Grade: B]

**CATX 705 Interdisciplinary Seminar III 3.0 Credits**

This course is one in a series of three seminars in which students study the inter-relatedness between collective interdisciplinary bodies of knowledge and the creative arts therapies (CAT). This seminar addresses the study of the interface between the tenets of anthropology, sociology, cultural diversity, and, the CATs. The study of how embedded cultural thought, semiotics, and healing practices, relate to theory, practice and research in the arts therapies will be the focus of the seminar.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**Prerequisites:** CATX 704 [Min Grade: B]

**CATX 712 Philosophy and Theory in Research 3.0 Credits**

This course is the first in the doctoral research sequence. It introduces the student to the philosophical, socio-cultural, and theoretical contexts for social science research and methods. The course introduces students to the ontology, epistemology, and axiology of various perspectives of research. The role of these research worldviews in creative arts therapies research is examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**CATX 715 Expanded Perspectives on Research Methodologies 3.0 Credits**

This course introduces current trends in research approaches for the Creative Arts Therapies and related fields. The philosophies and methods for mixed methods research, program evaluation, and other emergent approaches are discussed. Students also explore innovative approaches to design, data collection and data analysis based on their own research interests.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX 716 Studio Based Artistic Inquiry 3.0 Credits**

This course introduces methods of self-directed learning through creative processes. The course consists of three parts: 1) creative exploration; 2) personal and group reflection, notation, and sharing; and 3) emotional, cognitive, sensory-motor, artistic, and interpersonal small group experiences. Appropriate readings will be collaboratively sought and shared by all participants to parallel the emergent scholarship and information-seeking practices of the students and a final, arts-based synthesis will be presented to peers and the instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**Corequisites:** CATX 703, CATX 712

**CATX 717 Intro to Arts-Based Research 3.0 Credits**

This course introduces arts-based research for application in the Creative Arts Therapies as well as other healthcare and education disciplines. This course includes a critical review of arts-based research literature and aligning arts-based research methods appropriately with student research questions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

**CATX 804 Dissertation Research I 1.0-9.0 Credit**

This course focuses upon choosing a research topic for the dissertation. The topic will be chosen with ongoing faculty advisement. Once the topic is chosen the student prepares a dissertation proposal outline that includes the identification of the problem to be studied, the purpose of the study, the rationale, the methodology and the research question. The proposal outline must be approved by the program faculty. Following approval by the faculty the student begins writing their dissertation proposal.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 18 credits

**Restrictions:** Can enroll if major is CATX.

**CATX 805 Dissertation Research II 1.0-9.0 Credit**

In this course, with faculty advisement, the student writes the dissertation proposal. In addition, the student finalizes their dissertation committee during this term. The proposal is submitted to the dissertation proposal committee and the oral defense of the proposal takes place. The student must pass the oral proposal defense in order to register for CATX 806.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CATX.

**Prerequisites:** CATX 804 [Min Grade: B] or ARTS 804 [Min Grade: B]

**CATX 806 Dissertation Research III 1.0-9.0 Credit**

In this course the student revises the dissertation proposal based upon the results of the Dissertation Proposal Defense and the dissertation format selected. The student prepares materials for IRB submission and approval. Once the dissertation is approved by the IRB, and with the advisement of the Supervising Professor, the student establishes a data management system and begins data collection.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CATX 805 [Min Grade: B] or ARTS 805 [Min Grade: B]

**CATX 807 Dissertation Research IV 1.0-9.0 Credit**

This course includes the final stages of the dissertation during which the data collection is completed, the data is analyzed, the manuscripts, results and discussion chapters are written and the final dissertation is defended in an oral examination.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** CATX 806 [Min Grade: B] or ARTS 806 [Min Grade: B]

**CATX 808 Practicum I 2.0-9.0 Credits**

The practicum provides the practical application component of the doctoral program. The aim of the practicum courses is to transform the knowledge learned to this point in the doctoral program into practical application and research experiences in the Creative Arts Therapies fields.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CATX.

**CATX 809 Practicum II 2.0-9.0 Credits**

This practicum course is a continuation of CATX 808 Practicum I and provides the practical application component of the doctoral program. The aim of the practicum courses is to transform the knowledge learned to this point in the doctoral program into practical application and research experiences in the Creative Arts Therapies fields.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is CATX.

**Prerequisites:** CATX 808 [Min Grade: B] or ARTS 808 [Min Grade: B]

**CATX 812 Teaching Practicum 1.0 Credit**

The teaching practicum provides the opportunity for students to develop aptitudes and skills related to teaching in higher education including teaching philosophy, curriculum development, course construction and prep, in-class teaching experiences, pedagogical approaches, advisement, mentoring, supervision, and evaluation. The goal of the practicum is to prepare students for positions of leadership in academia in the Creative Arts Therapies fields.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**CATX I699 Independent Study in Creative Arts Therapy 0.5-4.5 Credits**

Independent opportunities for study may be offered to individual students who have an interest and an academic rationale to pursue greater depth than is provided in other CAT courses. This course is structured with a contract and under close advisement.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CATX I899 Independent Study 1.0-6.0 Credit**

Independent study provides students with an opportunity to develop various components of their interests in creative arts therapies and health sciences. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CATX T580 Special Topics in Creative Arts Therapies 1.0-5.0 Credit**

This course focuses on topics of current interest to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**CATX T780 Special Topics in Creative Arts Therapies 1.0-5.0 Credit**

This course focuses on topics of current interest to faculty and PhD students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

# Creative Therapies & Counseling

## Courses

**CTCN 501 Human Psychological Development 4.5 Credits**

This course provides an understanding of human growth and development over the lifespan including theoretical approaches and issues relevant to master's level clinicians. There is an emphasis placed on the interconnective nature of physiological, cognitive, social, emotional, personality, and moral development. Students will analyze major theories, from infancy to old age, and their application in working with people across the lifespan and describe multicultural implications (including issues of race, ethnicity, sexual orientation, gender, immigrant status, history, trauma, etc).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 503 Differential Diagnosis and Processes 4.5 Credits**

This course provides an introduction to the structure and uses of the Diagnostic Statistical Manual (DSM) and the International Classification of Diseases (ICD) for differential diagnosis, case formulation, and treatment planning. Critical analysis of the limitations and relevancy of these approaches, and the use of these systems effectively in the context of relational, biopsychosocial, cultural, spiritual, and systemic interventions will be emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 504 Professional Orientation and Ethics 4.5 Credits**

This course covers ethical principles, concerns, and legal issues related to clinical practice. Classes use readings, videos, lectures, and case discussions for mastery of concepts and problem-solving. The course also addresses professional identity and professionalism.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 505 Theories of Counseling and Psychotherapy 4.5 Credits**

This course will introduce traditional and contemporary counseling and psychotherapeutic theories. Through critical examination of theoretical research, historical foundations, evidence-based techniques, and multicultural implications, students will expand their orientation of counseling and psychotherapy theory to therapeutic practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.



**CTCN 506 Social and Cultural Foundations in Counseling and Art Therapy 4.5 Credits**

This class explores the impacts and implications of culture, race, ethnicity, sexual orientation, gender identity and expression, social class, ability, religion, and other relevant identities within the context of mental health treatment. Issues surrounding diversity, inclusion, social justice, and multiculturalism are examined. Multicultural competency and cultural humility are identity development frameworks taught and encouraged for the practitioner to foster inter-relational skills of flexibility, openness, knowledge, self-understanding, and ongoing growth to work with diverse populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 507 Social and Cultural Foundations in Counseling and Dance/Movement Therapy 4.5 Credits**

The purpose of this course is to provide students an opportunity to gain multicultural competency as professional creative art therapists and counselors. This class explores implications of culture, race, ethnicity, sexual orientation, gender, social class, physical ability, and religion within the context of mental health treatment. Through readings, experiential exercises, discussions, guest speakers, reflective writing, personal projects, and lecture, multicultural issues are examined and a framework presented for the practitioner to develop flexibility, openness, knowledge and competence with diverse populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 508 Social and Cultural Foundations in Counseling and Music Therapy 4.5 Credits**

The purpose of this course is to provide students an opportunity to gain multicultural competency as professional creative art therapist and counselors. This class explores implications of culture, race, ethnicity, sexual orientation, gender, social class, physical ability, and religion within the context of mental health treatment. Through readings, experiential exercises, discussions, guest speakers, reflective writing, personal projects, and lecture, multicultural issues are examined and a framework presented for the music therapy practitioner to develop flexibility, openness, knowledge and competence with diverse populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 509 Social and Cultural Foundations 4.5 Credits**

This course explores critical multicultural theories to support social and cultural dimensions of counseling processes. Students will develop awareness and knowledge of power, privilege and oppression across social locations and the ways personal and interpersonal behaviors relate to micro and macro systems. Culturally responsive practices and anti-oppressive intervention strategies will be cultivated to identify and eliminate cultural barriers, prejudice, and discriminatory practices.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 510 Clinical Practicum I 2.0 Credits**

A supervised clinical experience in art therapy and counseling, focused on the development of fundamental observation skills. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site art therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 511 Clinical Practicum & Practicum Seminar I 2.0 Credits**

This course introduces basic counseling skills and provides opportunities to put these skills into practice through a supervised clinical experience. A group seminar will support the integration of the clinical experience and the coursework. Students will explore the interpersonal dynamics of the helping relationship and develop self-in-role skills, such as self-reflection and strategies for self-care. The student is assigned, by the Coordinator of Field Education, to a clinical field experience under the guidance of an approved clinical supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 512 Clinical Practicum & Practicum Supervision I 2.0 Credits**

A supervised clinical experience in music therapy and counseling, focused on the development of fundamental observation skills and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site music therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 520 Clinical Practicum II 2.0 Credits**

A supervised clinical experience in art therapy and counseling, in which the student begins to function as a student therapist, co-leading and leading group and individual sessions. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site art therapist. Includes Mental Health Counseling (MHC) Supervision with a counselor, psychologist or other qualified mental health clinician.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 521 Clinical Practicum & Practicum Seminar II 2.0 Credits**

This course builds upon Clinical Practicum & Practicum Seminar I where the student begins to function as a student therapist, co-leading and leading group and/or individual sessions at an assigned clinical field experience under the guidance of an on-site approved clinical supervisor. The group seminar supports the integration of clinical experience and coursework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**Prerequisites:** CTCN 511 [Min Grade: CR]

**CTCN 522 Clinical Practicum & Practicum Supervision II 2.0 Credits**

A supervised clinical experience in music therapy and counseling, in which the student begins to function as a student therapist, co-leading and leading group and individual sessions and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site music therapist. Includes Mental Health Counseling (MHC) Supervision with a counselor, psychologist or other qualified mental health clinician.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 530 Clinical Practicum III 2.0 Credits**

A supervised clinical experience in art therapy and counseling, in which the student continues to function as a student therapist, co-leading and leading group and individual sessions. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site art therapist. Includes Mental Health Counseling (MHC) Supervision with a counselor, psychologist or other qualified mental health clinician.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 531 Clinical Practicum & Practicum Seminar III 2.0 Credits**

This course builds upon Clinical Practicum & Practicum Seminar II as the student continues to develop basic clinical skills and function as a student therapist co-leading and leading group and/or individual sessions under the supervision of an approved clinical supervisor at an assigned clinical site. The group seminar supports the integration of clinical experience and coursework, examines interpersonal dynamics of the helping relationship through case formulations, and deepens self-in-role skills, such as self-reflection and strategies for self-care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**Prerequisites:** CTCN 511 [Min Grade: CR] and CTCN 521 [Min Grade: CR]

**CTCN 532 Clinical Practicum & Practicum Supervision III 2.0 Credits**

A supervised clinical experience in music therapy and counseling, in which the student continues to function as a student therapist, co-leading and leading group and individual sessions, and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. The student is assigned, by Director of Field Education, to a clinical field experience under the guidance of an on-site art therapist. Includes Mental Health Counseling (MHC) Supervision with a counselor, psychologist or other qualified mental health clinician.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 540 Approaches to Addictions and Recovery 4.5 Credits**

This course will provide a basic foundation of the etiology, assessment, diagnosis, and the recovery and treatment of substance abuse and process addictions through bio-psycho-social models of theory and practice. Emphasis will be given to the transtheoretical approach of Motivational Interviewing and recovery models such the stages of change and mind-body approaches including the personal, social, and cultural attitudes and stereotypes that are often associated with chemical abuse and addictive behaviors and disorders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 542 Clinical Supplement 1.0 Credit**

A supervised clinical experience focused on the development of fundamental skills and group supervision to support the integration of clinical experience and coursework as related to clinical practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**CTCN 551 Introduction to Anatomy and Kinesiology for Dance/ Movement Therapy 2.0 Credits**

This course introduces anatomy and kinesiology through lecture, discussion, and experiential learning formats. The course provides an overview of the musculoskeletal system and how it functions to support the mechanics of human motion. An introduction to the principles of body connectivity provides a foundation for later dance/movement therapy clinical applications. The course also supports development of body/self awareness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 552 Therapy Relationship Skills I 2.5 Credits**

This course introduces and experientially practices skills for understanding, establishing and developing the therapeutic relationship and engaging in the therapeutic process. It will focus on the intrapersonal, interpersonal, and intercultural considerations during the initial phase of therapy and the role of the therapist in supporting relative safety and growth.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 553 Therapy Relationship Skills II 2.0 Credits**

This course continues Therapy Relationship Skills I with the experience and practice of movement and verbal counseling skills that facilitate individual and group therapy processes. Particular attention is given to discerning patterns and themes in the counseling/ therapy session through which the therapy relationship develops and therapy progresses. The focus is on the middle and closure phases of therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 554 Movement Observation and Assessment I 2.0 Credits**

This course will examine the interface between perception, observation, and description of human movement behavior with personal, relational, cultural, and societal influences. Through experiential methods, students develop basic kinesthetic awareness of the musculoskeletal and neuromotor systems and an understanding of their own personal movement preferences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 555 Movement Observation and Assessment II 2.5 Credits**

This course builds on Movement Observation and Assessment I to develop skills in perception, observation, and description of functional and expressive aspects of human movement behavior, including a focus on qualitative dynamics and discernment of movement patterns.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**Prerequisites:** CTCN 554 [Min Grade: B]

**CTCN 556 Movement Observation II 2.0 Credits**

This course builds on Movement Observation I to develop skills in perception, observation, and description of functional and expressive aspects of human movement behavior. Through critical examination, therapeutic implications of movement observation frameworks will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 557 Theory and Practice I- Children 3.0 Credits**

This course addresses the theory and practice of dance/movement therapy and counseling and approaches in working with typical and atypical children. The course reviews child and adolescent development, emotional, behavioral, and neurodevelopmental disorders, and concomitant patterns of movement behavior. Students investigate evidence and theory based therapy methods through lecture, readings, films, experiential structures, and discussion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 558 Theory and Practice II: Adults 3.0 Credits**

This course addresses the theory and practice of dance/movement therapy and counseling with adults. The course investigates a range of mental health disorders and conditions within a biopsychosocial and cultural framework with particular attention to the experience of those living with the disorder and therapy approaches. The course highlights the role of trauma across conditions. The course also addresses arts supports for community mental health and advocacy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 559 Orientation to Dance/Movement Therapy 1.0 Credit**

This survey seminar introduces students to the historical development of dance/movement therapy theoretical orientation, and supporting literature. Experiential activities and films will illustrate particular approaches.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 560 Theory and Practice: Special Populations 3.0 Credits**

This course will present a theoretical and experiential exploration of therapeutic practice with a variety of clinical populations. Attention will be given to how theories are applied to practice in relation to the following: (a) needs of specific populations, (b) socio-cultural and developmental considerations, (c) public policies, and (d) systems of health care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 563 Movement Perspectives in Human Development 3.0 Credits**

This course considers the roles of early movement patterns, basic senses, reflexes, culture, play, and relationships in physical, cognitive, emotional, and social development across the lifespan. Implications for developmentally-informed clinical interventions will be addressed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 564 Mental Health Applications of Movement Analysis 3.0 Credits**

This course provides an overview of assessment of psychosocial functioning using nonverbal behavior, nonverbal communication and analysis of movement dynamics. Relevant theory and research findings are applied to the understanding of individual, interpersonal, and family functioning with an emphasis on initial application in clinical assessment, treatment planning and the development of interventions grounded in observed movement behavior.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 565 Movement Observation and Assessment III 2.5 Credits**

This course provides an overview of theory and research findings related to dance/movement therapy assessment for application to the understanding of the individual, interpersonal, and family functioning. Students will practice using selected movement assessment approaches and explore collaborative and context-sensitive processes for meaning-making. Through critical examination, the therapeutic implications of various movement observation frameworks will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**Prerequisites:** CTCN 554 [Min Grade: B] and CTCN 555 [Min Grade: B]

**CTCN 575 Therapeutic Processes & Relationship Skills I 2.0 Credits**

This course provides a skill-based exploration of psychotherapeutic processes and practices. Through verbal and non-verbal micro-skills, intrapersonal, interpersonal, and intercultural aspects of the therapeutic relationship will be explored. Focus is placed on the development of therapeutic relationships during the initial phases of therapy and the role of the therapist in supporting safety and growth. Expanded awareness of personhood, including social location, intersectionality, and embodied social, emotional, cultural, and cognitive resources will be cultivated to support therapeutic relationship.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CTCN 601 Introduction to Behavioral Research 4.5 Credits**

This course introduces basic quantitative, qualitative, mixed methods, and arts-based research approaches within human and behavioral research and program evaluation, as well as attention to ethical and intercultural considerations. This course also addresses the knowledge and skills for becoming critical consumers of research in education and behavioral health care settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 603 Clinical Appraisal and Assessment 4.5 Credits**

The purpose of this course is to provide students with an overview of different types of tests used in clinical, educational, and organizational settings. Topics include: tests and assessments that are standardized, non-standardized, norm-referenced, criterion-referenced, group and individual testing and assessment, behavioral observations, and symptom checklists. Students will also explore theories of clinical appraisal and testing, interviewing for mental health functioning, and skills of professional case presentation, with an emphasis on case conceptualization and holistic assessment. The course also addresses ethical, legal, and sociocultural issues including cultural bias and fairness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is AC or major is ATC or major is DMTC or major is MTC.

**CTCN 604 Career Counseling 4.5 Credits**

This course will explore career counseling theories, assessment, and applied approaches to career development and counseling for diverse clients and settings. Current issues, employment trends, use of technology, as well as reflection on personal/professional career development will be addressed. Special attention will be given to ethical, multicultural, and social justice issues in career counseling.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 606 Group Dynamics and Processes 4.5 Credits**

This course aims to examine major group theories, practices, processes, and dynamics. Students will examine relevant literature, multimedia resources, and evidence-based practices to develop an understanding of intercultural factors and contextually relevant group facilitation practices, group leaders' roles and responsibilities, and the relevance and purpose of group work in counseling.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC or major is DMTC or major is MTC.

**CTCN 607 Group Dynamics in Counseling and Dance/Movement Therapy 4.5 Credits**

The purpose of this course is to examine group theory, process, and dynamics. Major emphasis is on the dynamics of groups, i.e. the group process and ways that basic group counseling plays out in psychotherapy and counseling groups. Students will examine relevant literature, multimedia resources, and evidence-based practices, to develop an understanding of culturally and contextually relevant group facilitation practices, group leaders' roles and responsibilities, and the relevance and purpose of group work in counseling and dance/movement therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 608 Group Dynamics in Counseling and Music Therapy 4.5 Credits**

The purpose of this course is to examine group theory, process, and dynamics. Major emphasis is on the dynamics of groups, i.e. the group process and ways that basic group counseling plays out in psychotherapy and counseling groups. Students will examine relevant literature, multimedia resources, and evidence-based practices, to develop an understanding of culturally and contextually relevant group facilitation practices, group leaders' roles and responsibilities, and the relevance and purpose of group work in counseling and music therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 610 Clinical Internship I 2.0 Credits**

Advanced supervised clinical experience in art therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Art Therapy Program Director. Individual clinical supervision provided by a qualified art therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 611 Clinical Internship & Internship Seminar I 2.0 Credits**

This course encompasses both an advanced supervised clinical experience with a population of the student's preference, arranged in collaboration with the Coordinator of Field Education, and a group supervision seminar to support the integration of clinical experience and coursework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.



**CTCN 612 Clinical Internship & Internship Supervision I 2.0 Credits**

Advanced supervised clinical experience in music therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Music Therapy Program Director; and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. Individual clinical supervision provided by a qualified music therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 620 Clinical Internship II 2.0 Credits**

Continuation of advanced supervised clinical experience in art therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Art Therapy Program Director. Individual clinical supervision provided by a qualified art therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 621 Clinical Internship & Internship Seminar II 2.0 Credits**

This course is a continuation of advanced supervised clinical internship experience with a population of the student's preference, arranged by the student in collaboration with the Coordinator of Field Education. The course also includes a group supervision seminar to support the integration of clinical experience and coursework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 622 Clinical Internship & Internship Supervision II 2.0 Credits**

Continuation of advanced supervised clinical experience in music therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Music Therapy Program Director; and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. Individual clinical supervision provided by a qualified music therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 630 Clinical Internship III 2.0 Credits**

Culmination of advanced supervised clinical experience in art therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Art Therapy Program Director. Individual clinical supervision provided by a qualified art therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ATC.

**CTCN 631 Clinical Internship & Internship Seminar III 2.0 Credits**

This course is the culmination of an advanced supervised clinical internship experience with a population of the student's preference arranged in collaboration with the Coordinator of Field Education. The course also includes a group supervision seminar to support the integration of the clinical experience and coursework.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 632 Advanced Clinical Internship & Internship Supervision III 2.0 Credits**

Culmination of advanced supervised clinical experience in music therapy and counseling, with a population of the student's preference, arranged by the student in collaboration with Director of Field Education and Music Therapy Program Director; and a group supervision to support the integration of clinical experience and coursework as related to music therapy and counseling clinical practice and research including small group presentation and discussion. Individual clinical supervision provided by a qualified music therapy supervisor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MTC.

**CTCN 651 Medical Dance/Movement Therapy 1.0 Credit**

This course examines dance/movement therapy as a complementary approach for people with primary medical conditions. Using readings, experiential exercises, lecture, discussion and video formats, the course includes relevant theory from health psychology and mind/body perspectives, in order to motivate programming and research in this sub-specialty.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 654 Crisis, Trauma, and the Body 4.0 Credits**

This course will present the theory and practice of mind-body approaches for crisis intervention and trauma. The roles, responsibilities, and techniques in providing trauma-informed interventions with individuals, groups, and community-based strategies will be highlighted. Prevention models utilizing approaches rooted in developmental affective neuroscience relevant to the mind-body impact of trauma will be of particular emphasis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 655 Dance, Culture, and Healing 1.5 Credit**

This course surveys global dance perspectives and practices through emphasis on dance as expression of cultural, historical, social and political forces. Phenomena of tradition, expression, and healing practices in select cultural dances are explored through readings, discussion, media presentation, embodied experiences, and movement laboratories. Examination of cultural appropriation vs. cultural appreciation and body knowledge/body prejudice as it applies to culturally-informed clinical application will be a focus.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 656 Movement Observation and Assessment IV 2.0 Credits**

This course supports the development of skills and knowledge for therapist responsibilities in the assessment, evaluation, and appraisal of clients as related to dance/movement therapy treatment planning and process. Students design and implement evidence-informed and culturally responsive clinical assessments and treatment plans using movement as primary clinical information.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CTCN 554 [Min Grade: B] and CTCN 555 [Min Grade: B] and CTCN 565 [Min Grade: B]

**CTCN 657 Dance/Movement Therapy Assessment 2.0 Credits**

This course aims to support the development of skills and knowledge for therapist responsibilities in assessment, evaluation and appraisal of patients and clients as related to dance/movement therapy treatment planning and process. Students design and implement evidence-informed and culturally responsive clinical assessments and treatment plans using movement as primary clinical information.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 658 Advanced Practice Topics and Skills I 2.5 Credits**

This special topics course provides support for students to advance understanding and practice of dance movement therapy and counseling. Students learn about specific and focused topics through readings and participation in experiential learning including medical dance/movement therapy. Student learn about integration of theory and practice through leadership, review of classroom sessions and written assignments.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 10 credits

**Restrictions:** Can enroll if major is DMTC.

**CTCN 659 Advanced Topics in Dance/Movement Therapy 2.0 Credits**

This special topics course provides support for students to advance understanding and practice of dance/movement therapy and counseling. Students learn about specific and focused topics through readings and participation in experiential learning focusing on the development of the professional identity. Students learn about integration of theory and practice through discussion, classroom experientials, and written assignments.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DMTC.

**CTCN 675 Therapeutic Processes & Relationship Skills II 2.0 Credits**

This course provides advanced exploration of psychotherapeutic processes and skills across theoretical models within therapeutic practice. It is designed to support advanced application of verbal and non-verbal micro-skills across major theoretical models and approaches in counseling psychotherapy. This course will focus on the middle and closure phases of therapy. Students will begin to personal orientations in relation to counseling practices.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**CTCN 677 Crisis & Trauma Approaches in Therapeutic Practice 4.0 Credits**

This course provides an overview of current theory and approaches for crisis intervention and trauma. This course will take an ecological approach exploring roles, responsibilities, strategies, and techniques to provide trauma-informed interventions with individuals, groups, and community-based strategies. Prevention models utilizing approaches rooted in developmental affective neuroscience relevant to the mind-body impact of trauma as well as systems theories of trauma effects, resilience, trauma recovery, and integrative models will be emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

## Creative Writing

### Courses

**CW 500 Reading as a Writer I 3.0 Credits**

This is a course whose purpose is to teach and promote the use of active reading as a methodology of acquiring expertise in creative writing.

Reading as a Writer I will give students a common language with which to discuss current fiction, not as the springboard for criticism, but as the wellspring for creation and inspiration.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CW 501 Reading as a Writer II 3.0 Credits**

This is a course whose purpose is to teach and promote the use of active reading as a methodology of acquiring expertise in creative writing with special focus on advanced considerations of genre and technique. This class features meet-ups with published guest authors on asynchronous Discussion Boards. Guest authors will share with students their own creative and professional journeys, their literary influences, and will discuss how to use published works as guidebook, inspiration, and as a customizable writer's tool box.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CW 510 Prepared to Publish 3.0 Credits**

Prepared to Publish is designed to give MFA creative writing students knowledge of and practice in the situations, roles, and skills they might encounter in their future publishing endeavors (whether as authors with big publishers or small presses, as self-publishers who take on the task of publishing their own books, or as professionals on the editorial or business side of publishing). Students will learn about such topics as editing, copy editing, book production, author rights and contracts, working with agents and editors, small press book publication, book cover design, interior book layout, building an author website, social media and book promotion, and literary magazines.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CW 550 Creative Writing Workshop 3.0 Credits**

This is a creative writing workshop whose purpose is to introduce core principles and give students a common language with which to create, analyze, and discuss creative writing within a workshop environment. Subjects covered include specificity, sensory language, symbolic language, character development, vivid scene crafting, organization/structure, and treatment of significance or themes.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CW 555 Creative Writing Packet Exchange I 1.0-3.0 Credit**

This is a creative writing mentorship course whose purpose is to enable students to practice and develop their craft, taking into consideration craft lessons learned in prior quarters. This course also emphasizes the importance of revision strategies. The format of the class is a packet exchange. The quarter will begin with a conversation between mentor and student in which they will discuss the nature of the project the student will work on and complete during the quarter. The student will then send their mentor three packets of writing on pre-arranged dates. The mentor will review and critique the student's efforts and return work on a pre-set date with a line edit and a robust editorial note.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** CW 550 [Min Grade: B]

**CW 556 Creative Writing Packet Exchange II 1.0-3.0 Credit**

This is a creative writing mentorship course whose purpose is to enable students to practice and develop their craft. This course also emphasizes the professional aspect of developing market awareness for one's own work. The format of the class is a packet exchange. The quarter will begin with a conversation between mentor and student in which they will discuss the nature of the project the student will work on and complete during the quarter. The student will then send their mentor three packets of writing on pre-arranged dates. The mentor will review and critique the student's efforts and return work on a pre-set date with a line edit and a robust editorial note. Students are expected to demonstrate an awareness of prior critique – in reflection and in the creation of new writing.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** CW 555 [Min Grade: B]

**CW 600 Creative Writing Craft Residency 3.0 Credits**

The residency will provide opportunity for intensive study and community building for the MFA cohort. Daily schedule consists of peer-critique, faculty-led master workshop, faculty talks and career development modules. As the inaugural residency in the MFA sequence, this course will introduce core craft principals and orient students for the course of study. Prior to the workshop students complete reading assignments and submit 20-30 page double-spaced works-in-progress for faculty-led workshop critique and analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**CW 601 Professional Residency in New York 3.0 Credits**

This is a residency for creative writers with an intensive focus on career development. Course consists of peer-critique, faculty-led master workshop, and intensive career development modules. Topics covered include platform building, social media tools, personal publication roadmap, pitch strategies, networking and agent searches. In advance of the workshop students complete reading assignments and submit 20-30 page double-spaced works-in-progress for faculty-led workshop critique and analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**CW 602 MFA Creative Writing Graduation Residency 3.0 Credits**

This is a residency with a daily schedule that consists of peer-critique, faculty-led master workshop, and career development modules. As the capstone residency, this course will allow students to present their thesis work to peers and mentors and to develop professional and aesthetic (craft) strategies for post-graduation success. The residency will also teach students to situate themselves within a creative tradition and to develop networks for post-graduation creative and professional support.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CW 600 [Min Grade: B] and (CW 601 [Min Grade: B] or CW 601 [Min Grade: CR])

**CW 653 Creative Writing Intensive Course Abroad 3.0 Credits**

This is an Intensive Course Abroad in Creative Writing. The location and availability of the course will change according to faculty availability and other programmatic details. The Drexel MFA encourages travel experiences as a formative part of a writer's education. The program consists of touring, community engagement, craft exercises, workshop and study of work by local authors and screenwriters. Prior to the course, students complete reading assignments and submit 20-30 page double-spaced works-in-progress for faculty-led workshop that will take place abroad.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**CW 654 Writing Pedagogy 3.0 Credits**

This is a pedagogy course whose purpose is to familiarize students with effective teaching modalities for undergraduate composition or fiction writing courses. The course will run in different versions, with an emphasis on creative writing or compositional pedagogy depending upon the cohort. Subjects covered include syllabus creation, grading, Drexel core principals, university resources, teaching strategies and subject-specific materials. Weekly assigned readings will inform discussions and be used for assignment materials. Students will receive focused instruction on common qualities of impactful writing, and on experiential techniques designed to elicit effective writing from students.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**CW 655 Fiction Writing Workshop II 3.0 Credits**

This is an advanced fiction-writing workshop whose purpose is to introduce core principals, and give Drexel MFA students a common language with which to create, analyze and discuss fiction within a workshop environment. Subjects covered can include: specificity, sensory language, symbolic language, character development, vivid scene crafting, and plot structure. The format of the class is a weekly peer-workshop meeting. Students post and share their own fiction in a rotating schedule and are required each week to engage in conversation while offering their own constructive criticism of all submitted work. Students will receive instruction on common qualities of impactful writing and on techniques designed to encourage the development of an author's unique style and voice.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CW 690 Thesis Development 1.0-3.0 Credit**

This is a course whose purpose is to enable students to begin thesis planning and execution. The quarter will begin with an in-depth conversation between instructor and student in which they will discuss the scope of the thesis project and student's particular interests as related to the creation and development of a publishable piece of work. Student will then propose two separate thesis topics. Instructor will review student efforts and make suggestions and give advice on best creative and professional course forward.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** CW 556 [Min Grade: B]

**CW 691 Thesis Packet Exchange I 1.0-3.0 Credit**

This is a course whose purpose is to enable students to commence and ultimately complete their capstone thesis project which is the culminating experience of the Drexel MFA. The quarter will begin with an in-depth conversation between instructor and student in which they will discuss the scope of the thesis project and student's plan for producing an ambitious publishable piece of work. Instructor will review student efforts and make suggestions and give advice on best creative and professional course forward.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** CW 690 [Min Grade: B] or CW 690 [Min Grade: CR]

**CW 692 Thesis Packet Exchange II 1.0-3.0 Credit**

This is a course whose purpose is to enable students to complete their capstone thesis project, which is the culminating experience of the Drexel MFA. The quarter will begin with an in-depth conversation between instructor and student in which they will discuss the scope of the thesis project and student's plan for producing an ambitious publishable piece of work. Instructor will review student efforts and make suggestions and give advice on best creative and professional course forward.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** CW 691 [Min Grade: B] or CW 691 [Min Grade: CR]

**CW I599 Independent Study in Creative Writing 0.0-12.0 Credits**

This course recognizes that writers have a variety of inspirations and that direct experience can provide raw material for story creation. Students are invited to propose Independent Study projects of any kind. Students are also invited to propose Independent Studies that draw inspiration from Drexel's unique resources, such as the Academy of Natural Sciences, the Bioko Biodiversity Protection Program or the Robert and Penny Fox Historic Costume Collection. Independent studies may also be inspired by subject matter far outside of university collections. The format of the class depends upon the particular project and will be determined in collaboration with the MFA director, the course instructor and the student.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CW I699 Independent Study in Creative Writing 3.0 Credits**

This course recognizes that writers have a variety of inspirations and that direct experience can provide raw material for story creation. Students are invited to propose Independent Study projects of any kind. Students are also invited to propose Independent Studies that draw inspiration from Drexel's unique resources, such as the Academy of Natural Sciences, the Bioko Biodiversity Protection Program or the Robert and Penny Fox Historic Costume Collection. Independent studies may also be inspired by subject matter far outside of university collections. The format of the class depends upon the particular project and will be determined in collaboration with the MFA director, the course instructor and the student.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CW I799 Community Based Learning Independent Study 0.0-12.0 Credits**

Students will develop and deliver innovative programming that uses creative writing to teach, inspire and make art with vulnerable and/or underserved populations. The format of the class depends upon the community setting and will be determined in collaboration with the MFA director, the community partner and the student. Student finds a community partner, develops teaching/enrichment plan, creates schedule for implementation and follows through on implementation. Or, student joins a Community Based Learning project which is already in progress. If this is the case, the student's initial proposal must explain the student's unique role in the project. Collaborative initiatives are encouraged.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**CW T580 Special Topics in Creative Writing 3.0 Credits**

This is a variable topics Course for the Drexel MFA in Creative Writing. The purpose of the course is for students to gain experience in specific genres and/or techniques such as but not limited to: dialogue writing, the hero's journey, memoir writing, creative non-fiction writing, comedy writing or writing from history. Emphasis is placed on revision, preparation for publication, and on identifying possible sources for publication.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit



**CW T680 Special Topics in Creative Writing 0.0-9.0 Credits**

The purpose of the course is for students to gain experience in specific genres and/or techniques such as but not limited to: dialogue writing, the hero's journey, memoir writing, creative non-fiction writing, comedy writing or writing from history. Emphasis is placed on revision, preparation for publication, and on identifying possible sources for publication. This is the second Special Topics course in the MFA sequence, and is intended for students taking a Special Topics course in their second year of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Creativity Studies

### Courses

**CRTV 501 Foundations in Creativity 3.0 Credits**

Provides a foundation in creativity including leading theorists and their ideas. Questions investigated include who is creative and why? What does it mean to be creative? Is creativity a general attribute or is it discipline specific? Students will complete and score a creativity assessment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 502 Tools and Techniques in Creativity 3.0 Credits**

Provides opportunities to enhance creative capacities and strengths. Through study and experiential learning, students work toward self-mastery of creative techniques, tools and strategies. Moreover, through a fieldwork experience, students learn to teach and motivate other individuals or groups to use these techniques in real life circumstances for their benefit.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 503 Creativity in the Workplace 3.0 Credits**

This course focuses on applied creativity, how creative ideas happen, how they become innovations, and how creativity can be infused into every aspect of an organization. Examples from a wide range of industries and organizations demonstrate how to build systemic creativity in individuals, in teams, and at the leadership level.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 505 Creative Interdisciplinary Team Research: Principles and Practice 3.0 Credits**

Course provides fluency with the foundational principles and processes that demonstrably enhance creative practice and problem-solving skills in interdisciplinary research teams. Students learn to identify and develop new, useful and high-quality ideas and products while practicing those skills and working as a member of an interdisciplinary team. A strong focus on theoretical principles of group dynamics provides the framework for participants to understand and experience best practices characteristic of highly productive collaborative research endeavors. Students with complementary interests work in teams to design an interdisciplinary project with STEM and social/educational components and apply learned concepts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 506 Enhancing the Creativity of a Research Project 3.0 Credits**

Course facilitates the development of a research idea. Participants learn proven creative practices to enhance their independent, problem-solving creative ability as practiced through developing a research project such as the selection of a thesis topic, an original research proposal, or the writing of a grant proposal. Students are required to formulate at least one potential research topic to iterate upon, develop, and hone.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 600 Mind, Brain and Learning 3.0 Credits**

This course focuses on current and emerging research related to the learning sciences and Mind, Brain, and Education science. Neuromyths and evidence-based practices are explored. The course examines general neuroanatomy and processes associated with learning, memory, and emotion. Topics include neuroplasticity, brain imaging, differentiation, stress, and self-efficacy.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 604 Neurodiversity in Education and Workforce 3.0 Credits**

This course focuses on neurodiversity. The neurobiology of learning and memory is explored from the learning sciences and Mind, Brain, and Education science within the context of educational and work environments. The impact of practice, stress, and environment are examined in connection to neuroplasticity, memory, performance, and brain imaging. Students are engaged in peer-review and self-evaluation as they demonstrate technical and applied knowledge, creative critical-thinking, and communication skills through presentations and projects aligned neurodiversity and Universal Design for Learning across real-world contexts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 608 Neuropedagogy and Assessment 3.0 Credits**

This course explores the connections between neuropedagogy, the learning sciences, and Mind, Brain, and Education science, and creative thinking. Evidence-based practices are examined including metacognition, Universal Design for Learning, spacing, interleaving, cognitive load, and feedback. Students are introduced to formative, interim, and summative assessment as well as technology platforms, tools, and applications that support mastery and transfer of learning. Students demonstrate their understanding of neuroplasticity, neuropedagogy, creative problem solving, and assessment through interactive real-world projects across educational and workforce environments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 610 Creativity and Change Leadership 3.0 Credits**

This course explores the relationship between change, leadership, and creativity, and how these three concepts mutually support one another. Distinction is made between a leader who is effective at introducing change, but who is not creative.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 615 Neuroscience, Creativity and Innovation 3.0 Credits**

This course explores research on understanding the neuroscience connection to creativity and innovation and on recognizing different patterns of neural activations and deactivations during various stages of the creative process. Topics include neuroplasticity, functional fixedness, metacognition, and design thinking, particularly as it relates to establishing creative learning across education and workforce environments moving towards promoting innovation and entrepreneurship.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 620 Research Methods and Assessment of Creative and Innovative Thinking 3.0 Credits**

This course acquaints students with creativity research and applications. The goal is to help students employ creative problem solving to successfully complete their course of study in the context of other responsibilities and the program's standards and requirements. Using creativity as a vehicle, students will study various research paradigms.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 630 Global Perspectives on Creativity 3.0 Credits**

The goal of this course is to explore theories, research, assessment, and programs for the development of creativity in a wide variety of countries around the world. Motives for the lack of global creativity research are suggested.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 640 Creativity & Innovation: 1500-Present 3.0 Credits**

Trends and interactions of creativity and innovation are examined from pre-1500 to present. Emphasis placed on understanding how the notion of creativity has evolved overtime and its influence on modern workplace and educational environments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 650 Current Trends in Creativity & Innovation 3.0 Credits**

Focus on five major trends: the study of creativity and social influence, innovation and planning, creativity and cognitive processes, sub-system configuration, and new venture emergence. Though unique in orientation, these trends have a common bond in raising and addressing multi-level issues and possible solutions that involve multiple levels of analysis.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**CRTV 660 Diagnostic Creative Intervention 3.0 Credits**

Integrates diagnostic teaching, creativity, and mediation skills. Diagnostic teaching is a creative problem solving instructional model framed upon core influences on learning, in depth content knowledge, and pedagogy knowledge. Creativity theories, applications and mediation concepts complement diagnostic teaching as individuals integrate intervention strategies in identifying real problems and creative resolutions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is MS.

**CRTV 695 Applied Project in Creativity Studies I 3.0 Credits**

First of a two-course capstone experience providing creativity studies students with an opportunity to demonstrate achievement in their concentration and to engage in self-reflection. Components include a statement of awareness of personal creative strengths, evidence of emergence as a creative thinker and doer, and synthesis of creative expansion to date.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CRTV 501 [Min Grade: C] and CRTV 502 [Min Grade: C] and CRTV 503 [Min Grade: C] and CRTV 610 [Min Grade: C] and CRTV 620 [Min Grade: C] and CRTV 630 [Min Grade: C]

**CRTV 696 Applied Project in Creativity Studies II 3.0 Credits**

Students will complete the creative portfolio begun in CRTV 695. Components include creative expression, future directions, and reflection on the major, concentration, and experience of creating a portfolio.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CRTV 695 [Min Grade: C]

**CRTV I599 Independent Study in CRTV 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV I699 Independent Study in CRTV 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV I799 Independent Study in CRTV 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV I899 Independent Study in CRTV 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV I999 Independent Study in CRTV 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV T580 Special topics in CRTV 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV T680 Special topics in CRTV 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV T780 Special topics in CRTV 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV T880 Special topics in CRTV 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**CRTV T980 Special topics in CRTV 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Data Science

### Courses

**DSCI 501 Quantitative Foundations of Data Science 3.0 Credits**

Linear algebra, calculus, probability and statistical methods are essential foundation areas required for an effective understanding and application of data science. In this course, students will get a gentle introduction to these important areas of quantitative reasoning. Along with introducing basics of linear algebra, calculus, probability, and statistical methods, this course will also introduce their computational application through the Python programming language. Concepts will be demonstrated using various python packages.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**DSCI 511 Data Acquisition and Pre-Processing 3.0 Credits**

Introduces the breadth of data science through a project lifecycle perspective. Covers early-stage data-life cycle activities in depth for the development and dissemination of data sets. Provides technical experience with data harvesting, acquisition, pre-processing, and curation. Concludes with an open-ended term project where students explore data availability, scale, variability, and reliability.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 570 [Min Grade: C] (Can be taken Concurrently)

**DSCI 521 Data Analysis and Interpretation 3.0 Credits**

Introduces methods for data analysis and their quantitative foundations in application to pre-processed data. Covers reproducibility and interpretation for project life cycle activities, including data exploration, hypothesis generation and testing, pattern recognition, and task automation. Provides experience with analysis methods for data science from a variety of quantitative disciplines. Concludes with an open-ended term project focused on the application of data exploration and analysis methods with interpretation via statistical, algorithmic, and mathematical reasoning.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 501 [Min Grade: C] (Can be taken Concurrently)

**DSCI 591 Data Science Capstone I 3.0 Credits**

Explores data science in practice as an open-ended team activity.

Initiates an in-depth multi-term capstone study applying computing and informatics knowledge in a data science project. Teams work to develop a significant product with advisors from industry and/or academia. Explores data science-related issues and challenges involved in the application domain of the team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, and documentation. This course should be taken towards the end of a student's program.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**DSCI 592 Data Science Capstone II 3.0 Credits**

Explores data science in practice as an open-ended team activity.

Completes an in-depth multi-term capstone study applying computing and informatics knowledge in a data science project. Teams work to develop a significant product with advisors from industry and/or academia. Explores data science-related issues and challenges involved in the application domain of the team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, and documentation. This course should be taken toward the end of the student's program.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 591 [Min Grade: C]

**DSCI 631 Applied Machine Learning for Data Science 3.0 Credits**

Introduces relevant topics in the life cycle of machine learning: extracting and engineering features, tuning parameters, comparing algorithms, interpreting results, and analyzing errors. Students will be exposed to various representative algorithms in the concept level and learn their trade-offs. Students will gain hands-on experiences with assignments and a term project. Students will be prepared to attack new problems using various machine learning methods and be able to compare the performance of different algorithms for the term project.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 521 [Min Grade: C] (Can be taken Concurrently)

**DSCI 632 Applied Cloud Computing 3.0 Credits**

The course will cover different technologies in cloud computing. This course focuses on the frameworks and algorithms used in the distributed processing of massive datasets. It will explore both batch and streaming data processing and examine the theory behind their algorithmic approaches. Students will gain practical experience by using cloud computing to solve real world problems.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 521 [Min Grade: C] (Can be taken Concurrently)

**DSCI 641 Recommender Systems for Data Science 3.0 Credits**

Recommender systems help users to discover new products and services. The goal is generating meaningful recommendation to a collection of users with items or products that might interest them. Recommender systems are encountered on multiple domains such as e-commerce, content and media distribution, social media, and more. The course will cover fundamental and practical aspects of Recommender systems focusing on the data science approach. The course includes topics and concepts for recommender systems: collaborative filtering, content-based recommendation, knowledge-based recommendation, hybrid recommendation, attack-resistance recommendation, and evaluation of the recommender systems. Students will gain hands-on experiences with assignments and a term project.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 521 [Min Grade: C]

**DSCI 691 Natural Language Processing with Deep Learning 3.0 Credits**

Natural Language Processing (NLP) is one of the most important technologies of the information age and is a critical component to AI. Recently, deep learning approaches have overtaken the domain. This course explores the basis of these neural models with a heavy emphasis on research.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 521 [Min Grade: C], CS 613 [Min Grade: C], CS 615 [Min Grade: C] (Can be taken Concurrently)

**DSCI T780 Special Topics in Data Science 3.0 Credits**

This course is a special topics numbering intended to afford a curricular place for special and developing topics in data science at a graduate level.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

## Design and Merchandising

### Courses

## Design Research

### Courses

**DSRE 620 Design Problem Solving 3.0 Credits**

A seminar course that examines different methods of design problem solving and its role across disciplines. The intention is to give the student a basis to approach interdisciplinary projects in an innovative way. In addition, the practice of design problem solving is examined from multiple viewpoints including human centered and technology centered approaches.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 625 Technologies of Making 3.0 Credits**

A Seminar and Lab course that examines and builds on the students' core skills in design and making. The Technologies of Making Course aims to continue the development of skills in various computational modeling and fabrication techniques and at varying scales. This course also includes an interdisciplinary exploration in digital fabrication.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 626 Design: Making and Disruption 3.0 Credits**

This course combines studio and lecture to introduce students to a variety of disruptive and destructive design techniques and guides them towards innovation and inventions. Through hands-on prompted experimentation, selected readings, in-class discussion, instructive editing, and group critique, students will explore unbuilding and rebuilding of design systems. Students will produce several small-scale experiments and create a larger deliverable based on opportunities discovered during the prototyping phase. To produce this work, students will engage with a variety of digital, philosophical, and material fabrication methods. The course aims to enhance student design abilities by promoting the out-of-the-box expansion of traditional design techniques.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 630 Data Visualization for Design Professionals 3.0 Credits**

A seminar course that examines and builds visual fluency in the understanding and re-communication of data including both quantitative and qualitative constructs. Skill building in the communication of research as a way of facilitating design research and the communication of intensive data including technology, environment and human based modes.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 635 Translational Design Research 3.0 Credits**

A seminar course that examines and builds on the students' core skills in design research. Students will understand the ways that research can drive innovation and iteration in the design process. Students will understand the ethics of research and how to engage with different types of research including engagement with different cultures and communities and a variety of stakeholders.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 640 Design Media and Communications 3.0 Credits**

New forms of communication in the many design disciplines will be examined. This course will also examine the ways in which this truly interdisciplinary media practice influences and creates the current and future culture of design via a hybridization of media. The goal is to produce interdisciplinary researchers from a group of multi disciplinary students. For the purpose of this course, media refers to a broad set of digital and analogue modes of operation, contemporary works, theories, history and practice. This course will engage students in historical, current and future theories and speculative strategies in relationship to these evolving forms of design and information transfer.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit



**DSRE 641 Contemporary Design Theory 3.0 Credits**

In this core course, we will work on the development and positioning of current research within a broader theoretical, philosophical and contextual framework. We will be examining how a larger body of research can spawn multiple threads of inquiry each with differing aspects which are relevant to specific audiences related to funding, academic conferences and publications. Within an academic research context, this entails the extraction of specific aspects of students' work which are then investigated further through the specific lens of conference or journal themes and topics.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DSRE 645 Design Research Thesis Proposal 3.0 Credits**

In this course students will integrate their thoughts, research and progress into a proposal for their Masters of Science in Design Research (DSRE) thesis capstone project. The DSRE thesis proposal will include elements of speculation related to their chosen research path. Proposal possible outcomes for the project and research methods will be examined and implemented. Students will use the proposal as a plan to organize the four term thesis research project they will undertake in the second year of the program.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSRE 625 [Min Grade: C] and DSRE 635 [Min Grade: C]

**DSRE 650 Thesis Research and Practicum 3.0 Credits**

In this course, students will spend the term documenting, preparing for, and reflecting on a practicum experience related to their path of study; or an initial research endeavor related to the path of study. Students will also take part in various professional and research activities that will augment their thesis process integrate their experience into the ongoing research.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSRE 645 [Min Grade: C]

**DSRE 677 Health and Design Research 3.0 Credits**

In this inter-professional course, students will explore concepts and methodologies of design, health research, and design thinking. The course is cross-listed between the disciplines of public health and design research, and students will be drawn from both disciplines to examine the reciprocal relationship between health research and human-centered innovation and creative thinking.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**DSRE 750 Thesis in Design Research I 3.0 Credits**

In this, the first of the three thesis project courses, students will expand their research, and progress, into their Masters of Science in Design Research (DSRE) thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. The initial work of the proposal written in DSRE 645 and outcomes from the practicum/research course DSRE 650 will be examined and synthesized in this first of the three-course thesis project sequence-additional research methods will be implemented and examined. The outcome from this term is a research report that will be integrated into the final binder in the third thesis term.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSRE 650 [Min Grade: C]

**DSRE 760 Thesis in Design Research II 3.0 Credits**

In this, the second course of the thesis sequence, students will continue to develop their Masters of Science in Design Research (DSRE) thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. Student will build on initial research outcomes to develop a draft of their final thesis-this may include a physical artifact, prototype or a database-or a combination of outcomes. All students will produce a final binder that documents the proposal, base research, and outcomes. This term students will produce, document and speculate on initial outcomes-a draft of the final document will be due at the end of this term.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSRE 750 [Min Grade: C]

**DSRE 770 Thesis in Design Research III 3.0 Credits**

In this course, the culmination of the Masters of Science in Design Research (DSRE) Thesis sequence, students will finalize their DSRE thesis capstone project. The DSRE thesis project will include elements of speculation related to their chosen research path. Students will build on initial research outcomes to complete their final thesis-this may include a physical artifact, prototype, database-or a combination of outcomes. All students will produce a final, publication quality paper that documents the proposal, base research, and outcomes. In this final term, students will finalize both the outcome and the document. The final format will be determined by the student and advisor-final outcome to be evaluated with professional input.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSRE 760 [Min Grade: C]

**DSRE I599 Independent Study 1.0-3.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DSRE I699 Independent Study 1.0-3.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DSRE T580 Special Topics in Design Research 3.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DSRE T680 Special Topics in Design Research 3.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

# Digital Media

## Courses

### **DIGM 501 New Media: History, Theory and Methods 3.0 Credits**

New Media: History, Theory and Methods. This advanced seminar class examines parallel developments in modern art and computer technology beginning in World War II to the present. It will survey writings and works of major contributors to the field.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

### **DIGM 502 Advanced New Media Topics 3.0 Credits**

Advanced Seminar in New Media Topics. This Seminar is dedicated to topical readings and in-depth discussions in Digital Media ranging from virtual reality to digital art and the socio-cultural impact of the Internet.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 501 [Min Grade: C]

### **DIGM 505 Design and Interactivity Bootcamp 3.0 Credits**

This course focuses on the understanding and comprehension of the basic tools and strategies for design within a two-dimensional environment. In addition to design, web development and interactivity will be covered, including a discussion of various display platforms, including mobile development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM and program is MS.

### **DIGM 506 Animation and Game Design Bootcamp 3.0 Credits**

This course focuses on the understanding and comprehension of the basic tools and strategies for animation and game production. This course will focus on the production of digital assets using standard modeling and animation software, along with their integration into a game engine.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM and program is MS.

### **DIGM 508 Digital Cultural Heritage 3.0 Credits**

Digital Cultural Heritage is a growing transdisciplinary pursuit having components in academic research and applied situations, commercial applications, as well as new media technology development. This class will investigate Digital Cultural Heritage's position within the tradition of digital media discourse, potential research issues, interdisciplinary collaborations, emerging best practices and project development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

### **DIGM 510 Designing for Interactivity 3.0 Credits**

This course will provide the hands-on experience to designing and developing visual interactive media projects including, but not limited to, games, web art, interactive animation, and immersive media.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 501 [Min Grade: B]

### **DIGM 511 Research Methods for Digital Media 3.0 Credits**

This course will survey the fundamental methods to evaluate digital media projects. It will cover the basics of human-centered design paradigm, iterative design and refinement progress, and qualitative and quantitative methods to evaluate a project within the area of digital media.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 501 [Min Grade: B]

### **DIGM 512 Shader Writing and Programming 3.0 Credits**

Shader Writing and Programming. Development of custom output shaders allows for the use and manipulation of materials for use in production render engines. This course focuses on the basic components of shaders including reflective, translucency, and illumination models.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 501 [Min Grade: C] (Can be taken Concurrently)

### **DIGM 515 Digital Matte Painting 3.0 Credits**

Digital Matte Painting. Digital matte painting and set extension are methods of integrating live action footage into lush and believable CG environments. By using physical construction as a basis for a digital environment, greater integration between live and CG plates can be achieved.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 512 [Min Grade: C]

### **DIGM 518 Particle Systems and Artificial Intelligence for Visual Effects 3.0 Credits**

Particle Systems/Artificial Intelligence for Visual Effects. Particle systems can be used to stimulate natural phenomena as well as create ethereal effects through the use of scripting and mathematical expressions. In the same way, digital crowds can be created to populate a scene with autonomous characters. This hybrid course addresses software applications and trigonometric functions for advanced animation by digital media designers.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 515 [Min Grade: C]

### **DIGM 520 Interactivity I 3.0 Credits**

This course focuses on the development of interactive media across a variety of platforms. Human-Computer interaction and layout are discussed along with implementations on mobile and PC based platforms. Dynamically created web content and integration with databases, as a server-side component, will also be covered.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 505 [Min Grade: B]

**DIGM 521 Interactivity II 3.0 Credits**

This course covers advanced topics in the development of interactive digital media, in particular with respect to the use of new and experimental interaction technologies (for example gesture control, virtual reality and heads up displays, augmented reality, location aware media, etc.) and the implementation of novel user experience design methods.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 520 [Min Grade: B]

**DIGM 525 Animation I 3.0 Credits**

This course delves into advanced topics in animation, including procedural modeling and dynamics. Emphasis will be placed on the development of natural phenomena in a simulated environment and physically accurate movement of characters.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 506 [Min Grade: B]

**DIGM 526 Animation II 3.0 Credits**

This course delves into advanced topics in animation, including light transport and crowd simulation. Also discussed will be integration of acquired data, specifically from motion capture sources. Multi-layer rendering output and shaders for production will be discussed.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 525 [Min Grade: B]

**DIGM 530 Game Design I 3.0 Credits**

This course sequence covers advanced gaming topics, including mobile games, motion capture, artificial intelligence, real-time effects and shaders, and advanced user interfaces.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 506 [Min Grade: B]

**DIGM 531 Game Design II 3.0 Credits**

This course sequence covers advanced gaming topics, including mobile games, motion capture, artificial intelligence, real-time effects and shaders, and advanced user interfaces. The group project will follow an Agile software development methodology with weekly Scrum sprints for iterative project development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 530 [Min Grade: B]

**DIGM 540 New Media Project 3.0 Credits**

New Media Project. Students work on funded and unfunded research and industrial projects. With faculty approval, students may work on personally designed projects relevant to problem solving in a student's area of interest. Each student is required to complete it two times. This course may be repeated up to three times for credit.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 12 credits

**Restrictions:** Can enroll if major is DIGM.

**DIGM 547 Organic Modeling 3.0 Credits**

This course will be an intensive exploration of organic modeling. Through lectures, demonstrations, class critiques and individual feedback from the instructor, the best approaches to modeling organic forms will be explored.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 526 [Min Grade: C]

**DIGM 560 Advanced Concepts and Applications in Interactive 3D Environments 3.0 Credits**

Advanced Concepts/Applications in Interactive 3D Environments.

Advanced concepts/applications on adding interactivity to 3D environments via an assortment of software packages including 3D Max, Director and Flash. This course focuses on the optimized integration of 3D objects in environments with interactive authoring tools.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 501 [Min Grade: C]

**DIGM 580 Thesis Preparation 3.0 Credits**

This course instructs on Thesis proposal writing within a Digital Media context, covering style, performing research, assigning credit and reference, and topic exploration and expansion.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 501 [Min Grade: B]

**DIGM 591 Digital Media Skills Intensive 1.0-3.0 Credit**

This course provides students with an in-depth understanding of a specialized skills topic within digital media.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 605 Advanced Techniques in Computer Generated Imagery 3.0 Credits**

Advanced Techniques in Computer Generated Imagery. Students create electronic media assets that effect the stimuli, bearings, and responses of human cognition to phenomena of light and sound. Student works explore integrations of visual and aural illusions to affect alterations in audience-perceived realities.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 518 [Min Grade: C] (Can be taken Concurrently)

**DIGM 616 Immersive World Building 3.0 Credits**

Immersive World Building. Students investigate various emerging technologies for immersive content creation. Focus is on the production of 3D animated environments. Special production issues and concerns to dome planetaria and theatrical (IMAX) venues are considered. Interdisciplinary activities are strongly encouraged.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 605 [Min Grade: C]

**DIGM 620 Digital Media Workshop 3.0 Credits**

This course addresses issues in the field of Digital Media, with emphasis on a single, comprehensive project. Examples of topics include stereoscopic production, mobile game development or training through game development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 531 [Min Grade: C]

**DIGM 630 Digital Media Group Workshop 3.0 Credits**

The course addresses topical issues in the field of Digital Media, with emphasis placed on a single, comprehensive group project. Examples of topics include stereoscopic production, mobile game development or training through game development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 531 [Min Grade: C]

**DIGM 650 Public Venue Seminar 3.0 Credits**

This group project course is focused on creating public venue works, either performance-based, interactive or web-distributed. The distinguishing mark of graduate research is an original contribution to knowledge and this course is intended to design and implement a media piece to be viewed by a large group of people.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 531 [Min Grade: C]

**DIGM 651 Publication and Presentation 3.0 Credits**

This course instructs on the submission of portfolio and thesis work including journal publication, conference presentations, contests and competition and public performance venues.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 670 Gaming I 3.0 Credits**

Gaming I. Students learn to solve 3D game design problems working with game programming techniques and leading cross platform software.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 518 [Min Grade: C] and DIGM 560 [Min Grade: C]

**DIGM 671 Gaming II 3.0 Credits**

Gaming II. Building upon skills developed in Gaming I, students form small teams and work to develop and implement original 3D game designs.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 670 [Min Grade: C]

**DIGM 680 Thesis Development 1.0-3.0 Credit**

Thesis development results in a project including the production of original media assets, a written thesis paper, as well as an oral presentation and demonstration delivered to the Department of Digital Media.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 12 credits

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 511 [Min Grade: B]

**DIGM 681 Thesis Completion 0.5-9.0 Credits**

This course assists students who have completed all course requirements in completing their master thesis.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** DIGM 680 [Min Grade: B]

**DIGM 690 Advanced Special Topics in Digital Media 3.0 Credits**

Advanced Special Topics in Digital Media. This class is reserved for occasional special topics in Graduate Digital Media Studies. It may include seminars, studio and classes taught by visiting faculty.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 502 [Min Grade: C]

**DIGM 701 Advanced New Media Topics 3.0 Credits**

This seminar covers advanced topics in new media theory. It is dedicated to topical readings and in-depth discussions in digital media ranging from virtual reality to digital art and the socio-cultural impact of the Internet.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 710 Digital Media Research Methods I 3.0 Credits**

This course focuses on quantitative research methodologies and statistical analysis tools and methods relevant for digital media research. The course also introduces students to basic epistemological positions and concepts, such as Popper's falsificationism or Kuhn's research paradigms.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 711 Digital Media Research Methods II 3.0 Credits**

This course focuses on qualitative and mixed research methodologies relevant for digital media research. It introduces students to the concepts of design research and deals with the challenges of interdisciplinary or translational research methods.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 710 [Min Grade: B]



**DIGM 810 Advanced Topics in Digital Media Research 3.0 Credits**

This course focuses on advanced topics in digital media research with an emphasis on current technological developments. Examples include augmented reality research, user experience design research or interaction design research.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**Prerequisites:** DIGM 701 [Min Grade: B] and DIGM 711 [Min Grade: B]

**DIGM 850 Public Venue Seminar 3.0 Credits**

This group project course is focused on creating digital media research driven public venue works that are performance-driven, interactive or web-distributed. The course is intended to design and implement a media piece that communicates scientific knowledge to a large group of people within a public environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 851 Publication and Presentation 3.0 Credits**

This course instructs on the submission of portfolio and thesis work including journal publication, conference presentations, contests and competition and public performance venues. It supports Digital Media Ph.D. students in publishing their graduate work through various scientific media channels.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 998 Digital Media Ph.D. Seminar 1.0 Credit**

This seminar guides students in their Digital Media Ph.D. dissertation progress.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM 999 Digital Media Research 0.5-9.0 Credits**

Students in this course participate in a faculty led research project.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is DIGM.

**DIGM I599 Independent Study in Digital Media 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM I699 Independent Study in Digital Media 0.5-6.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 6 credits

**DIGM I799 Independent Study in Digital Media 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM I899 Independent Study in Digital Media 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM I999 Independent Study in Digital Media 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM T580 Special Topics in Digital Media 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM T680 Special Topics in Digital Media 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM T780 Special Topics in Digital Media 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM T880 Special Topics in Digital Media 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**DIGM T980 Special Topics in Digital Media 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## E-Learning

### Courses

**ELL 501 The Purpose and Business of E-Learning 3.0 Credits**

Examines the business side of e-learning. Explores historical, organizational and strategic issues associated with developing and delivering e-learning through a wide range of topics. Non-profit and profit models used for marketing and delivering e-learning products are examined and business practices, as they affect the success of e-learning enterprises, are examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**ELL 502 E-Learning Technologies 3.0 Credits**

This course provides a comprehensive introduction to the wide range of emerging e-learning technologies, a description of what is in store for the near future, and foundational elements for sound decision making regarding technological responses to well-defined learning problems.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**ELL 503 Teaching and Learning Issues in E-Learning 3.0 Credits**

This course prepares trainers, teachers, and administrators at all educational levels with the knowledge they will need to provide effective experiences in distance education. Provides a conceptual and theoretical foundation as well as practical skills and knowledge, along with numerous opportunities for hands-on experience.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**ELL 504 Learning Technologies & Disabilities 3.0 Credits**

The course is designed to develop the knowledge and skills required to utilize adaptive and assistive technology (AT) and accommodation in the facilitation of learning design and delivery.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**ELL 1599 Independent Study in ELL 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL 1699 Independent Study in ELL 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL 1799 Independent Study in ELL 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL 1899 Independent Study in ELL 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL 1999 Independent Study in ELL 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL T580 Special topics in ELL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL T680 Special topics in ELL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL T780 Special topics in ELL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL T880 Special topics in ELL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**ELL T980 Special topics in ELL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Economics

### Courses

**ECON 540 Intro to Econometrics and Data Analysis 3.0 Credits**

This course will provide students with a hands-on introduction to econometrics, emphasizing both theory and applications. The applied side of the course will focus on developing students' data manipulation and programming skills in econometric software. The theory side of the course will cover basic probability theory, hypothesis testing, simple linear regression and multiple regression models.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 548 Mathematical Economics 3.0 Credits**

Discusses the application of mathematics in economic models, with extensive discussion of economic applications of calculus and other mathematical tools. Considers implications of the assumptions of maximization of profits and utility. Stresses mathematical models and techniques useful in theoretical and applied applications of economics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 550 Econometrics 3.0 Credits**

This course is an applied course in econometrics for Masters students and covers some statistical tools to understand economic relationships. Economic applications will be discussed and real economic data will be analyzed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C] or STAT 510 [Min Grade: C] or BSAN 601 [Min Grade: C]

**ECON 560 Time Series Econometrics 3.0 Credits**

The objectives of this course are to introduce the students to time series econometric models and to provide them with tools for empirical analysis using time series economic and financial data, with specific emphasis on application and forecasting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (STAT 610 [Min Grade: C] or ECON 550 [Min Grade: C] or ECON 540 [Min Grade: C]) and (BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C])

**ECON 601 Managerial Economics 3.0 Credits**

Covers demand and cost analysis, pricing policies, and selected topics of economic analysis as they relate to business policies.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 610 Microeconomics 3.0 Credits**

This course develops microeconomic theory with advanced mathematical tools. It covers models of consumer behavior and individual decision making including responses to price and income changes, choice over time, and choice under uncertainty. Students will also learn how technology and cost affect firm decisions, and how consumer and producer behavior interact to determine prices in competitive markets. The course includes applications of microeconomic theory to policy making.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 614 Macroeconomics 3.0 Credits**

Provides an in-depth analysis of dominant theories behind short-run economic fluctuations and long-run economic growth. Employs both mathematical and graphical tools to discuss determination of output, employment, and price level in the aggregate economy. Also covers effectiveness of monetary and fiscal policies in dealing with unemployment and inflation. Emphasizes the use of theory to understand past and current macroeconomic events.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 548 [Min Grade: C] or ECON 610 [Min Grade: C]

**ECON 616 Public Finance and Cost Benefit Analysis 3.0 Credits**

Introduces market failure as a justification for government provision of public goods and regulation. Covers public choice theory and cost-benefit analysis for public expenditure, impact of taxation on efficiency, incidence of taxes, personal and corporate income taxes, and fiscal federalism.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

**ECON 621 Business, Government, and Global Macroeconomics 3.0 Credits**

The emergence of a globalized and interconnected economy means that adverse macroeconomic events can greatly impact a firm's performance. Witness for example the 2007-08 financial crisis and ensuing recession in the US, or the fiscal crises in Europe. To effectively respond to these risks and opportunities, business leaders need to have a sound understanding of the key economic and institutional factors that affect their firm's environment. Relying primarily on a case-based learning approach, we will study key macroeconomic events and policies that have had widespread implications for society and firms doing business in a country. The experience gained from analyzing these phenomena with a coherent framework will provide managers with a competitive advantage.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C] or BUSN 502 [Min Grade: C]

**ECON 625 Urban and Real Estate Economics 3.0 Credits**

The course applies economic concepts to the study of real estate markets, including the determinants of urban development, residential and commercial construction and investment, real estate prices, and rents. We will examine how national and local economic policies impact the supply and demand for housing and housing prices, and how government policies can correct for or exacerbate market imperfections.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 601 [Min Grade: C] or BUSN 502 [Min Grade: C]

**ECON 630 International Economics 3.0 Credits**

Examines the theoretical principles guiding international trade. Emphasizes the gains from trade, exchange rates, and balance-of-payments adjustments.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

**ECON 631 International Macroeconomics 3.0 Credits**

This is a course in open economy macroeconomics. Key topics include: The Real Business Cycle (RBC) model in an open economy, the effects of interest rate shocks in small open economies, the determination of equilibrium terms of trade, non-tradable goods and the real exchange rate, the role of price rigidity in the determination of nominal exchange rates, exchange rate regimes, capital controls and labor markets, balance of payments crises and sovereign default.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 614 [Min Grade: C]

**ECON 639 Applied Industrial Analysis 3.0 Credits**

This course will provide students with the theoretical and empirical tools to determine how markets work and to answer a variety of policy-relevant questions. For each topic, students will use real data and court documents to justify their conclusions, so econometrics is a prerequisite for taking the course.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 550 [Min Grade: C]

**ECON 644 Trade Policy: Theory and Evidence 3.0 Credits**

This course reviews the major theories of international trade. It then introduces a series of trade policy instruments, and analyzes their effects on various economic outcomes. It develops a practical guide to benchmark partial and general equilibrium analysis of the effects of trade policy. Students will also address policy issues of current and ongoing concern.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 610 [Min Grade: C] and STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

**ECON 650 Business & Economic Strategy: Game Theory & Applications 3.0 Credits**

This course discusses business strategy in the context of the "game theory" approach to strategic interaction, with additional tools drawn from industrial organization and economic theory. Alternative approaches to pricing strategy, strategic investment, strategies of technological innovation, market entry, and information release; strategy for design of and participation in auctions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

**ECON 661 Health Economics 3.0 Credits**

Use analytical techniques from microeconomics to analyze the inter-relationship between health care resources, providers, consumers, and markets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

**ECON 662 Economic Analysis of Health Systems 3.0 Credits**

Using applies microeconomic models developed in ECON 661, this course analyzes the government's role in health care. Methodology for economic evaluation of health care intervention and analysis of the pharmaceutical industry.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 661 [Min Grade: C]

**ECON 700 Economics Seminar 3.0 Credits**

The Economics Seminar is a course designed to give students who have completed the first four quarters of the MS program in economics an opportunity to put what they have learned to work, and gain wider and deeper knowledge of the field, through discussions and writing.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 902 Mathematical Economics 3.0 Credits**

The purpose of this course is to provide Ph.D. students with a survey of the basic math tools applied in the study of Microeconomics, Macroeconomics, Econometrics and related areas such as Finance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 910 Advanced Microeconomics I 3.0 Credits**

This course is intended to introduce the student to a rigorous treatment of Microeconomic Theory. Topics include an introduction to choice theory; the representative consumer's utility maximization problem; and the firm's profit maximization problem and choice under certainty.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 902 [Min Grade: C]

**ECON 911 Advanced Microeconomics II 3.0 Credits**

This course is a continuation of Advanced Microeconomics I. Topics to be covered include competitive markets, oligopoly model, adverse selection, signaling, screening, moral hazard, the principle-agent problem and auctions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 910 [Min Grade: C]

**ECON 920 Advanced Macroeconomics I 3.0 Credits**

This course introduces student to the basic tools and structures used in modern macroeconomic research. The course covers basic general equilibrium models of business cycles and growth including two period models: finite horizon models and infinite horizon models in both discrete and continuous time.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 902 [Min Grade: C]

**ECON 921 Advanced Macroeconomics II 3.0 Credits**

This course introduces students to models and techniques used extensively in macroeconomics. While focusing on tools, the course presents and discusses competing theories of monetary aspects of macroeconomic and short-run fluctuations in a closed economy, with several extensions to the open-economy setting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 920 [Min Grade: C]

**ECON 925 Macroeconomic Dynamics 3.0 Credits**

This course introduces students to advanced methods and current research in Macroeconomics. The course will focus on dynamic macroeconomic models including theory, policy implications and numerical solution methods. Topics will be selected from Growth Theory, DSGE models, Calibration, Labor, Monetary Economics, Search Theory, and Banking and Business Cycles.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** ECON 920 [Min Grade: C] and ECON 921 [Min Grade: C]

**ECON 930 Monetary Economics 3.0 Credits**

This course is designed to give students in-depth knowledge of the models used to investigate the interactions between real and monetary factors. Topics covered include short-run real effects of monetary policy, the credit channel of money, and types and effectiveness of monetary policy rules.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 920 [Min Grade: C]

**ECON 940 Econometrics I 3.0 Credits**

This course is an introduction to applied econometric techniques beyond Ordinary Least Squares (OLS). Many of the questions that arise in economics cannot be studied using linear estimation methods. Nonlinear estimation techniques will be presented with emphasis on interesting economic questions that can be analyzed using these methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 931 [Min Grade: C]



**ECON 941 Econometrics II 3.0 Credits**

This course examines advanced topics in time-series econometrics and its application to economic/finance research, unit-root tests, bivariate and multivariate co-integration relationships, causality and error correction models, vector autoregression models, and the time-varying heteroskedastic behavior of economic and financial data.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 940 [Min Grade: C]

**ECON 942 Applied Microeconometrics 3.0 Credits**

This course provides an advanced, in-depth study of many of the popular techniques used in the analysis of microeconomic data. Topics will include panel data, identification of causal effects, and Generalized Method of Moments estimation. The course will present theoretical models but will stress the implementation of the models to applied settings and the interpretation of the empirical results.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** ECON 940 [Min Grade: C]

**ECON 950 Industrial Organization I 3.0 Credits**

This course is an introduction to theoretical industrial organization. We will examine how firms interact in markets characterized by imperfect competition.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 911 [Min Grade: C]

**ECON 951 Industrial Organization II 3.0 Credits**

This course introduces the student to research methods in industrial organization. The primary focus is on the use of empirical analysis, although relevant theoretical papers are discussed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 950 [Min Grade: C]

**ECON 955 Public Economics 3.0 Credits**

This course discusses the welfare effects of government expenditure programs, taxes, and other policies including their incentive effects on firms and households.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 910 [Min Grade: C] and ECON 940 [Min Grade: C]

**ECON 959 Industrial Organization Seminar 3.0 Credits**

This course will be team-taught by Economics faculty members whose research interest lie in the areas of Industrial Organization (theoretical and applied). It will be a continuation of IO-I (theory) and IO-II (applied).

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 951 [Min Grade: C]

**ECON 960 International Trade 3.0 Credits**

This course provides the student with an understanding of the theory of International Economics and some empirical issues. Topics include: determinants of trade patterns, gains from trade, international factor mobility, factor market distortions, strategic trade policy, and issues related to the theory of commercial policy and international finance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 910 [Min Grade: C]

**ECON 961 Empirical International Trade 3.0 Credits**

The purpose of this course is for students to be familiar with a number of important topics and papers in the empirical trade literature.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 960 [Min Grade: C]

**ECON 962 Open Economy Macroeconomics 3.0 Credits**

This course emphasizes macroeconomic issues and policies in an open-economy setting. Topics covered include: monetary and exchange rate regimes, international capital flows, and current issues in international macroeconomic policy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 920 [Min Grade: C] and ECON 940 [Min Grade: C]

**ECON 964 Economic Development 3.0 Credits**

This course examines a number of theoretical and empirical issues in economic development of underdeveloped economies, including topics dealing with growth, inequality, human capital, the relationship between international trade and economic development, and credit and labor market imperfections.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 910 [Min Grade: C]

**ECON 969 International Trade Seminar 3.0 Credits**

This course is the last of a three-course sequence of international trade at the graduate level. The course will be jointly taught by faculty with expertise in theoretical and/or empirical aspects of international trade and public policy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 960 [Min Grade: C] and ECON 961 [Min Grade: C]

**ECON 979 Open Economy Macro Seminar 3.0 Credits**

The objective of the course is to introduce students to current/relevant topics in open economy macroeconomics (OEM) and international finance (IF) and get them started on their own individual research. The course emphasizes international macroeconomic and financial topics in an open-economy setting and relevant international policy issues. The course is organized as a broad-based reading on main issues in OEM/IF and producing and presenting a research paper.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECON 962 [Min Grade: C]

**ECON 980 Game Theory 3.0 Credits**

This course introduces concepts and tools of game theory as they enter into business and economics research. Topics to be covers include Nash equilibrium, games in extensive form and repeated games, together with critical and scholarly controversies about game theory.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ECON 998 Dissertation Research in Economics 1.0-12.0 Credit**

Dissertation Research in Economics.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON I599 Independent Study in ECON 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON I699 Independent Study in ECON 0.5-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON I799 Independent Study in ECON 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON I899 Independent Study in ECON 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON I999 Independent Study in ECON 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**ECON T580 Special Topics in ECON 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON T680 Special Topics in ECON 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON T780 Special Topics in ECON 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON T880 Special Topics in ECON 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ECON T980 Special Topics in ECON 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Education Human Resource Development

### Courses

**EHRD 500 Foundations of Human Resources Development 3.0 Credits**

Introduces HRD as a professional field of practice, places HRD within the context of the contemporary workplace, presents theories, paradigms, and issues in the field; introduces the concept of a learning organization and the HRD practitioner as a change agent.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 600 Organizational Consulting 3.0 Credits**

Prepares students to be effective internal or external consultants for management. Covers partnering and contracting skills, organizational diagnosis and feedback, intervention strategies, interpersonal communications, influencing skills, and ethics.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 602 Coaching and Mentoring for Sustainable Learning 3.0 Credits**

The purpose of this course is to develop leaders at executive levels into organizational mentors who help to sustain a learning culture in organizations. Using readings, written assignments, self-assessments, case studies, and group activities, students will learn specific skills & concepts of effective mentoring/coaching for building learning communities in organizations. The course will address how coaching and mentoring can be used as effective development initiatives for nurturing learners at all levels within organizations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 606 Human and Organizational Performance 3.0 Credits**

Systemic strategies for attaining continuous improvement in the private and public sector marketplace are examined. This includes the concept of human performance improvement in research and practice and the role of the performance improvement professional in facilitating individual, team, and organizational performance to support and sustain these strategies.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 607 Global Human Resource Development 3.0 Credits**

This course explores the scope of human resource development programs in multinational and global settings. Using readings, written assignments, case studies, and group activities, students will learn about the national and international trends and initiatives regarding human resource development with a focus on the influence and impact of a diverse and global workforce.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 611 Organization Development and Change 3.0 Credits**

This course serves as introduction to the study and practice of organization development and change. Students will gain a broad understanding of the field including its philosophy, history, models, and techniques used in facilitating system-wide as well as incremental organizational change and improvement. Issues related to values, ethics, and organizational assessment and diagnosis are explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 612 Strategic Human Resource Development 3.0 Credits**

This course introduces strategic human resource development theories, topics, and themes. Students will explore the notion of strategic human resource development, integrated talent development, career development, leader development, and succession planning. Advanced topics such as the role of people analytics and evidence-based decision making in formulating HRD strategies and adopting organizational practices will be critically examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD 660 Principles of Adult Learning 3.0 Credits**

This course explores in-depth analysis of relevant theories relating to contemporary application of adult learner materials and methods. Many adult education theories and practices are explored to provide the participants with a broad understanding of andragogy (the art and science of teaching adults) and how it relates to the field.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EHRD I599 Independent Study in EHRD 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD I699 Independent Study in EHRD 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD I799 Independent Study in EHRD 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD I899 Independent Study in EHRD 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD I999 Independent Study in EHRD 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD T580 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD T680 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD T780 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD T880 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EHRD T980 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Education Improvement & Transformation

### Courses

**EIT 715 EIT Evaluation, Assessment and Capstone Preparation 4.5 Credits**

Students will review evaluation and assessment practices and propose an action research capstone project in the area of Educational Improvement and Transformation that demonstrates the skills and tools they have garnered in obtaining their Drexel Professional Development certifications and/or concentrations. The project is to provide the student with real-life, hands on experience in being a change agent.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is EIT.

**EIT I599 Independent Study in EIT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT I699 Independent Study in EIT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT I799 Independent Study in EIT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT I899 Independent Study in EIT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT I999 Independent Study in EIT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT T580 Special topics in EHRD 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT T680 Special topics in EIT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT T780 Special topics in EIT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT T880 Special topics in EIT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EIT T980 Special topics in EIT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

# Education Learning Technologies

## Courses

**EDLT 502 Learning Experience Design 3.0 Credits**

This course will prepare students with a foundation of Learning Experience Design (LXD) as an area of inquiry and practice, and as a practical career endeavor. Learners will acquire a foundational understanding of human computer interaction and user experience design by applying design thinking methods and skills involved in creating interactive learning systems for diverse audiences by using appropriate standards for accessibility.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 503 The Learning Sciences 3.0 Credits**

This course draws from research in the cognitive sciences, education, and computer sciences. It covers three broad themes around sociocultural, design, and cognition domains. Learners are expected to become competent in understanding cognitive and sociocultural perspectives on learning, as well as perspectives on the design of learning environments for teaching and learning in both school and non-school settings. In addition, the relevance and impact of the learning sciences on specific learning technologies is explored and demonstrated.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 504 Learning Engineering 3.0 Credits**

This course will prepare students to pursue learning engineering as an academic field of inquiry and a practical career endeavor. Learners will be enabled to understand and apply a knowledge of the Learning Sciences, Design Thinking, Data Analyses, and Applied Technology in the creation of Experiences, Environments, and Technologies that will impact learning within social, cultural contexts and intersectional influences of the lived world.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 512 Using and Integrating Learning Technologies 3.0 Credits**

This course covers learning theories and recent research relevant to emerging trends in technology and their possible effects on learning. Students will demonstrate strategies for using and integrating technologies in the design, implementation, integration, and assessment of technology based applications in formal and informal learning settings. Students will also investigate the role of leadership and innovation in technology related change in education and learning.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 525 Design for Learning with Digital Media 3.0 Credits**

Investigates the relationship among learning sciences, theory, technology, and design in the creation of learning goals and experiences. Special emphasis is placed on the integration of technology in order to enhance effective learning. Learners will design learning activities, create them, implement them, and assess their effectiveness with digital tools. Issues in digital citizenship, collaboration, affordability, and continuous learning will also be examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDLT 532 Designing Virtual Communities for Staff Development - Non-Field Experience 3.0 Credits**

Examines the impact of distance learning and multimedia technologies on the educational systems of teachers, administrators, librarians, and other professionals in schools responsible for technology and professional development. Online discussion groups, video conferencing, and web-based instruction will be used to form a virtual learning community. There is no field experience component in this course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 533 Designing Virtual Communities 3.0 Credits**

Examines the impact of distance learning and multimedia technologies on the educational systems of teachers and other professionals responsible for technology and professional development. Online discussion groups, video conferencing, and Web-based instruction will be used to form a virtual learning community. This course includes a 20-hour internship for ITS certification.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 534 Developing Educational Leaders Using Technology 3.0 Credits**

Addresses leadership and team building competencies that instructional technologists need to work collaboratively with teachers, administrations, parent groups, and the community. Will use technologies that facilitate communication and team building.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 535 Researching & Evaluating Instructional Technology 3.0 Credits**

Course will focus on teaching and learning technology standards, general applications of technology and basic technology and skills. Will examine and critique educational software and learning technologies, and through research, develop criteria for technology. This course includes a 1-2 day field-based research assignment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 537 Technologies for Performance Support 3.0 Credits**

This course focuses on online performance support systems, job aids, and assessment tools for e-portfolios, authentic assessments, and data collection to meet performance requirements in education and business. Students will have experience in designing embedded interventions for information help, procedural support, feedback and tracking goals, and develop their own e-portfolio.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 541 Foundations of Game-Based Learning 3.0 Credits**

Students explore the rationale of game studies, the history of games and learning, the role of digital media, and the social nature of games as an affinity space for social learning. Students demonstrate their understanding of why games are powerful environments for learning, identity formation, and motivation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 542 Research in Motivation & Game-based Learning 3.0 Credits**

This course introduces students to research in game-based learning and the role of motivational theories associated with games and player styles. Students conduct research on existing games to identify the motivational and learning factors. The course provides a foundation for incorporating the role of motivation for engaging learning.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 543 Play & Learning in a Participatory Culture 3.0 Credits**

Students examine games, emerging media, and learning in the context of participatory culture. Students focus on play, its role in learning in social spaces, and the current research around these practices. Students study the issues relating to how schools, organizations, and society are responding to the challenges of emerging technologies.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 544 Integrating Games & Pedagogical Content Knowledge 3.0 Credits**

Students use the technological, pedagogical and content knowledge (TPACK) educational technology framework. Students explore game design systematically by framing game genres as forms of pedagogy as they consider educational content. Students demonstrate their understanding of the interplay of technology, pedagogy, and content in the game environment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 551 Instructional Design Methods 3.0 Credits**

In this course, students will be introduced to the practice of instructional design and develop fluency with the models that support instructional design activities. Beginning with an overview of the history and development of instructional design, students will explore how instructional design differs in the domains of higher education, K-12, corporate, and non-profit environments. The impact of educational research such as learning theories and student engagement on instructional design will be investigated. Students will also consider the impact of technology on instructional strategies and delivery and gain proficiency with several tools. The course will culminate with a project that draws on the knowledge and skills that students have developed throughout the term.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 552 Instructional Design: Project Management 3.0 Credits**

This course will lead students through the full lifecycle of an instructional design project. Students will learn to develop a project's scope, work with stakeholders, develop schedules, identify accountability, and consider the pedagogical factors in their project. They will then move through the development, design and implementation phases; using formative feedback and multiple iterations to complete their project.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 553 Instructional Design: Special Topics 3.0 Credits**

In this course students will be exposed to an array of special topics related to the research and practice of instructional design, including learning science, assessment of learning, emerging technologies and technology integration, universal design for learning, learning theories, and more. Students will select two of these topics to explore more deeply, one through a research paper and one through a practical project. They will also reflect on the use of instructional design in multiple contexts and their own agency in influencing the practice of instructional design in their own organizations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 554 Learning with Social Media and Mobiles 3.0 Credits**

Students learn to use social media tools based on a more relevant pedagogy of 21st century learning and change. Students examine the culture of connectivity and networking, use mobile learning strategies and role play, and design an action plan that incorporates social media for learning outcomes.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 561 Design-Based Research Methods 3.0 Credits**

This course introduces students to multi-disciplinary design-based research methods in educational research, while providing an intensive experience in implementing a design-based research study. Focused on the conceptualization of a design-based research study and the associated design of learning environments, the course features a research case study approach. Students will explore how the specific research goals a scholar brings to design-based research (e.g. the refinement of an existing learning environment or the creation of a novel one) determine the appropriate form of inquiry.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 591 Learning Analytics: Lenses on students, teaching, and curriculum enactment 3.0 Credits**

This course will prepare students to use data collected from classrooms and online programs to understand and help guide instructional practice. Using a range of information (ex: assessments, game/simulation telemetry, engagement with learning management systems, collaboration/communication data, and administrative/demographic information) students will develop skills in developing dashboards, evaluating grading, and developing authentic datasets about practice. This course is targeted to course designers/developers, teachers, lead teachers/professional learning community coordinators, and media center specialists.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 592 Information Enabled Change in Educational Organizations 3.0 Credits**

This course will prepare students to frame systems issues with information and to lead organizational change in educational systems using data. Using a range of information (test scores across courses, learning goals and exemplars, surveys, and administrative data) students will develop a plan to lead teams and groups through a change process, including developing a project plan and success metrics. Students will gain experience in describing stakeholders, developing boundary objects for monitoring. This course is targeted to course designers, teachers, professional learning communities, and media specialists.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 593 Using Data to Understand Educational Systems 3.0 Credits**

This course will prepare students to be able to look at educational systems from an information perspective using a range of input and outcome measures, programmatic metrics, and special systems datasets like those made available by the National Student Clearinghouse and administrative systems. Students will look across classrooms and organizational boundaries. Students will gain experience in telling a story about an educational organization with data, visualization of systemic patterns in an educational system. This course is targeted to consultants, administrators, course/curriculum designers, and systems improvement teams.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 595 Learning through the Lifespan 3.0 Credits**

This course will prepare students with a foundation of Lifelong Learning and continuous education as an area of inquiry and practice, and as a practical career endeavor. Learners will acquire a thorough understanding of lifelong learning environments, lifespan development, applications for social, cultural, and community contexts, as well as emerging issues and challenges.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 596 Lifelong Learning Models & Best Practices 3.0 Credits**

This course will prepare students with the knowledge and understanding necessary for the creation and implementation of effective Lifelong Learning strategies and tactics, markets and marketing, assessment, and management practices by examining current and future models.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 811 Designing and Developing Multimedia Applications For Learning 3.0 Credits**

Allows students to design and develop a multimedia application for learning using an object-oriented authoring application and the process of design, development, and testing. Demonstrates and applies principles of learning that affect interface design, instructional design, storyboarding, navigation, interactivity, and feedback design.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLT 1599 Independent Study in EDLT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT 1699 Independent Study in EDLT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT 1799 Independent Study in EDLT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT 1899 Independent Study in EDLT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT 1999 Independent Study in EDLT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT T580 Special topics in EDLT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT T680 Special topics in EDLT 12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT T780 Special topics in EDLT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT T880 Special topics in EDLT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLT T980 Special topics in EDLT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Education Lesson Study

### Courses

**EDUL 780 Lesson Study Capstone Course I 3.0 Credits**

This course is the first of the two-part, capstone research based instructional design and analysis sequence for students interested in pursuing a teaching research agenda. This course provides opportunity for students to identify critical areas of study, design and implement substantive, and outcome-driven lessons that utilize effective instructional practices. Course requires an intensive analysis of curricular goals, intended student outcomes, lesson planning and classroom-based action research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDU 780 [Min Grade: B], EDEX 631 [Min Grade: B] (Can be taken Concurrently)

**EDUL 781 Lesson Study Capstone Course II 3.0-4.5 Credits**

This course is the second in a two-part capstone sequence, research based instructional design and analysis for students interested in pursuing a teaching research agenda. The course provides opportunity for students to identify critical areas for study, design and implement substantive, outcome-driven lessons that utilize effective instructional practices. Course requires intensive analysis of curricular goals, intended student outcomes, lesson planning and classroom-based action research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUL 780 [Min Grade: B] (Can be taken Concurrently)

## Education Practitioner

### Courses

**EDUP 780 Practitioner Capstone Course I 3.0 Credits**

This is the first course in a two part sequence. This course provides a framework for advancing skills and knowledge as a practitioner researcher. Using continuous inquiry, students will explore the role of practitioners as agents of change. Examples of the implementation of various research methods and models for the effective use of data will be explored. By the end of the course, the student will have identified a topic of concern, problem statement, and research questions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDU 780 [Min Grade: B], EDEX 631 [Min Grade: B] (Can be taken Concurrently)

**EDUP 781 Practitioner Capstone Course II 3.0-4.5 Credits**

This is the second course in a two-part sequence. In this course, methodology for information gathering will be discussed and students will implement appropriate methods for gaining information and engaging with other practitioners. This course culminates in a profession product including a review and analysis of literature.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUP 780 [Min Grade: B] (Can be taken Concurrently)

# Education Thesis

## Courses

### EDUT 780 Thesis Capstone Course I 3.0 Credits

This course is course one of a two-part capstone Master's Thesis for individuals interested in pursuing a thesis agenda. In this course students will learn the process of designing and conducting research and understand the differences between quantitative, qualitative, and mixed methods paradigms in educational research. Students will also choose a topic for their capstone research project, and begin the process of developing their research proposal. By the end of this course, students will be required to develop Chapters 1-3 of their Thesis proposal.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDU 780 [Min Grade: B], EDEX 631 [Min Grade: B] (Can be taken Concurrently)

### EDUT 781 Thesis Capstone Course II 3.0-4.5 Credits

This course is course two of a two-part capstone Master's Thesis for individuals interested in pursuing a thesis agenda. In this course students will conduct their research, conduct data collection and analysis, interpret the data findings, and write the implications and recommendations based on the results and findings. By the end of this course the students will have a complete thesis of Chapters 1-5.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUT 780 [Min Grade: B] (Can be taken Concurrently)

# Educational Administration

## Courses

### EDAM 700 Leading in Urban, Rural and Suburban Settings 3.0 Credits

Provide school leadership experiences from three settings: urban, rural and suburban. The study of the similarities and differences within and across these types of schools to learn effective leadership skills and strategies will be examined. They will identify significant educational issues pertaining to these locales and use problem-solving skills, visitations, recent research and scenarios.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 701 Resource Management, Allocation and Entrepreneurship 3.0 Credits

Students learn to find, use and allocate needed resources for their schools, communities, and organizations from experienced business and school leaders. Management and monitoring technology tools for optimum effective use of resources and how to gain entrepreneurship skills for expanding opportunities to gain new resources will be explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 702 School Leadership & Decision Making 3.0 Credits

This course will focus on decision-making in the schools. Emphasis will be placed on major challenges and opportunities in the work world of the principal and the interpersonal skills of school leadership.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 705 School Law and Politics 3.0 Credits

This course is designed to assist students with their understanding of how law, politics, and power structures interact to influence the goals and operations of the schools. Students will study the roles of school boards and community organizations, state boards of education, state government agencies, special interest groups, professional organizations, and unions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 708 Integration of Technology with School Instruction and Management 3.0 Credits

In this course students will investigate learning theory and its implication for interactive multimedia learning formats including the relationship of instructional design principles to selection of multimedia elements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 710 School Finance and Facilities 3.0 Credits

In this course, students will study the school budgeting process and school facilities management. Students will receive an overview of the basic financial and facility issues, unique to education that affect individual school buildings.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 712 School and Community Partnerships and Relations 3.0 Credits

In this course, students will study the skills, techniques and attitudes school leaders need to work effectively with school constituents.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 714 Instructional and Curriculum Leadership 3.0 Credits

In this course, students will examine the relationship between school culture and classroom instruction. Students will study the five fundamental tasks of instructional leadership (direct assistance, group development, professional development, curriculum development, and action research). Students will also investigate effective classroom observation methods.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 715 School Principal Internship: Technology 1.5 Credit

This yearlong intensive internship is the activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDAM 716 School Principal Internship: Finance 1.5 Credit

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDAM 717 School Principal Internship: Leadership 1.5 Credit**

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 718 School Principal Internship: Relations 1.5 Credit**

The yearlong intensive internship is the culminating activity for the students in the Drexel Education Leadership Program. During this course, the students will put school leadership theory and knowledge to practical application.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 722 Evaluation & Assessment Competencies 3.0 Credits**

Procedures and tools of research will be used to evaluate school programs. Program of evaluation in a school setting will be implemented. Essential assessment principles about the importance of implementing an assessment system, distinguish between assessments of learning versus assessment for learning, and about the types of student work samples needed for monitoring and reporting will be examined. Data on norm-referenced and other standardized tests in reporting achievement will be explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 724 Mentoring and Collaborative Leadership 3.0 Credits**

Research and experience on mentoring as a critical need in sustaining new teachers, creating renewal for experienced teachers, and building leadership capacity across the staff will be the focus of this course. Specific skills and concepts for effective mentoring/coaching of others and collaborative leadership will be examined. The importance of establishing learning communities in schools will be emphasized with a student's plan for induction within context of supportive school practices.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 726 Interpreting & Evaluating Research & Achievement Data 3.0 Credits**

Substantive opportunities for interpreting and evaluating different kinds of research with established criteria will be provided. Ways to lead school teams in analyzing, interpreting and evaluating student achievement data (from several sources, both formative and summative) to monitor student learning, to improve curriculum and instruction, to meet NCLB requirements and for reporting to the community. A balanced perspective in reviewing data from group achievement data to the collaborative analysis of an individual student's work over time will be explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDAM 722 [Min Grade: B] or EDAM 522 [Min Grade: B]

**EDAM 728 Research Methodology for Action Research 3.0 Credits**

Provides rationale, theoretical constructs and methodology for conducting Action Research within a school and/or classroom setting. Significant practical applications for other school practitioners.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 740 Action Research Project 3.0 Credits**

Students will complete the written research project according to established criteria building from the four stages of Action Research completed in previous course work. The research will be shared in an article or summary form on the School of Education website.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 1 times for 6 credits

**Prerequisites:** EDAM 728 [Min Grade: B] or EDAM 528 [Min Grade: B]

**EDAM 750 Leadership in K-12 Virtual Schools I 3.0 Credits**

Students will examine K-12 virtual school leadership issues including policy, accountability, finance, and infrastructure in virtual schools. Case study and critical analysis of existing virtual school policy and procedure are addressed.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 752 Leadership in K-12 Virtual Schools II 3.0 Credits**

Students examine K-12 virtual leadership issues including professional development, teacher evaluation student, counseling and communication. Differentiation strategies among early childhood, adolescent and secondary students is explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 817 Curriculum Models 3.0 Credits**

Allows candidates to develop models of curricula aligned with local, state, and national standards. Presents strategies for interdisciplinary teaching, creating constructivist learning environments, and developing integrative curriculum modules. Considers learning styles in effective methods that will be modeled and implemented in the course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 820 School Superintendency 3.0 Credits**

This course is designed to provide both theoretical and practical insights into the evolving responsibilities associated with being the chief executive office of a school system.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 824 Parents and Schools 3.0 Credits**

This course provides the candidate with the skills required by system-level administrators to work with a broad spectrum of constituencies. Students will focus on the major issues facing families, especially those that mitigate against strong home-school relations, such as poverty, domestic violence, and drug abuse.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 827 School Superintendent's Internship: Curriculum Models 1.0 Credit**

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 828 School Superintendent's Internship: Parents and Schools 1.0 Credit**

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 829 School Superintendent's Internship: Budget and Finance 1.0 Credit**

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM 830 School Superintendent's Internship: Human Resource Development 1.0 Credit**

This is a yearlong internship in various central office positions depending on the candidate's career preferences. The experience will focus on school issues of a system-wide impact, such as policy development, long-range planning, school board function and personnel management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDAM I599 Independent Study in EDAM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM I699 Independent Study in EDAM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM I799 Independent Study in EDAM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM I899 Independent Study in EDAM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM I999 Independent Study in EDAM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM T580 Special topics in EDAM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM T680 Special topics in EDAM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM T780 Special topics in EDAM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM T880 Special topics in EDAM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDAM T980 Special topics in EDAM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Educational Lifelong Literacy

### Courses

**EDLS 550 Theories of Reading and Writing 3.0 Credits**

Course examines major developmental theories of literacy as they pertain to the development of literacy skills starting from infancy through adulthood. Course will also investigate major theoretical models of reading and writing acquisition and instruction in areas such as constructing literacy rich contexts for K-12 students; integrating literacy skills across the content areas; understanding the relationship between reading, writing, speaking and listening; and understanding the processes of how students develop and use reading and writing practices in meaningful ways. Major theoretical models of reading and writing inform decisions and purposes for using particular instructional practices and strategies in a variety of educational contexts, but with a specific focus on urban settings.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### **EDLS 555 Understanding Literacy through Sociocultural Perspectives 3.0 Credits**

The central purpose of this course is to use sociocultural theories to investigate the wide range of “literacies” that students possess from diverse backgrounds in urban communities, and ones that literacy teachers can scaffold and build upon while developing their students’ reading, writing, speaking, and listening skills. The course also investigates how linguistic differences and styles of language affect literacy acquisition for students from culturally and linguistically diverse backgrounds, and how literacy teachers can create an inclusive learning environment for all students. Students will learn the critical need for literacy teachers to create effective partnerships with parents from diverse urban communities in supporting the literacy development of their children at home. Stage I/II Field exp req’d.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### **EDLS 560 Reading and Writing in the Content Areas (7-12) 3.0 Credits**

Students will learn how to identify and explain specific reading and writing expectations of the content areas as described in national and state standards. Language and reading development during adolescence will be explained with supporting evidence from theory and research. Major theories of reading and writing processes will be explored to understand needs of all learners in diverse contexts, and develop and implement the curriculum to meet the specific needs of struggling readers. Students will also learn how to support teachers in the design, implementation and evaluation of reading and writing curriculum that is responsive to diverse learners. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 550 [Min Grade: B]

### **EDLS 565 Constructing Meaning through Reading and Writing 3.0 Credits**

This course will emphasize literacy as a meaning-making process that is constructed through interaction of the text, the learner and the context. EDLS 565 will include an emphasis on literacy as a meaning making process in urban contexts. The ways in which reading, writing, listening and speaking work together to help learners decode and encode text will be explored. Various models of reading comprehension will be investigated and the power of the writing process to construct and communicate knowledge will be studied. Specific teaching strategies that increase students’ ability to comprehend a variety of text types will be mastered. Instructional approaches that help learners to become fluent writers will also be learned.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 550 [Min Grade: B] and EDLS 555 [Min Grade: B]

### **EDLS 570 Literacy and Evaluation 3.0 Credits**

This is a 3 credit course designed to prepare students to develop and use a variety of assessment tools for planning and evaluating effective reading and writing instruction. Students will understand the monitoring of performance at individual, classroom, school, and statewide levels. Understanding the important role of assessment in informing instruction is stressed. Students will learn to analyze data and communicate the findings to the necessary individuals in order to improve instruction. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 550 [Min Grade: B]

### **EDLS 575 Responding to Children's and Young Adult Literature 3.0 Credits**

This course will begin with an overview of the history of children’s and young adult literature in the classroom. Participants will learn meaningful ways in which diverse genres of literature can be embedded across all instructional contexts. The course will then explore the ways in which learners can respond to these texts using academic, aesthetic, critical, and personal lenses. The course will emphasize the unique opportunities and challenges of responding to children’s and young adult literature in urban settings. The role of eBooks and other reading technologies in the literacy learning process will also be studied.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### **EDLS 620 Applied Methods in Multisensory Reading Instruction 1.0 Credit**

This course provides students with an intro to multisensory structured language instruction with the Wilson Reading System® (WRS). This course examines reading research and the five areas of reading in relation to students beyond grade two with persistent phonological coding deficits. Students will specifically study the Wilson Reading System® (WRS), including student identification and placement, program implementation, progress monitoring, scheduling, creating a successful classroom environment, principles of language structure, and how to teach language with direct, multisensory methods. An oncampus, three consecutive day seminar is required for all students residing within a 60 mile radius of the University City campus. Students residing outside a 60 mile radius may be given the option to attend virtually.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### **EDLS 621 Multisensory Reading Instruction 2.0 Credits**

In this course students will be introduced to the use and methodology of research validated strategies that focus on the development of carefully sequenced literacy skills including print knowledge, alphabet awareness, phonological awareness, phonemic awareness, decoding, vocabulary, fluency, spelling and handwriting.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDLS 622 Basic Word Study I 3.0 Credits**

This course presents in detail the multisensory structured language instruction that is required for teaching students beyond grade two with word-level deficits who are unresponsive to previous instruction. This course provides practical application of reading research, with particular emphasis on phonological awareness, phonics and spelling at the beginning levels of decoding and encoding as well as expands upon these concepts with specific instruction in the closed syllable pattern. Students will be provided with specific procedures to teach the concepts presented in Wilson Reading (WRS) Steps 1-3.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 620 [Min Grade: B]

**EDLS 623 Basic Word Study II 3.0 Credits**

This course presents in detail the multisensory structured language instruction that is required for teaching students beyond grade two with word-level deficits who are unresponsive to previous instruction. This course provides practical application of reading research, with particular emphasis on phonological awareness, phonics and spelling at the beginning levels of decoding and encoding as well as expands upon these concepts with specific instruction in the vowel-consonant-e, open, and consonant-le syllable patterns.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 620 [Min Grade: B] and EDLS 622 [Min Grade: B]

**EDLS 624 Multisensory Practicum I 1.0 Credit**

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 2.3.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 622 [Min Grade: B] (Can be taken Concurrently)

**EDLS 625 Multisensory Practicum II 1.0 Credit**

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 3.1.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 623 [Min Grade: B] (Can be taken Concurrently) and EDLS 622 [Min Grade: B] and EDLS 624 [Min Grade: B]

**EDLS 626 Multisensory Practicum III 1.0 Credit**

Supervised practicum requires identifying and securing a practicum student in grade 4-12 with significant word level deficits, selected according to practicum student selection criteria. A second, or back-up, practicum student is highly recommended, but that student does not have to meet all practicum student selection criteria. The practicum entails successful delivery of a minimum of 20 Wilson Reading System (WRS) lessons and teaching mastery through WRS Step 4.2.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 623 [Min Grade: B] and EDLS 625 [Min Grade: B]

**EDLS 650 Designing a Literacy Program 3.0 Credits**

Course designed for literacy leaders in classrooms, schools and other instructional settings. Participants learn to synthesize research-based approaches to instruction with local, state and national standards into a cohesive and effective literacy program. Strategies for evaluating literacy assessments and materials for literacy instruction will be examined. The critical role of professional collaboration in the creation and implementation of effective literacy programs for urban environments will be highlighted. Students create and run a literacy program held on the Drexel campus during summer term. Students within a 60 mile radius are encouraged to attend on campus for at least 8 days. Students outside a 60 mile radius will create and run a Drexel-approved literacy program in their home location.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDLS 550 [Min Grade: B] and EDLS 555 [Min Grade: B] and EDLS 560 [Min Grade: B] and EDLS 565 [Min Grade: B] and EDLS 570 [Min Grade: B] and EDLS 575 [Min Grade: B] and EDLS 620 [Min Grade: B] and EDLS 622 [Min Grade: B] and EDLS 623 [Min Grade: B]

**EDLS I599 Independent Study in EDLS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS I699 Independent Study in EDLS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS I799 Independent Study in EDLS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS I899 Independent Study in EDLS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit



**EDLS 1999 Independent Study in EDLS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS T580 Special topics in EDLS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS T680 Special topics in EDLS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS T780 Special topics in EDLS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS T880 Special topics in EDLS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDLS T980 Special topics in EDLS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Educational Policy

### Courses

**EDPO 620 Education Policy: Concepts, Issues, and Applications 3.0 Credits**

Examines concept of "policy" as it relates to education and educational institutions and their governance and practices. Related issues and applications that drive current national and global forces are explored with applications to education. Applied learning component of the course requires student to identify, research and apply understandings of both "policy" and current issues.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDPO 624 The Shaping of American Education Policy: Global Forces, Interest Groups, and Politics 3.0 Credits**

This course develops and deepens understanding of impact of education policies and how in combination they hold the potential for transforming American education. Learning activities encourage investigation, analysis, and speculation about educational policies and the three forces that shape them: global forces, public interests, and politics.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDPO 628 American Educational Policy and U.S. Competitiveness 3.0 Credits**

Through the lens of educational policy, this course will explore the ties between K-12 education, higher education and lifelong learning on the one hand and economic and workforce development on the other hand. Linkages and policies will be examined in the contexts of what "global competitiveness" means at the national, state, and local levels.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDPO 632 Ethics in Educational Policy Making 3.0 Credits**

The critical nature of ethics in educational policy-making is closely examined through a series of intersecting elements. A foundation of understanding is created by study of the concept of ethics and by practicing ethical decision-making strategies. Critical literature from the fields of ethics and of policy-making frame an investigation of how educational policy-making is impacted by global, technological, and demographic forces.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDPO 636 Access & Equity in Educational Policy Making 3.0 Credits**

Researched and studied is the myriad of phenomenon that can deny individuals full access to education. Critical analysis of past and present educational policies and the attempts to implement them reveal how legislators and educators have attempted to insure access and equity. A chosen issue in access and equity is researched and projections are made about how policy-makers might address it.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDPO I599 Independent Study in EDPO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO I699 Independent Study in EDPO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO I799 Independent Study in EDPO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO I899 Independent Study in EDPO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO I999 Independent Study in EDPO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO T580 Special topics in EDPO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO T680 Special topics in EDPO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO T780 Special topics in EDPO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO T880 Special topics in EDPO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDPO T980 Special topics in EDPO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

# Electrical & Computer Engineering

## Courses

**ECE 500 Advanced Power Electronics 3.0 Credits**

This power electronics course is for graduate students in the area of power engineering, focusing on advanced knowledge and technology in the research and applications of power electronics. It will introduce the latest achievements in power electronics and provides future trend of technology developments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 501 Topics in Circuits and Systems 3.0 Credits**

Circuit laws, transfer functions, convolution, transform techniques, systems engineering. This series of courses may be used to meet the admission prerequisites to ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 502 Topics In Communications, Controls and Computers 3.0 Credits**

Modulation theory, noise, feedback theory, stability, computer engineering fundamentals, computers in communication and controls. This series of courses may be used to meet the admission prerequisites to the ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 503 Topics in Mathematical Techniques In Electrical and Computer Engineering 3.0 Credits**

Complex variables in communication and control, matrix methods in circuits and systems, vector calculus in fields, two-dimensional image processing. This series of courses may be used to meet the admission prerequisites to the ECE graduate program. One credit per term is creditable to the M.S.E.E. degree.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 506 Hands on Computer Networks 3.0 Credits**

This course makes use of a remote platform, an open infrastructure for networking research and education that spans multiple testbeds of real networking equipment around the United States and abroad. Students will gain hands-on experience designing, configuring and analyzing real networks. We will work in small groups on lab exercises by creating a shared "networking slice" for each group. We will explore several networking protocols, from basic home gateway services (DHCP, DNS, NAT), to TCP/IP Protocol layers (Link State Routing, TCP congestion control), network security basics (network reconnaissance, DNS spoofing scenarios) to more advanced topics, such as programmable switches and software defined networking.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 531 Modern Transistors 3.0 Credits**

This course teaches the underlying physics of the operation of modern bipolar and unipolar transistors which are used in modern electronics. This background is helpful for a) courses related to digital microelectronics, logical gates, memories, and sub circuits, and VLSI circuits; b) courses in analog electronics; and c) courses in microwave electronic systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 532 Modern Photonics 3.0 Credits**

This course will teach students the principles that underline the interaction of light and matter, leading to the understanding of the basis of operation of photonic devices such as lasers, LEDs, solar cells, and photodetectors. The course starts with how understanding of light spectrum that is generated due to heat started the development of the field of quantum mechanics by Max Planck. This is then expanded by Einstein to include a quantum theory of light, on which basis absorption, stimulated and spontaneous emission are explained. Building on that work, we analyze light interaction with semiconductors and show how lasers, LEDs and photodetectors work, and how modern photonics is able to solve great challenges of humanity.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 551 Digital Systems Design 3.0 Credits**

A project-based course on design concepts, tools and implementation of systems with embedded processors, library IP (Intellectual Property) cores and custom IP cores, synthesis and Field Programmable Gate Array (FPGA) implementation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 571 Introduction to Electrical and Computer Engineering****Research 0.0 Credits**

Topics of departmental research. Thesis selection. Required of all full-time graduate students.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 572 Techniques of Electrical and Computer Engineering****Research 0.0 Credits**

Techniques for making technical presentations: oral and written modes. Meeting organization, audience awareness. Writer-to-reader communication. Required of all full-time graduate students.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 573 Presentation of Electrical and Computer Engineering****Research 0.0 Credits**

Conference attendance and critique. Student presentation and critique. Topics of concern: professional ethics, liability, etc. Required of all full-time graduate students.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 600 Applied Robotics Laboratory 3.0 Credits**

Students will learn the underlying background/theory to simulate and physically implement a two axis scara robot that can draw a straight line or follow curves. Key topics include: creation of motion profiles, forward and inverse kinematics, Devenit-Haretnburg matrices, Lagrangian dynamic, position servo systems and determining required bandwidth of servo system to ensure tracking of desired waveforms as well as fundamentals of robot motion programming. In addition students will also explore commercial codes used for robot design and analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 603 Computing and Control 3.0 Credits**

This course focuses on the practical aspects of implementing Computer Control using microcontrollers in such applications as: Automated Equipment, Robotics, Motor Control, Process Control and Aerospace. The course is essentially divided into two parts: (1) the computer in the loop and (2) addressing noisy measurements.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 605 Quantum Computing and Informatics 3.0 Credits**

Implementation of computing and information processing depends on physical laws. Laws of quantum theory could make it possible to circumvent some current limitations of classical computers and information processing methods. This course introduces the concepts of quantum computing and informatics with a particular emphasis on comparison with its classical counterparts. The course does not discuss technology or devices that can be used to implement quantum computers. Instead, it is meant to provide logical foundation for the quantum computation paradigm culminating in the discussion, analysis and simulation of simple quantum computing algorithms and information transfer fundamentals.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 608 Decision-Making for Robotics 3.0 Credits**

Robots today are equipped with sophisticated computing, communication, and sensing resources. It is becoming increasingly important to develop efficient decision-making algorithms that make full use of the robot's capabilities. In this course, we will discuss the state-of-the-art algorithms that aim for that. Topics range from Information-theoretic Planning, Planning under Uncertainty, Adversarial Planning, to Learning and Perception.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 610 Machine Learning & Artificial Intelligence 3.0 Credits**

This course introduces students to topics in modern machine learning, along with applications of machine learning to problems in engineering. Introductory topics will include an overview of classification, overfitting, cross-validation, and dimensionality reduction. Supervised classification approaches will be covered including linear classifiers, generative and discriminative models, non-probabilistic classification approaches, kernel methods, and neural networks. Topics in unsupervised learning will also be covered if time permits.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C]

**ECE 612 Applied Machine Learning Engineering 3.0 Credits**

This course emphasizes how to gather data then train, test, and deploy practical machine learning systems using modern software libraries, with an emphasis on Keras on TensorFlow. Complementing the other department courses emphasizing the mathematics behind machine learning algorithms and the ways these can be tailored to specific computing architectures, this project-focused course emphasizes the practice of rapidly prototyping and testing multiple learning structures. To provide the broadest applicability, datasets will range from rich text, to financial time series, to sound, images, and video.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 613 Neuromorphic Computing 3.0 Credits**

This course will cover the principles of neuromorphic computing. Topics will cover 1) fundamentals of spiking neural network (SNN), which mimics the computation in mammalian brain; 2) supervised and unsupervised learning algorithms for SNN; 3) novel applications of SNN, including in vision and time series processing; 4) architectures for implementing SNN in hardware, aka neuromorphic hardware; 5) introduction to non-volatile memory technologies to implement synaptic processing in neuromorphic hardware; 6) software stacks for neuromorphic computing; and 7) design challenges in dependable neuromorphic computing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 630 Software Defined Radio Laboratory 3.0 Credits**

This laboratory course takes a Software-Defined Radio (SDR) implementation approach to learn about modern analog and digital communication systems. Software defined radio uses general purpose radio hardware that can be programmed in software to implement different communication standards. Discussion of the basic principles of wireless radio frequency transmissions and leverage this knowledge to build analog and digital communication systems. Knowledge of these techniques and systems will provide a platform that can be used in the class project for further exploration of wireless networking topics such as cybersecurity, cognitive radio, smart cities, and the Internet of Things.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 686 Cell & Tissue Image Analysis 3.0 Credits**

Theory and practice of building computational tools for biological image analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 687 Pattern Recognition 3.0 Credits**

Theory of supervised and unsupervised statistical pattern recognition, presented through practical programming techniques.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 695 Research Rotations in Cybersecurity 1.0-12.0 Credit**

The research rotation course allows students to gain exposure to cybersecurity-related research that cuts across conventional departmental barriers and traditional research groups, prior to identifying and focusing on a specific interdisciplinary project or thesis topic. Students selecting to participate in research rotations would participate in the research activities of two labs for each three credits of research rotation they undertake.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE 697 Research 1.0-12.0 Credit**

Research in electrical and computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE 898 Master's Thesis 1.0-12.0 Credit**

Master's thesis in electrical and computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE 997 Dissertation Research 1.0-12.0 Credit**

Graded Ph.D. dissertation research in electrical and computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation research in electrical and computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE I699 Independent Study in ECE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECE T580 Special Topics in ECE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Electrical & Computer Engineering - Computers

### Courses

**ECE 500 Fundamentals Of Computer Hardware 3.0 Credits**

Covers computer organization and architecture; elements of computer hardware, processors, control units, and memories; hardware for basic mathematical operations; tradeoffs between speed and complexity; examples of embedded systems; microcontrollers; systems modeling.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 501 Computational Principles of Representation and Reasoning 3.0 Credits**

This course presents fundamentals of discrete mathematics as applied within the computer engineering and manufacturing environment. Students are given the theoretical background in representation and reasoning for a broad variety of engineering problems solving situations. Entity-relational techniques of representation are demonstrated to evolve into the object-oriented approach. Various search techniques are applied in the cases of representing engineering systems by using theory of automata techniques.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 502 Principles of Data Analysis 3.0 Credits**

This course presents theoretical methods and techniques of model development applicable within the computer engineering design and manufacturing environment. Students are given the theoretical background in data analysis (including "data mining"). Emphasis is on hybrid systems and discrete events systems. Various methods of recognizing regularities in data will be presented. Elements of the theory of clustering and classification will be dealt with for the paradigm of software and hardware problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECE 503 Principles of Decision Making 3.0 Credits**

This course presents theoretical fundamentals and engineering techniques of decision making and problem solving applicable within the computer engineering design and manufacturing environment. Students are given the theoretical background in optimization methods for a broad variety of situation. Elements of the theory of planning and on-line control of systems are presented within the scope of software and hardware computer design and control.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**ECEC 511 Combinational Circuit Design 3.0 Credits**

Representing arithmetic. Logic and syntax data for machine processing. Switching algebra: Boolean and multiple values. Identification and classification of functions. Realizing completely specified and incompletely specified Boolean functions. Issues in designing large communication/control Boolean functions. Fault and testing of Boolean function.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 512 Sequential Circuit Design 3.0 Credits**

Finite automata and their realization by sequential machines, capabilities, transformation, and minimization of finite automata, linear finite automata. Clocked pulsed and level mode sequential circuits. Malfunctions in sequential circuits: hazards, races, lockouts, metastability. Issues of state assignment. Evolution of memory elements design: ROM vs. RAM vs. associative memory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 511 [Min Grade: C]

**ECEC 513 Design for Testability 3.0 Credits**

Economics vs. Complexity vs. Strategy of Testing; Fault Models; Test Generation; Testability Analysis & Designing Testable Circuits; Testing Microprocessors, Memories and Computer Components; Test Data Compression; Fault Tolerant Hardware; Reliably vs. Availability; Redundancy and Error Correcting Codes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 511 [Min Grade: C] and ECEC 512 [Min Grade: C]

**ECEC 520 Dependable Computing 3.0 Credits**

Fundamental design issues involved in building reliable, safety-critical, and highly available systems. Topics include testing and fault-tolerant design of VLSI circuits, hardware and software fault tolerance, information redundancy, and fault-tolerant distributed systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 531 Principles of Computer Networking 3.0 Credits**

Principles of circuit switching, packet switching and virtual circuits; protocol layering; application layer protocols for e-mail and web applications; naming and addressing; flow control and congestion avoidance with TCP; Internet Protocol (IP); routing algorithms; router architectures; multicast protocols; local area network technologies and protocols; issues in multimedia transmissions; scheduling and policing; Quality-of-Service and emerging Internet service architectures; principles of cryptography.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 541 Robotic Computer Interface Controls I 3.0 Credits**

Covers sensors, actuators, mechanical components of robots, kinematics, inverse kinematics, dynamics, and equations of motion.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 542 Robotic Computer Interface Controls II 3.0 Credits**

Covers the robot control problem, including PD, PID, position, force and hybrid controllers, resolved rate and acceleration control, and multiprocessor architecture.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 641 [Min Grade: C] and ECES 643 [Min Grade: C] and ECEC 541 [Min Grade: C]

**ECEC 543 Robotic Computer Interface Controls III 3.0 Credits**

Covers non-linear control techniques, FLDT, and advanced topics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 542 [Min Grade: C]

**ECEC 571 Introduction to VLSI Design 3.0 Credits**

This is an introductory course where systematic understanding, design and analysis of digital VLSI integrated circuits will be covered. The course will begin with a review of CMOS transistor operation and semiconductor processes. Logic design with CMOS transistor and circuit families will be described. Specifically, layout, design rules, and circuit simulation will be addressed. Performance metrics will be analyzed in design and simulation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 572 Custom VLSI Design & Analysis I 3.0 Credits**

This is the first of two courses offered on Custom VLSI circuit and systems design and analysis. An understanding of VLSI integrated circuits is achieved through circuit design and analysis. This course focuses exclusively on high performance digital CMOS VLSI circuit and systems design, although some topics on mixed-signal circuits are also addressed. Design and analysis of VLSI integrated circuits will be covered from the circuits and systems design perspectives. First, a thorough analysis of interconnect networks is presented. The second part of the class focuses on synchronization of high performance ICs.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 571 [Min Grade: C]

**ECEC 573 Custom VLSI Design & Analysis II 3.0 Credits**

This is the second of two courses offered on Custom VLSI circuit and systems design and analysis. An understanding of VLSI integrated circuits is achieved through circuit design and analysis. This course focuses exclusively on high performance digital CMOS VLSI circuit and systems design, although some topics on mixed-signal circuits are also addressed. The primary focus is on-chip power management. Power generation techniques are discussed and different power converters are analyzed. Power distribution networks are presented with a focus on the different distribution architectures and output impedance characteristics. Techniques to reduce power supply noise are also provided. A secondary focus examines substrate noise in mixed-signal systems and techniques to reduce substrate noise.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 571 [Min Grade: C]

**ECEC 574 ASIC Design I 3.0 Credits**

This course will focus exclusively on digital CMOS Application Specific Integrated Circuit (ASIC) systems design and automation. The ASIC physical design flow, including logic synthesis, floorplanning, placement, clock tree synthesis, routing and verification will be presented. These back-end physical design flow steps will also be covered through hands-on practice using industrial VLSI CAD tools. Contemporary design practices will be reviewed and presented in experiments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 575 ASIC Design II 3.0 Credits**

Design and analysis of VLSI integrated circuits will be covered from a systems design perspective. System timing, arithmetic building block and memory block design processes will be presented. Design tasks in a quarter-long, small-complexity processor design project will cover the back-end of the IC design flow range, from RTL synthesis to timing and power analysis. Projects will be performed in a hierarchical group, similar to an industrial setting, with other graduate and undergraduate students.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 574 [Min Grade: C]

**ECEC 576 Hardware Security & Trust 3.0 Credits**

The course will cover a broad range of current topics in the areas of security and protection of modern integrated circuits. The covered material includes cryptographic processor and processing overhead, physical and invasive attacks, side-channel attacks, physically unclonable functions, hardware-based true random number generators, watermarking of intellectual property, FPGA security, passive and active metering for prevention of piracy, access control, and emerging threats to current and next-generation technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 571 [Min Grade: C]

**ECEC 600 Fundamentals of Computer Networks 3.0 Credits**

Fundamentals design principles of ATM, Internet and local area networks; protocol layers and the Internet Architecture; medium access protocols; application protocols and TCP/IP utilities; basic principles and virtual circuit switching; naming and addressing; flow and congestion control protocols; routing algorithms; Quality-of-Service in computer networks; security issues in networks.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 621 High Performance Computer Architecture 3.0 Credits**

Maximizing single processor performance. Concepts and techniques for design of computer systems. Processor design, instruction set architecture design and implementation, memory hierarchy, pipelines processors, bus bandwidth, processor/memory interconnections, cache memory, virtual memory, advanced I/O systems, performance evaluation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 622 Parallel Programming 3.0 Credits**

This course will focus on developing parallel algorithms for multi-core CPUs using: (1) OpenMP, a programming interface for shared-memory parallel computers, (2) streaming SIMD extensions (SSE2), and (2) the pthread multi-threading library. The course will also teach students how to develop parallel algorithms for the graphics processing unit (GPU) and implement them using the CUDA programming interface. Specifically, students will be introduced to the architecture of a modern GPU, to the CUDA programming interface, and to general purpose programming on the GPU.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 623 Advanced Topics in Computer Architecture 3.0 Credits**

This course teaches advanced concepts of modern computer architecture and introduces the current challenges faced by computer architects. These challenges include power consumption, transistor variability, and processor heterogeneity. Students develop their research skills through a self directed research project with a final presentation and conference style writeup.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 621 [Min Grade: C]

**ECEC 632 Performance Analysis of Computer Networks 3.0 Credits**

Covers probability theory and its applications to networks, random variable and random processes; Markov chains, multi-dimensional Markov chains; M/M/1, M/M/m, M/M/m/m, M/G/1 and G/G/1 queueing systems and their applications in computer networks; analysis of networks of queues: Kleinrock Independence Approximation; Time-reversibility and Burke's theorem; Jackson's theorem; the phenomenon of long-range dependence and its implications in network design and traffic engineering.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 631 [Min Grade: C] or ECEC 531 [Min Grade: C]

**ECEC 633 Advanced Topics in Computer Networking 3.0 Credits**

Perspectives in the areas of switch/router architectures, scheduling for best-effort and guaranteed services, QoS mechanisms and architectures, web protocols and applications, network interface design, optical networking, and network economics. The course also includes a research project in computer networking involving literature survey, critical analysis, and finally, an original and novel research contribution.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 632 [Min Grade: C]

**ECEC 641 Web Security I 3.0 Credits**

An introduction to web security risks, attack strategies and defenses; a security-conscious introduction to web development languages; security issues in HTTP; symmetric and public key encryption on the web; cryptographic hash functions; digital certificates and authentication; case studies of attacks; encrypted web communications (HTTPS).

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 642 Web Security II 3.0 Credits**

Origin-based isolation of web content; attacks on the Domain Name System (DNS) and countermeasures; Secure DNS; anonymous web browsing; onion-routing; Tor browser; attacks on Tor and defenses; illegal hosting and anonymous publishing; fast-flux proxies; Internet censorship, surveillance and their circumvention; security issues in Internet governance.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 643 Web Security III 3.0 Credits**

Advanced topics in JavaScript security; Asynchronous JavaScript (AJAX); mobile web security; elliptic-curve cryptography; secure coding principles; web-based malware; secure database management on the web; intrusion detection; principles of security for web users, web developers, and web hosts; trade-offs between performance and security; research perspectives in web security.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 654 Knowledge Engineering I 3.0 Credits**

Covers conceptual modeling, including an overview of knowledge representation. Includes semantic networks, reduced semantic networks, logic of incomplete knowledge bases, extensional semantic networks, and applications of conceptual models.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 655 Knowledge Engineering II 3.0 Credits**

Covers expert systems, including language and tools of knowledge engineering. Includes reasoning about reasoning, design and evaluation, heuristics in expert systems, expert systems for decision support, and expert systems in conceptual design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 654 [Min Grade: C]

**ECEC 656 Knowledge Engineering III 3.0 Credits**

Covers information-intensive systems, including information representation in autonomous systems. Includes clauses and their validation; clustering in linguistic structures; linguistic and pictorial knowledge bases; discovery in mathematics, including am; and methods of new knowledge generation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 655 [Min Grade: C]

**ECEC 661 Digital Systems Design 3.0 Credits**

A project-based course on design concepts, tools and implementation of systems with embedded processors, library IP (Intellectual Property) cores and custom IP cores, synthesis and Field Programmable Gate Array (FPGA) implementation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 662 VLSI Array Processors I 3.0 Credits**

Covers VLSI testing, including design for testability and parallel computer architectures; signal and image processing algorithms and mapping algorithms onto array structures; and systolic array processors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 661 [Min Grade: C]

**ECEC 663 VLSI Array Processors II 3.0 Credits**

Covers wavefront array processors; matching hardware to arrays; hardware design, systems design, and fault-tolerant design; and implementations and VLSI design projects.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 662 [Min Grade: C]

**ECEC 671 Electronic Design Automation for VLSI Circuits I 3.0 Credits**

This course focuses on the electronic design automation problems in the design process of VLSI integrated circuits. In this first quarter of the course, algorithms, techniques and heuristics structuring the foundations of contemporary VLSI CAD tools are presented. Boolean algebra, graph theory, logic minimization and satisfiability topics are presented.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEC 672 Electronic Design Automation for VLSI Circuits II 3.0 Credits**

This course focuses on the electronic design automation problems in the design process of VLSI integrated circuits. In this second quarter of the course, physical VLSI design steps of technology mapping, floor planning, placement, routing and timing and presented individual and team-based small-to-medium scale programming projects are assigned.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 671 [Min Grade: C]

**ECEC 673 Deep Sub-Micron Integrated Circuit Design 3.0 Credits**

This course focuses on the design challenges of digital VLSI integrated circuits in deep sub-micron manufacturing technologies. Automation challenges and high-performance circuit design techniques such as low-power and variation-aware design are presented. The course material is delivered in a lecture format structured on recent presentations, articles, and tutorials.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 671 [Min Grade: C]

**ECEC 697 Research in Computer Engineering 1.0-12.0 Credit**

Research in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 699 Supervised Study in Computer Engineering 0.0-9.0 Credits**

Supervised study in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 890 Advanced Special Topics in Computer Engineering 1.0-9.0 Credit**

Covers advanced special topics of interest to students and faculty.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 891 Advanced Topics in Computer Engineering 0.5-9.0 Credits**

Advanced topics in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 898 Master's Thesis in Computer Engineering 1.0-12.0 Credit**

Master's thesis in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 997 Dissertation Research in Computer Engineering 1.0-12.0 Credit**

Graded Ph.D. dissertation in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC 998 Ph.D. Dissertation in Computer Engineering 1.0-12.0 Credit**

Ph.D. dissertation in computer engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC I599 Independent Study in ECEC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC I699 Independent Study in ECEC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC I799 Independent Study in ECEC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC I899 Independent Study in ECEC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC I999 Independent Study in ECEC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC T580 Special Topics in ECEC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC T680 Special Topics in ECEC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC T780 Special Topics in ECEC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC T880 Special Topics in ECEC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEC T980 Special Topics in ECEC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Electrical & Computer Engineering - Electroph

### Courses

**ECEE 501 Physical Principles of Electrical Engineering I 3.0 Credits**

Core course. Covers classical mechanics, including generalized coordinates, Lagrangian and Hamiltonian formulation, and variational principle. Introduces quantum mechanics, including Schrodinger equation, wave functions, operators, expectation values, and hydrogen atom.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 502 Physical Principles of Electrical Engineering II 3.0 Credits**

Core course. Continues ECEE 501. Covers atomic orbitals, angular momentum, oscillators, time-independent and time-dependent perturbation theories, many-particle wave functions, and optical transitions. Also covers statistical mechanics, including distributions, ensembles, and thermal properties of solids.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 501 [Min Grade: C]

**ECEE 507 Electromagnetic Field Analysis I 3.0 Credits**

Core course. Covers Maxwell's equations; solutions of Laplace's equation, Green's function, and scalar and vector potentials; energy and momentum in electromagnetic fields; and interaction of fields and material media.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**ECEE 508 Electromagnetic Field Analysis II 3.0 Credits**

Core course. Continues ECEE 507. Covers em waves, including reflection, refraction, polarization, and dispersion. Includes metallic and dielectric guiding structures, guides, and waveguide circuits and applications to stripline, microstrip, and optical fiber transmission systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 507 [Min Grade: C]

**ECEE 510 Scattering & Diffraction of Electromagnetic Waves 3.0 Credits**

Boundary value problems of EM theory. Exact and approximate methods for scattering by spheres, half plane, slit; radar cross-section theory. Quasi-optical theory, scattering, diffraction coefficients. Applications to radio propagation around the earth.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 517 Microwave Networks & Transmission Media 3.0 Credits**

Core course. Atmospheric wave propagation, solution of wave equation without sources in isotropic media, plane-waves, polarization, dispersion surfaces, wave admittance and impedance, wave propagation in free-space and various media, waves at interfaces, solution of wave equation with sources, duality principle, arrays analysis, metallic waveguides, modes in cylindrical waveguides, rectangular and circular, resonant cavities and perturbational methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 518 Microwave Passive Components 3.0 Credits**

Core course. V-I and E-H analogy, Kirchoff's Law, Telegrapher's EQ, voltage and current waves, reflection coefficient and impedance relationship, Smith Chart, impedance matching techniques, Bode-Fano theoretical limit, Broadband Quarter-wave Transformer, N-port linear networks, Z, Y, and S parameters, ABCD and T matrices, signal flow-graph and transfer functions, synthesis of two-port and unitary properties, even-odd mode analysis and dual directional couplers (design and synthesis), periodic structures and Floquet modes, filter design and synthesis using insertion loss and image methods, prototype LO filter and transformation to LP, BP, HP, and BS filters, Richards transform and Kuroda identities.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 519 Microwave Active Subsystems 3.0 Credits**

Core course. Overview of physics of P-N junction and Schottky junctions, pin, varactor, and step recovery diodes and their applications, transistors, MESFET and HEMT, BJT and HBT passive microwave circuits: switches, detectors, attenuators, modulators, and phase shifter, active microwave circuits: LNA, power amplifier, distributed amplifier, oscillators (fixed and VCO) power budget and link performance calculations for telecommunication, radar, and EW systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 520 Solid-State Electronics 3.0 Credits**

This course is the first in a three-quarter sequence in electronic and photonic devices. The purpose of this sequence is to familiarize the students with the fundamental properties of semiconductor materials and study various families of electronic and photonic device based on the elemental semiconductor silicon and compound semiconductors. Covered topics include: atomic structure, crystal structure, theories of electron conduction, scattering, pn junctions, heterojunctions, metal-semiconductor contacts, and junction devices.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 521 Bipolar and FETs 3.0 Credits**

This is the second course in a sequence of three on electronic and photonic devices. The course covers families of electronic devices. The course covers various families of electronic devices based on silicon and compound semiconductors. Bipolar transistors such as BJTs and HBTs and field-effect devices such as MOSFETs, MESFETs, and MODFETs are studied.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 520 [Min Grade: C]

**ECEE 522 Photonic Devices 3.0 Credits**

Covers fundamentals of absorption, spontaneous, and stimulated emission, photodetectors, light emitting diodes, laser oscillation, semiconductor laser diodes, RIN and phase noise, quantum well lasers, optical receivers, and quantum effect devices.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 521 [Min Grade: C]

**ECEE 523 Integrated Circuits 3.0 Credits**

Covers growth of single-crystal silicon, growth of oxide and epitaxial layers, photolithography, diffusion of impurities, fabrication of bipolar and unipolar integrated circuits, and interconnections and packaging.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 521 [Min Grade: C]

**ECEE 525 Digital IC and CMOS Technology 3.0 Credits**

Covers digital ICs using CMOS technology. Transistor level building blocks, -NOT, NAND, NOR, XOR, OAI, and AOI ? are designed using industry standard CAD tools, e.g. Cadence. Circuit topologies such as CPL, transmission gates are explored. CMOS technology/fabrication and layout are discussed to optimize speed, power, and area.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 526 Custom VLSI Design 3.0 Credits**

Course covers advanced design styles such as dynamic CMOS circuits, low power circuit concepts, bi-CMOS circuits and the design of VLSI sub-systems. A major category is memory design, both DRAM. VLSI design styles, system integration aspects are discussed. Project design involves a fair amount of layout.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 525 [Min Grade: C]

**ECEE 541 Photonic Systems 3.0 Credits**

Introduction to Optical principles through EM theory. Covers the mathematics of wave motion, as well as the idea of light propagating as particles. The course shows how ray (or geometrical) optics and Gaussian optics are derived from the wave theory. The course also introduces the polarization of light, and how this effects optical propagation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 542 Optical Applications of Diffraction and Interference 3.0 Credits**

Optical Applications of Diffraction and Interference. This course is an introduction to optical principles through EM theory. Covered topics include wave motion and superposition. Introduction to optical interference, or the interaction of light with itself. Topics include interference and interferometers, diffraction, and Fourier Optics. Diffraction topics include, far (Fraunhofer), near (Fresnel), and the near-field diffraction. The course includes coding of some of the classical diffraction algorithms for the use in a project.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 603 Cooperative Phenomena 3.0 Credits**

Covers dielectrics, ferroelectrics, diamagnetism, paramagnetism, ferromagnetism, and antiferromagnetism; superconductivity, London's equations, BCS theory, and Josephson effect; and flux quantization, hard superconductors, GLAG theory, flux dynamics, and high-temperature superconductors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 502 [Min Grade: C] and ECEE 503 [Min Grade: C]

**ECEE 607 Nanoscale Fields 3.0 Credits**

Course covers essentials of electric and magnetic fields, including thermodynamics of polarizable media. Emphasis is on nano-and micro-scale effects like Van der Waals and double layer interactions, plasmon resonance and others. Examples from colloids and other areas of nanotechnology are used to illustrate main ideas.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 619 Radio Frequency Integrated Circuit Design 3.0 Credits**

This course introduces concepts in design of radio frequency (microwave and millimeter wave) integrated circuits. Optimum transistor technologies based on unipolar (MOS, FET, HEMT) and bipolar (BJT, HBT) are discussed for various RFIC applications. Performance of devices and circuits are evaluated in terms of gain, noise, and linearity. Active circuits and systems used in a variety of communications, imaging, and sensing are discussed in terms of standards and applications. IC design projects are integral to this course.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 518 [Min Grade: C]

**ECEE 621 Thin Film Technology I 3.0 Credits**

Covers vacuum technology, plasma processing, VLSI fabrication, and thin film technologies (e.g., plasma etching, thin film deposition, and thin film characterizations).

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 622 Microfabrication Technology 3.0 Credits**

The course provides an overview of basic technological processes typically involved in microfabrication of Micro-Electro-Mechanical Systems (MEMS). The course includes several demonstration laboratories involving basic photolithography, thin film depositions and electroplating.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 623 Thin Film Technology III 3.0 Credits**

Presents speakers on state-of-the-art practice and future applications of thin film deposition and processing technology.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 622 [Min Grade: C]

**ECEE 641 Fiber Optics & Optical Communications I 3.0 Credits**

Covers propagation in guided and unguided media, including step and graded fibers, dispersion, guide deformations, and mode coupling. Involves design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 642 Fiber Optics & Optical Communications II 3.0 Credits**

Covers coupling devices, multimode guides, sources, lasers, and radiation patterns. Includes reliability, detectors, circuit models, and noise.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 641 [Min Grade: C]

**ECEE 671 Seminar in Electro-Physics I 2.0 Credits**

Advanced graduate seminar. Focuses on recent developments in microwaves, electro-optics, and solid-state devices.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 672 Seminar in Electro-Physics II 2.0 Credits**

Continues ECEE 671.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 673 Seminar in Electro-Physics III 2.0 Credits**

Continues ECEE 672.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 697 Research in Electrophysics 1.0-12.0 Credit**

Research in electrophysics.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE 699 Supervised Study in Electrophysics 0.5-9.0 Credits**

Supervised study in electrophysics.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE 811 Microwave & THz Photonics I 3.0 Credits**

This course focuses on high speed photonic components for microwave and terahertz fiber-optic links, namely high speed lasers, external modulators and photodetectors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEE 812 Microwave & THz Photonics II 3.0 Credits**

This course focuses on high speed analog and digital fiber-optic links including loss and dynamic range calculations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 811 [Min Grade: C]

**ECEE 813 Microwave & THz Photonics III 3.0 Credits**

This course focuses on the applications of fiber-optic links; antenna remoting, optically fed and controlled phased array antennas and fiber radio.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 811 [Min Grade: C] and ECEE 812 [Min Grade: C]

**ECEE 820 Carrier Transport Fundamentals 3.0 Credits**

This course introduces the fundamentals of carrier transport in semiconductors, beyond the common drift-diffusion description functions and Boltzmann transport equations are covered. Monte Carlo simulations are used for low field and high field transport studies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 520 [Min Grade: C]

**ECEE 821 Nanoelectronics 3.0 Credits**

Focus is on current transport when the size of electronic medium reaches nanometer scales, that is, deBroglie wavelength. Topics include: characteristic lengths, magneto-electric subbands, conductance from transmission, resistance in a ballistic conductor, quantum Hall effect, electron scattering in quantum structures.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEE 820 [Min Grade: C]

**ECEE 890 Advanced Special Topics in Electrophysics 1.0-9.0 Credit**

Covers advanced special topics of interest to students and faculty.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE 898 Masters Thesis in Electrophysics 1.0-12.0 Credit**

Master's thesis in electrophysics.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE 997 Dissertation Research in Electrophysics 1.0-12.0 Credit**

Graded Ph.D. dissertation in electrophysics.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE 998 Ph.D. Dissertation in Electrophysics 1.0-12.0 Credit**

Ph.D. dissertation in electrophysics.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE I599 Independent Study in ECEE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE I699 Independent Study in ECEE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE I799 Independent Study in ECEE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE I899 Independent Study in ECEE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE I999 Independent Study in ECEE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE T580 Special Topics in ECEE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE T680 Special Topics in ECEE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE T780 Special Topics in ECEE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE T880 Special Topics in ECEE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEE T980 Special Topics in ECEE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Electrical & Computer Engineering - Power Engineering

## Courses

### **ECEP 501 Power System Analysis 3.0 Credits**

Core course. Covers modeling of power systems, including: symmetrical components, transmission lines, transformers, per-unit values and one-line diagrams. Introduces power flow. Required of first-year power majors; equivalent undergraduate credits may be substituted.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **ECEP 502 Computer Analysis of Power Systems 3.0 Credits**

Core course. Covers digital computation methods, including load flow, fault, and transient stability problems. Required of first-year power engineering majors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 501 [Min Grade: C]

### **ECEP 503 Synchronous Machine Modeling 3.0 Credits**

Core course. Covers two-reaction theory, Park's synchronous machine models, modeling of the synchronous machine excitation and governor systems, and the effects on power system stability. Required of first-year power engineering majors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 502 [Min Grade: C]

### **ECEP 601 Modeling & Analysis of Power Distribution Systems 3.0 Credits**

Modeling and Analysis of Power Distribution Systems. Introduction to power distribution system; balanced and unbalanced systems, component and load modeling, radial and weakly meshed topologies; algorithms for unbalanced power flow studies including radial and general structure solver.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 501 [Min Grade: C] (Can be taken Concurrently)

### **ECEP 602 Power Distribution Automation and Control 3.0 Credits**

Power Distribution Automation and Control. Focuses on distribution management systems and their application: including optimizing network operation -capacitor placement and control, network reconfiguration, service restoration. Modern solution technology will be addresses.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 502 [Min Grade: C] (Can be taken Concurrently)

### **ECEP 603 Service and Power Quality in Distribution Systems 3.0 Credits**

Service and Power Quality in Distribution Systems. Focus power distribution systems: service and power quality assessment including stat estimation, voltage quality, trouble call analysis, service restoration, component and system reliability assessment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 601 [Min Grade: C]

### **ECEP 610 Power System Dynamics 3.0 Credits**

Covers system parameters and dynamics, swing equation and solutions for two-machine and multimachine systems, equal area criterion, computer solution techniques, system effects due to dynamic behavior of particular system components, and load characteristics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 503 [Min Grade: C]

### **ECEP 611 Power System Security 3.0 Credits**

Covers contingency analysis, including operating and security constraints and network sensitivities; corrective dispatch using linear programming; and state estimation, including network observability, detection, and identification of bad data.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 610 [Min Grade: C]

### **ECEP 612 Economic Operation of Power Systems 3.0 Credits**

Covers unit characteristics and economic operation, including transmission loss coefficients, general loss formula, and automatic economic load dispatch.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 501 [Min Grade: C]

### **ECEP 613 Advanced Power System Design 3.0 Credits**

Covers components, functions, application, and performance; relative cost and scaling parameters; overall planning problem considering present-worth and cost-benefit principles; system reliability; intersystem pooling; and growth.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **ECEP 614 Power System Dynamic Security 3.0 Credits**

Covers power system small signal stability and voltage stability modeling, analysis and simulation and its use in power system dynamic security assessment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 610 [Min Grade: C]

### **ECEP 641 Protective Relaying 3.0 Credits**

Covers relay principles and types, instrumentation of system parameters, relay characteristics and response, system component protection, solid-state relaying, underfrequency relays, and load shedding.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 503 [Min Grade: C]

### **ECEP 642 Protective Relay Laboratory 3.0 Credits**

Covers electromechanical and static relays. Emphasizes application based on observed performance. Includes testing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 641 [Min Grade: C]



**ECEP 643 Solid State Protective Relaying 3.0 Credits**

Covers solid-state protective relays as applied to power system stability and protection, including comparisons with electromechanical relays.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 641 [Min Grade: C]

**ECEP 661 High Voltage High Power Phenomena 3.0 Credits**

Covers corona, corona losses, electromagnetic noise, dielectric strength, lightning, impulse testing and safety practices, elements of high-power circuit interruption, circuit and physical phenomena, and circuit breakers.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEP 671 AC-DC and DC-AC Power Electronic Converters 3.0 Credits**

AC-DC and DC-AC Power Electronic Converters. Study of basic power electronic converter circuits: diode and phase controlled rectifiers and inverters; switch-mode converters. Applications to DC and AC power supplies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 501 [Min Grade: C] or ECEP 601 [Min Grade: C]

**ECEP 672 Power Electronic Experiments: Hardware and Software 3.0 Credits**

Hardware and Software Lab-Intensive course. Additional lectures on: Study of DC-DC switch-mode converters; Study of power electronic circuitry in residential, industrial and electric utility applications; Optimizing utility interfaces with power electronic systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 671 [Min Grade: C]

**ECEP 673 Power Electronic Applications 3.0 Credits**

Electric Utility Applications with emphasis on DC Transmission, Optimizing the Utility interface. Resonant converters. Fundamentals of motor drives and their controls: induction, DC, synchronous and specialized motors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 671 [Min Grade: C]

**ECEP 697 Research in Power Engineering 1.0-12.0 Credit**

Research in power engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 699 Supervised Study in Power Engineering 0.0-9.0 Credits**

Supervised study in power engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 801 Advanced Topics in Power Systems I 0.5-9.0 Credits**

Discusses the latest innovations, theories, and methodologies for the design, planning, and operation of power systems. Requires students to read and discuss technical articles published in the IEEE Transactions on pas, the Journal of Electric Energy and Systems, and other publications.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 802 Advanced Topics in Power Systems II 3.0 Credits**

Continues ECEP 801.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEP 803 Advanced Topics in Power Systems III 3.0 Credits**

Continues ECEP 802.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECEP 821 Load Forecasting & Probability Methods 3.0 Credits**

Reviews probability methods. Covers probabilistic generation and load models; forecasting methodologies; load classification and characterization; energy and peak demand forecasting; weather-and non-weather-sensitive forecast; and annual, monthly, weekly, and daily forecast.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 610 [Min Grade: C]

**ECEP 822 Power System Planning 3.0 Credits**

Covers deterministic planning, including automated transmission system expansion planning and network sensitivities, and probabilistic planning, including generation and load models, generation cost analysis, production costing, and energy production cost models for budgeting and planning.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 821 [Min Grade: C]

**ECEP 823 Power System Reliability 3.0 Credits**

Covers basic reliability concepts, including probabilistic generation and load models, loss of load probability (LOLP), static and spinning generating-capacity reliability, transmission system reliability, and composite system and interconnected system reliability.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEP 822 [Min Grade: C]

**ECEP 890 Advanced Special Topics in Power Engineering 1.0-9.0 Credit**

Covers advanced special topics of interest to students and faculty.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 898 Master's Thesis Power Engineering 1.0-12.0 Credit**

Master's thesis in power engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 997 Dissertation Research in Power Engineering 1.0-12.0 Credit**

Graded Ph.D. dissertation in power engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP 998 Ph.D. Dissertation in Power Engineering 1.0-12.0 Credit**

Ph.D. dissertation in power engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP I599 Independent Study in ECEP 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP I699 Independent Study in ECEP 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP I799 Independent Study in ECEP 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP I899 Independent Study in ECEP 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP I999 Independent Study in ECEP 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP T580 Special Topics in ECEP 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP T680 Special Topics in ECEP 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP T780 Special Topics in ECEP 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP T880 Special Topics in ECEP 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECEP T980 Special Topics in ECEP 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Electrical & Computer Engineering - Systems

## Courses

**ECES 510 Analytical Methods in Systems 3.0 Credits**

This course is intended to provide graduate student in the field of signal and image processing with the necessary mathematical foundation, which is prevalent in contemporary signal and image processing research and practice.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 511 Fundamentals of Systems I 3.0 Credits**

Core course. Covers linear operators, including forms and properties (differential equations, transfer function, state space, causality, linearity, and time invariance); impulse response, including convolution, transition matrices, fundamental matrix, and linear dynamical system; definition, including properties and classification; representation, including block diagrams, signal flow, and analog and digital; properties, including controllability and observability; and eigenstructure, including eigenvalues and eigenvector and similarity transformations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 512 Fundamentals of Systems II 3.0 Credits**

Core course. Covers realization and identification, including minimal realization, reducibility and equivalence of models, and identification of systems; stability, including bounded input-bounded output, polynomial roots, and Lyapunov; and feedback compensation and design, including observers and controllers and multi-input/multi-output systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 511 [Min Grade: C]

**ECES 513 Fundamentals of Systems III 3.0 Credits**

Core course. Covers multivariable systems, numerical aspects of system analysis and design, design of compensators, elements of robustness, and robust stabilization.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 512 [Min Grade: C]

**ECES 521 Probability & Random Variables 3.0 Credits**

Probability concepts. Single and multiple random variables. Functions of random variables. Moments and characteristic functions. Random number and hypothesis testing. Maximum likelihood estimation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 522 Random Process & Spectral Analysis 3.0 Credits**

Random Process. Poisson Process, Shot Noise. Gaussian Process. Matched Filters. Kalman Filters. Power Spectral Density. Autocorrelation and cross correlation. PSD estimation. Entropy. Markov Processes. Queuing Theory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C]

**ECES 523 Detection & Estimation Theory 3.0 Credits**

This course introduces the field of detection and estimation and provides tools for classifying and learning about patterns in the face of total, partial or incomplete prior knowledge. Topics covered include Bayes classifier; Parametric estimation and supervised learning (MLE and Bayes Learning); Hypothesis testing; Decision Fusion; Unsupervised learning; and Non parametric testing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C]

**ECES 558 Digital Signal Processing for Sound & Hearing 3.0 Credits**

Introduction to the computational modeling of sound and the human auditory system. Signal processing issues, such as sampling, aliasing, and quantization, are examined from an audio perspective. Covers applications including audio data compression (mp3), sound synthesis, and audio watermarking.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 631 [Min Grade: C]

**ECES 559 Processing of the Human Voice 3.0 Credits**

Introduction to the computational modeling of the human voice for analysis, synthesis, and recognition. Topics covered include vocal physiology, voice analysis-synthesis, voice data coding (for digital communications, VoIP), speaker identification, speech synthesis, and automatic speech recognition.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 631 [Min Grade: C] and ECES 558 [Min Grade: C]

**ECES 561 Medical Robotics I 3.0 Credits**

This course will introduce the emerging, multidisciplinary field of medical robotics. Topics include: introduction to robot architecture, kinematics, dynamics and control; automation aspects of medical procedures; safety, performance limitations; regulatory and economics and future developments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 562 Medical Robotics II 3.0 Credits**

This course will continue the introduction to the emerging, multidisciplinary field of medical robotics. Topics include: medical procedure automation; robot testing and simulation techniques; This is a project based course that will afford students the opportunity to work with existing medical robotic systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 561 [Min Grade: C]

**ECES 604 Optimal Estimation & Stochastic Control 3.0 Credits**

Introduction to control system problems with stochastic disturbances; linear state space filtering, Kalman Filtering, Non-linear systems; extended Kalman Filtering. Robust and H-infinity methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 512 [Min Grade: C] and ECES 521 [Min Grade: C]

**ECES 607 Estimation Theory 3.0 Credits**

General characteristics of estimators. Estimators: least squares, mean square, minimum variance, maximum a posteriori, maximum likelihood. Numerical solution. Sequential estimators.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 614 Passive Network Synthesis 3.0 Credits**

An introduction to approximation theory; driving point functions; realizability by lumped-parameter circuits; positive real functions; properties of two and three element driving point functions and their synthesis; transfer function synthesis; all-pass networks.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 615 Analysis & Design of Linear Active Networks 3.0 Credits**

DC and AC models of bipolar transistors and FETs; design of differential operational amplifiers; optimal design of broad-band IC amplifiers; design of tuned amplifiers; design for optimal power gain, distortion, and efficiency; noise in transistor circuits.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 620 Multimedia Forensics and Security 3.0 Credits**

This course introduces students to fundamental concepts in multimedia forensics and security. Topics covered include signal processing and machine learning techniques to detect forgeries, identify editing or manipulation, and determine the source of an image or video through direct signal analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C]

**ECES 621 Communications I 3.0 Credits**

Covers modulation techniques: baseband PAM, passband PAM, QAM, and PSK; orthogonal signaling: FSK; symbol/vector detection: matched filter and correlation detector; sequence detection: ISI; equalization: adaptive and blind; carrier synchronization; and timing recovery.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 622 Communications II 3.0 Credits**

Covers shot noise, noise in detectors, analog fiberoptic systems, carrier and subcarrier modulation, digital systems bit error rates for NRZ and RZ formats, coherent optical communication systems-heterodyne and homodyne systems, wavelength division multiplexing, system design concepts, power budgets, rise time budgets, and optical switching networks.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 623 Communications III 3.0 Credits**

Covers fundamentals of information theory: information measure, entropy, and channel capacity; source encoding and decoding; rate distortion theory; linear codes; block codes; convolutional codes, Viterbi algorithm; encryption and decryption; and spread spectrum communications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 631 Fundamentals of Deterministic Digital Signal Processing 3.0 Credits**

Fundamentals of Deterministic Digital Signal Processing. This course introduces the fundamentals of deterministic signal processing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 632 Fundamentals of Statistical Digital Signal Processing 3.0 Credits**

Fundamentals of Statistical Deterministic Digital Signal Processing. The course covers topics on statistical signal processing related to data modeling, forecasting and system identification.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 631 [Min Grade: C]

**ECES 640 Genomic Signal Processing 3.0 Credits**

This course focuses on signal processing applied to analysis and design of biological systems. This is a growing area of interest with many topics ranging from DNA sequence analysis, to gene prediction, sequence alignment, and bio-inspired signal processing for robust system design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 641 Bioinformatics 3.0 Credits**

This course will focus on developing the computational, algorithmic, and database navigational skills required to analyze genomic data that have become available with the development of high throughput genomic technologies. We will also illustrate statistical signal processing concepts such as dynamic programming, hidden markov models, information theoretic measures, and assessing statistical significance. The goals will be achieved through lecture and lab exercises that focus on genomic databases, genome annotation via hidden markov models, sequence alignment through dynamic programming, metagenomic analyses, and phylogenetics with maximum likelihood approaches.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 642 Optimal Control 3.0 Credits**

Introduces the concept of optimal control first by static optimization for state space formulated systems. The concept is expanded as the linear quadratic regulator problem for dynamic systems allowing solution of the optimal control and suboptimal control problems for both discrete and continuous time. Additional topics include the Riccati equation, the tracking problem, the minimum time problem, dynamic programming, differential games and reinforcement learning. The course focuses on deriving, understanding, and implementation of the algorithms.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 512 [Min Grade: C]

**ECES 643 Digital Control Systems Analysis & Design 3.0 Credits**

Covers analysis and design of sampled-data control system using Z-transform and state-variable formulation, sampling, data reconstruction and error analysis, stability of linear and non-linear discrete time systems by classical and Lyapunov's second method, compensator design using classical methods (e.g., rootlocus) and computer-aided techniques for online digital controls, optimal control, discrete-time maximum principle, sensitivity analysis, and multirate sampled-data systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 513 [Min Grade: C]

**ECES 644 Computer Control Systems 3.0 Credits**

Introduction to the fundamentals of real-time controlling electromechanical dynamic systems, including modeling, analysis, simulation, stabilization and controller design. Control design approaches include: pole placement, quadratic and robust control performances.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 650 Statistical Analysis of Genomics 3.0 Credits**

This course focuses on the computational and statistical methods required to analyze metagenomic data. Students learn R and QIIME for conducting analyses. Students learn how to classify DNA sequences, distance and diversity metrics, ordination (ordering) techniques, and comparative statistical methods such as ANOVA and variations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 651 Intelligent Control 3.0 Credits**

Concepts of Intelligence in Engineering Systems, Learning Automation, Principles of Knowledge Representation. Levels of Resolution and Nestedness. Organization of Planning: Axioms and Self-Evident Principles.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 660 Machine Listening and Music IR 3.0 Credits**

This course introduces methods for the computational analysis, recognition, and understanding of sound and music from the acoustic signal. Covered applications include sound detection and recognition, sound source separation, artist and song identification, music similarity determination, and automatic transcription.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 631 [Min Grade: C]

**ECES 670 Seminar in Systems I 2.0 Credits**

Involves presentations focused on recent publications and research in systems, including communications, controls, signal processing, robotics, and networks.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 671 Seminar in Systems II 2.0 Credits**

Continues ECES 670.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**ECES 672 Seminar in Systems III 2.0 Credits**

Continues ECES 671.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 681 Fundamentals of Computer Vision 3.0 Credits**

Develops the theoretical and algorithmic tool that enables a machine (computer) to analyze, to make inferences about a "scene" from a scene's "manifestations", which are acquired through sensory data (image, or image sequence), and to perform tasks.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 682 Fundamentals of Image Processing 3.0 Credits**

The course introduces the foundation of image processing with hands-on settings. Taught in conjunction with an imaging laboratory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 631 [Min Grade: C]

**ECES 684 Imaging Modalities 3.0 Credits**

This course is intended to produce students and image processing with a background on image formation in modalities for non-invasive 3D imaging. The goal is to develop models that lead to qualitative measures of image quality and the dependence of quality imaging system parameters.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 685 Image Reconstruction Algorithms 3.0 Credits**

This course is intended to provide graduate students in signal and image processing with an exposure to the design and evaluation of algorithms for tomographic imaging.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 684 [Min Grade: C] and BMES 621 [Min Grade: C]

**ECES 697 Research In Systems Engineering 1.0-12.0 Credit**

Research in systems engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 699 Supervised Study in Systems Engineering 0.0-9.0 Credits**

Supervised study in systems engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 801 Advanced Topics in Systems I 3.0 Credits**

Familiarizes students with current research results in their field of interest, specifically in works reported in such journals as The IEEE Transactions.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 802 Advanced Topics in Systems II 3.0 Credits**

Continues ECES 801.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 803 Advanced Topics in Systems III 3.0 Credits**

Continues ECES 802.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 811 Optimization Methods for Engineering Design 3.0 Credits**

Applications of mathematical programming and optimization methods in engineering design problems such as networks, control, communication, and power systems optimization. Optimization problem definition in terms of objective function, design variables, and design constraints. Single variable and multivariable search methods for unconstrained and constrained minimization using Fibonacci, gradient, conjugate gradient, Fletcher-Powell methods and penalty function approach. Classical optimization--Lagrange multiplier, Kuhn-Tucker conditions. Emphasis is on developing efficient digital computer algorithms for design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 812 Mathematical Program Engineering Design 3.0 Credits**

Approximation theory projection theorem. Solution of nonlinear equations by Newton-Raphson method. Resource allocation, linear programming, and network flow problems. Integer programming for digital filter design and power system expansion problems. Gamory's algorithm.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 813 Computer-Aided Network Design 3.0 Credits**

Simulation and circuit analysis programs: PCAP, MIMIC, GASP. Data structures. Algorithms. Languages. Interactive I/O. Integration of subroutines for simulation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 817 Non-Linear Control Systems 3.0 Credits**

Covers key topics of feedback linearization, sliding mode control, model reference adaptive control, self-tuning controllers and on-line parameter estimation. In addition additional non-linear topics such as Barbalat's Lemma, Kalman-Yakubovich Lemma, passivity, absolute stability, and establishing boundedness of signals are presented. The focus of the course is the understanding each of these algorithms in detail through derivation and their implementation through coding in Matlab and Simulink.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 513 [Min Grade: C]

**ECES 818 Machine Learning & Adaptive Control 3.0 Credits**

System identification and parameter estimation, gradient search, least squares and Neural Networks methods. Closed loop implementation of system learning and self-organizing controllers. Random searching learning systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 512 [Min Grade: C]

**ECES 821 Reliable Communications & Coding I 3.0 Credits**

Covers fundamentals of information theory, including measures of communication, channel capacity, coding for discrete sources, converse of coding system, noisy-channel coding, rate distortion theory for memoryless sources and for sources with memory, and universal coding.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C] and ECES 522 [Min Grade: C]

**ECES 822 Reliable Communications & Coding II 3.0 Credits**

Introduces algebra of coding, including groups, rings, fields, and vector fields. Covers finite fields, decoding circuitry, techniques for coding and decoding, linear codes, error-correction capabilities of linear codes, dual codes and weight distribution, important linear block codes, perfect codes, and Plotkin's and Varshamov's bounds.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 821 [Min Grade: C]

**ECES 823 Reliable Communications & Coding III 3.0 Credits**

Continues techniques for coding and decoding. Covers convolutional codes; Viterbi algorithm; BCH, cyclic, burst-error-correcting, Reed-Solomon, and Reed-Muller codes; and elements of cryptography.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 822 [Min Grade: C]

**ECES 890 Advanced Special Topics in Systems Engineering 1.0-9.0 Credit**

Covers advanced special topics of interest to students and faculty.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 898 Master's Thesis in Systems Engineering 1.0-12.0 Credit**

Master's thesis in systems engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 921 Reliable Communications & Coding I 3.0 Credits**

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECES 997 Dissertation Research in Systems Engineering 1.0-12.0 Credit**

Graded Ph.D. dissertation in systems engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES 998 Ph.D. Dissertation in Systems Engineering 1.0-12.0 Credit**

Ph.D. dissertation in systems engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES I599 Independent Study in ECES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES I699 Independent Study in ECES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES I799 Independent Study in ECES 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES I899 Independent Study in ECES 12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES I999 Independent Study in ECES 12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES T580 Special Topics in ECES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES T680 Special Topics in ECES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES T780 Special Topics in ECES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES T880 Special Topics in ECES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECES T980 Special Topics in ECES 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Engineering Geology

### Courses

**EGEO I999 Independent Study in EGEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGEO T580 Special Topics in EGEO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGEO T680 Special Topics in EGEO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGEO T780 Special Topics in EGEO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGEO T880 Special Topics in EGEO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGEO T980 Special Topics in EGEO 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Engineering Management

### Courses

**EGMT 501 Leading and Managing Technical Workers 3.0 Credits**

The course will cover the history and evolution of management theory as well as planning, organizational design, management styles, motivation/rewards/punishments and problem solving. Emphasis will be on developing a systemic, holistic approach. This course is designed to provide the necessary business knowledge for further study in the Engineering Management advanced courses. Students will have the opportunity to analyze issues dealing with various aspects of management. In addition, the required writing assignments should aid in developing critical thinking and written communication skills.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 502 Analysis and Decision Methods for Technical Managers 3.0 Credits**

The course will develop a framework that can be used to effectively manage organizations for sustainable high performance. It will build on the fundamentals that were learned in Engineering Management I and explore concepts related to change, strategy, culture, complexity, systems thinking, learning, creativity, problem solving, and innovation. Upon completing the course the student will have an enhanced ability to bring creativity to management and leadership challenges as well as an appreciation of the processes, skills, and attitude needed for success.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C]

**EGMT 504 Design Thinking for Engineering Communications 3.0 Credits**

Teaches effective communication skills, both written and spoken, and strategies essential for success in the workplace. Addresses interpersonal issues, communicating across functional disciplines. Uses the Design Approach. Addresses the communication demands of engineers.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 515 Infrastructure Systems & Performance Evaluation 3.0 Credits**

Characterization of transportation, building, urban water resources and power distribution infrastructure. Capacity, functional performance and serviceability metrics. Risk and vulnerability concepts. Physical deterioration mechanisms. Asset management principles. Data management supporting scoping and sequencing of facility maintenance, repair, upgrading, interconnection, expansion or replacement.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 516 Infrastructure Project & Program Planning 3.0 Credits**

Coordination of infrastructure systems with multiple integrated projects through concept development, regulatory, environmental and economic screening, and then through design, construction, commissioning, operation and maintenance. Includes definition of program objectives and geographic limits; assessing asset conditions; sustainability and stakeholder analysis, team assembly and governance; defining performance and status reporting metrics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C]

**EGMT 517 Public Value & Participation in Infrastructure Decision 3.0 Credits**

Adjusting sponsoring agency plans and program for external statutory and informal inputs, including regulatory approvals, environmental assessment, interested and affected party stakeholder concerns, life cycle sustain ability, and resource allocation. Includes communication of and transparent ratification of tradeoffs in expectations of project performance and reliability.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 516 [Min Grade: C]

**EGMT 520 Infrastructure Capstone Project 3.0 Credits**

Group project to produce an engineering- intensive submission for approval by a regulatory agency, addressing compliance with regulatory, codes and professional standards and resource requirements. The student team, with diverse backgrounds, will prepare and present the report to the designated entity, following the procedures and protocols that it has published.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C] and EGMT 515 [Min Grade: C] and EGMT 516 [Min Grade: C]

**EGMT 531 Engineering Economic Evaluation & Analysis 3.0 Credits**

Provides a review of economic analysis, with emphasis on those phases of major interest to engineering administration. Covers the calculation of economic equivalence, inflation and the purchasing power of money, decision-making among alternatives, evaluation of public activities, and estimation of costs.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 535 Financial Management 3.0 Credits**

Studies the features of accounting data essential to the interpretation and evaluation of engineering operations and financial position of the engineering enterprise. Analyzes financial statements and reports from the point of view of management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 531 [Min Grade: C]

**EGMT 536 Advanced Financial Management for Engineers 3.0 Credits**

Covers advanced problems in planning, controlling, and directing engineering and other operating costs through budgeting and analysis of cost data. Studies judging of profitability, liquidity, and the organizational structure of the engineering functions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 535 [Min Grade: C] and EGMT 531 [Min Grade: C]

**EGMT 545 Introduction to Peacebuilding for Engineers 3.0 Credits**

Developed in partnership with professional peacebuilders from the PeaceTech Lab and USIP's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills practiced in the field of international peacebuilding and conflict transformation. This course provides students with first-hand accounts of peacebuilders describing the challenges and opportunities in their work, short presentations outlining key theories and concepts that guide that work, and opportunities to think about how this knowledge, skills, and attitudes can be applied to real-life peacebuilding dilemmas.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 550 Conflict Management for Engineers 3.0 Credits**

As the pace of science and technology innovation increases, so too does the role of engineers in solving some of the world's toughest challenges. The prevention of violent conflict and the pursuit of a sustainable peace is just such a challenge. Developed in partnership with professional peacebuilders from the PeaceTech Lab and the US Institute of Peace's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills they will need in order to use technology expertise in service of conflict-affected communities. This course provides students with an introduction to the theory and practice of conflict analysis, strategic peacebuilding, and negotiation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 571 Engineering Statistics 3.0 Credits**

Covers probability, including random variables and probability distributions, mathematical expectation, discrete probability distributions, continuous probability distributions, sampling and sampling distribution, and estimators and confidence intervals. Includes applications to engineering and industrial problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 572 Statistical Data Analysis 3.0 Credits**

Continues EGMT 571. Covers hypothesis testing, linear regression and correlation, multiple regression, and some topics from analysis of variance and non-parametric statistics. Introduces quality control.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C]

**EGMT 573 Operations Research 3.0 Credits**

Covers deterministic modeling, including linear programming; the Simplex Method; theory of the Simplex Method; duality and sensitivity analysis; transportation, transshipment, and assignment problems; problem formulation; goal programming; network analysis; dynamic programming; and integer and non-linear programming. Discusses case study applications of engineering and management problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C]

**EGMT 575 Quality Systems Engineering 3.0 Credits**

This course provides students with a broad overview of quality systems engineering, quality management systems, and global quality systems regulations. Students will gain knowledge for managing and performing a wide variety of activities to ensure that operations maintains a culture of quality and continuous improvements. It also provides guidance on strategic leadership and direction over various aspects of the quality management system and quality engineering tactical execution of related processes to meet or exceed defined organizational and quality objectives for new product development, operations and regulatory compliance.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 572 [Min Grade: C]

**EGMT 581 Human Relations and Organizational Behavior 3.0 Credits**

Covers morale and discipline in management situations. Includes case studies stressing the prevention of and solution to employee problems by means of appropriate policies, techniques, practices, and procedures. Examines group dynamics from the point of view of both psychological and sociological factors under varying situations, especially industrial.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 504 [Min Grade: C] and EGMT 501 [Min Grade: C]



**EGMT 610 Ethics & Business Practices for Engineers 3.0 Credits**

Course will raise level of awareness and sensitivity of and teach how to create a workplace valuing ethical behavior and business conduct. Discusses engineering ethics, how to establish and administer an effective corporate compliance program, case studies and application of the case method, ethical implications of business practice issues in the workplace.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 614 Marketing: Identifying Customer Needs 3.0 Credits**

Prepares students for management of research and development by exposing them to the needs of the environment and industries outside of their employers. Teaches students how to find business opportunities based on the wants and needs of customers. Focuses on the marketing of engineering services and engineered products to industrial and governmental customers. Explores the interdependence of engineering marketing, manufacturing, and finance through strategic business planning. Covers industrial and government procurement, sales techniques, costs, pricing, marketing research, proposal preparation, and client relationships.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C]

**EGMT 615 New Product Conceptualization, Justification, and Implementation 3.0 Credits**

Covers two broad themes: (1) innovation processes and (2) specific tools to use in the process. The course will acquaint students with the nature and the fundamental concepts of innovation processes, develop an understanding of which innovation processes are best applied to specific competitive environments and basic skill in the use of specific engineering and management tools useful in the development of innovative products, services and business models and the integration of the engineering/management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 616 Value Creation through New Product Development 3.0 Credits**

Analyzes the issues and concepts involved in the management of research and development and its functional relationship to other elements of the corporate structure. Pays particular attention to the functional characteristics of the product line, company growth by technological innovation, application of systems engineering concepts to the corporate organization, and changing concepts in management structures to accommodate advances in science and technology.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 618 Intrapreneurship for Engineers 3.0 Credits**

Corporations experiencing diminishing traditional markets must reposition themselves to develop new markets to stay competitive. Forward-thinking corporations rely on internal entrepreneurial efforts to alter an organization's status quo, harness the energies of talented renegades, and align with the company's objectives. Many mid-level engineers within such companies are ideal candidates to form groups of intrapreneurs to develop and implement innovative concepts using the corporate resources of a large industrial entity in a fresh, lean new venture subdivision. This course describes a process that can be used as a guide for intrapreneurs and corporations who wish to develop an idea from conception to corporate senior leadership approval such that a new venture can be established within the corporation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 620 Engineering Project Management 3.0 Credits**

This course addresses the fundamentals of project management, and the techniques to ensure successful project execution. The course will look at qualitative and quantitative project management techniques, the impact of technology on PM, cost and schedule controls, financial considerations, leadership, team development, how other industries approach project management, and planning. We will also examine case studies of project management for international projects, different industries, and outsourcing situations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 625 Project Planning, Scheduling and Control 3.0 Credits**

This course provides a basic understanding of project planning and control by examining concepts and theories. Emphasis is placed on planning and control of technology based organizations. Upon successful completion of this course, students should be able to use the tools and concepts of project control and apply them.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C]

**EGMT 630 Global Engineering Project Management 3.0 Credits**

This course will focus on strategies and techniques needed for managing a global project in an engineering environment. Develop concepts of leadership for diverse global teams comm. strategies, cultural considerations, organizational structure, collaborative tools & techniques, risk mitigation and contracting strategies, legal and financial issues when executing a global engineering project. Highlight techniques used in design/construction, prod, devpt and technology transfer projects. Essential in today's environment of global competition.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 635 Visual System Mapping 3.0 Credits**

Visual System Mapping is an elective course designed to unlock creativity used to solve problems, accelerate learning and improve communications. Application of VSM techniques provides an advantage to solution development, collaboration and consensus in business problems for success in today's highly complex and competitive environment. VSM was inspired by a technique known as "Mind Mapping, and was designed to improve the use of the brain in learning and mastery and has been demonstrated to lead to enhanced creativity and better results. Practitioners can expect to have fun while virtually guaranteeing breakthrough outcomes. This course allows students to learn techniques and methods and apply them to personal, professional and organizational issues on individual and team projects.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 645 Managing Engineering Disasters 3.0 Credits**

Examines the technical issues with engineering disasters as well as the business, psychological, and social impacts. Reviews case studies in various industries (building, power, chemical, aerospace, materials, etc) to understand the technical issues behind the disasters and how these events changed the industry to improve oversight and safety. Challenges students to think how events today could have major impacts on supply chain, cities and communities. Finally, considers the ethics of designing new projects and technological improvements.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 650 Systems Thinking for Leaders 3.0 Credits**

Course will explore concepts related to effective leadership within practice of engineering. Equips practicing engineers to move beyond engineering training to focus on algorithms and analysis and develop a broad understanding of leadership effectiveness in a technically oriented work place. Course will include models related to sustainable, high performance and topics related to living, learning, effectiveness, power, influence, networking, and systems thinking. Emphasis on developing systems thinking.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 652 Engineering Law 3.0 Credits**

Examines the influence of contract, tort, and property law on engineering and construction activities. Includes legal principles relating to management of engineering organizations and governmental departments, and legal procedures of interest to engineers. Covers contracts, professional malpractice, expert testimony, intellectual property law, and business organizations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 660 Sustainable Business Practices for Engineers 3.0 Credits**

The course will give students a broad and practical understanding of various environmental issues as well as sustainability concepts. The challenges associated with sustainable development are multifaceted involving economic, social and environmental concerns. These concerns are altering business strategies and practices and are leading to new opportunities.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C]

**EGMT 692 Engineering Management Capstone 3.0 Credits**

Uses the case method to provide a thorough study of engineering management and administrative procedures in recognizing and solving engineering problems. Emphasizes strategic planning and policy decisions that affect the image and success of the whole organization in its domestic and global environments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 501 [Min Grade: C] and EGMT 502 [Min Grade: C] and EGMT 531 [Min Grade: C] and EGMT 535 [Min Grade: C]

**EGMT 799 Research 0.5-20.0 Credits**

Involves the selection and solution of a problem in the field of engineering management. Expects students to conduct independent research and demonstrate the ability to employ one or more of the managerial tools to which they were exposed. Emphasizes the composition and organization of the paper, the logical development of a solution to the problem, and the contribution of the solution to knowledge.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT 898 Master's Thesis 0.5-20.0 Credits**

Involves the study and investigation of a research or development problem in the area of the student's major elective. Requires the problem to be reported in a dissertation under the direction of a faculty adviser. No credit will be granted until thesis is completed and approved.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**EGMT I599 Independent Study in EGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT I699 Independent Study in EGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT I799 Independent Study in EGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT I899 Independent Study in EGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT I999 Independent Study in EGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT T580 Special Topics in EGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT T680 Special Topics in EGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT T780 Special Topics in EGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT T880 Special Topics in EGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**EGMT T980 Special Topics in EGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Engineering Technology

### Courses

**ET 605 Materials for Emerging Technologies 3.0 Credits**

General properties of metals, ceramics and polymers are presented.

Focus shifts to technologies - photo and fuel cells in the energy industry.

Topic include: the chemical process that converts fuel to electricity directly, light energy that converts to electrical energy, band model for optical materials, and materials for the optical and electronic industries.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 610 Networks for Industrial Environments 3.0 Credits**

An in-depth review of high-performance wired and wireless networks for industrial control, communications, and computing. The emphasis is on understanding current and newly emerging network architectures, protocols and technologies from the point of view of performance, reliability, and cost. Industry standard modeling and simulation tools are also reviewed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 615 Rapid Prototyping and Product Design 3.0 Credits**

This course will introduce concepts and methods for rapid prototyping, including their technical basis, and unified principles common to almost all rapid prototyping technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 619 Programmable Devices and Systems 3.0 Credits**

A review of programmable devices and systems for industrial and embedded applications. Field-Programmable Gate Arrays, microcontrollers, and Programmable Logic Controllers are compared with respect to suitability, performance, and cost in industrial and embedded environments. Industry standard modeling and development tools will be introduced and used to predict performance and reliability.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 620 Microsystems and Microfabrication 3.0 Credits**

Microsystems and microfabrication covers the principles of design, structure, and operation, as well as fabrication technologies for microsystems including microelectronics, sensors, MEMS, micro-optics, and microfluidics (lab-on-a-chip).

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 635 Engineering Quality Methods 3.0 Credits**

Six Sigma concepts and methods are covered with emphasis on its framework, statistical tools and practical implementations. Students will gain a working knowledge of Six Sigma approaches and techniques for applications to both manufacturing and services.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 675 Reliability Engineering 3.0 Credits**

This course will introduce the foundations and applications of reliability engineering including basic probability models for component and system failure, with emphasis on practical applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 681 Nanomaterials and Nanoengineering 3.0 Credits**

This course is a graduate level introduction, survey, and case study analysis of nanoscale materials and nanoengineering, including nanodevices, processing, characterization, and applications. The course will feature coordinated and themed focused studies of fundamental developments in novel materials at the nanoscale, and their applications to several fields of engineering. The objectives include familiarizing students with nanoscale perspectives of materials science in the development materials with tailored properties and functions. Applications areas include materials for structures, optics, electronics, processing, and biomedical diagnostics and therapeutics. Topics related to commercialization and intellectual property, as well as environmental, safety, and regulatory issues will also be discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 685 Precision Manufacturing 3.0 Credits**

Introduction to precision engineering for manufacturing. Emphasis on design and performance of precision machinery for manufacturing. Topics include machine tool elements and structure, sources of error (thermal, static, dynamic, process related), error mapping, precision machining processes and process models, sensors for process monitoring and control, metrology, role of CAD/CAM in precision manufacturing, examples of precision component manufacture.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 725 Sensors and Measurement Systems 3.0 Credits**

This course provides a foundation in sensors and measurement systems including data acquisition for quality control. It covers general concepts, measuring devices, and the manipulation, transmission and recording of data. expanded coverage of sensors, and the use of computer tools in measurement & data acquisition for quality control. Measurement techniques related to micro- and nano-technologies are also discussed, reflecting the growing importance of these technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 730 Lean Manufacturing Principles 3.0 Credits**

Lean is a generic process management philosophy, developed initially for manufacturing and derived mainly from the Toyota Production System (TPS), Just-in-Time (JIT) operations theory, and earlier sources dating from the work of Taylor, Ford, and others or work methods, mass production, and automation. Lean is an integral part of today's modern manufacturing enterprises.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 732 Modern Energy Conversion Technologies 3.0 Credits**

This course introduces new energy conversion technologies, with an emphasis on solid-state devices, distributed systems with storage, and alternative energy sources including solar, waste heat, wind, biomass, and hydrogen. Solid-state energy conversion devices including solar cells, thermoelectrics, thermionics, thermophotovoltaics and light-emitting diodes, as well as solid-state refrigerators, will be described and analyzed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 733 Renewable Energy Technology 3.0 Credits**

This course covers electric power generation technologies for renewable energy resources. Major topics are electrical machines appropriate for renewable energy systems, power converters for wind turbine and solar photovoltaics, renewable energy power transmission and distribution, and the economics of energy efficiency.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 755 Sustainable and Green Manufacturing 3.0 Credits**

This course covers environmental considerations in engineering product and process design, reduction of environmental impact by design, recycling, material selection, demanufacturing and remanufacturing and trade-offs.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ET 775 Master's Project and Thesis in Engineering Technology 3.0 Credits**

Involves the study and investigation of a research or development topic in the area of the student's interest. Requires the topic and solution to be reported in a thesis under the direction of a faculty advisor. Can be repeated for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 3 times for 9 credits

**ET I599 Independent Study in ET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET I699 Independent Study in ET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET I799 Independent Study in ET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET I899 Independent Study in ET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET I999 Independent Study in ET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET T580 Special Topics in ET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET T680 Special Topics in ET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET T780 Special Topics in ET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET T880 Special Topics in ET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ET T980 Special Topics in ET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit



# Engineering, General

## Courses

### **ENGR 701 Career Integrated Education 3.0 Credits**

Industrial and practical training for engineers.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **ENGR 702 Career Integrated Education II 3.0 Credits**

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### **ENGR T580 Special Topics in Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### **ENGR T680 Special Topics in Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### **ENGR T780 Special Topics in Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### **ENGR T880 Special Topics in Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### **ENGR T980 Special Topics in Engineering 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Entrepreneurship and Innovation

## Courses

### **ENTP 501 Entrepreneurship Practice & Mindset 3.0 Credits**

Master's-level introductory course designed for all Drexel graduate students who are looking to begin to explore entrepreneurship. With the foundational belief in the individual as the cornerstone of enterprise, this course introduces those skills and characteristics central to an entrepreneurial "habit of mind" or entrepreneurial mindset to support pursuits as wide-ranging as going into business for yourself to landing a leadership role within a larger organization. Entrepreneurship begins with gaining insight into, and facility with, one's own tools and skills to better recognize, frame and leverage them for personal and professional opportunity.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

### **ENTP 515 Pitch It! 3.0 Credits**

The entrepreneur's pitch deck and presentation are critical to the funding process and it should not be underestimated how important they are to the success or failure of a startup. The investor-level presentation is unlike any other business presentation, as investors are typically a demanding and impatient audience. This course is designed for students who want to learn how to create and present effective, investor-level presentations for an entrepreneurial startup.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

### **ENTP 535 Social Entrepreneurship 3.0 Credits**

This course is designed to immerse graduate students in social entrepreneurship ventures through experiential learning. While introducing students to frameworks and methodologies that address societal problems through data-driven and market approaches, students will simultaneously work with a social entrepreneur in the development of their existing business or their business model.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

### **ENTP 540 Approaches to Entrepreneurship 3.0 Credits**

This course examines approaches to entrepreneurship from a wide range of contexts including traditional profit-driven enterprises, social enterprises, and microenterprises in both mature and emerging economies. Students will be introduced to modern entrepreneurial concepts including lean start up methodology, B-corporations, and Bottom of the Pyramid (BoP) markets. Application and reinforcement of course concepts will be highlighted through class discussions and case analyses.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

### **ENTP 545 International Entrepreneurship 3.0 Credits**

This course is intended for students interested in launching an innovative, international venture. It will examine the social and environmental challenges that can impede the entrepreneurial venture in world economies. Students will understand how culture and local customs affect entrepreneurial ventures in five specific regions of the world: Latin America, Eastern Europe, the Middle East, Africa, and Asia. Students will also compare global entrepreneurship to the U.S. model of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

### **ENTP 555 Dynamics of the Family Firm 3.0 Credits**

Family firms make up more than two-thirds of the global economy. This course examines this unique business culture, characteristics, and interpersonal dynamics involved in family enterprise. Emphasis is placed on the opportunities and challenges most commonly found family-operated endeavors. Topics include succession, balancing both family and business roles, family dynamics, managing non-family employees, and advising family enterprises.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 565 Franchising 3.0 Credits**

Nearly half of all global retail businesses are managed through franchising networks. Furthermore, franchising continues to grow rapidly worldwide and as a result, there is an increasing need among franchising firms for employees with franchising knowledge and experience. This course deals with the various aspects of starting, developing, and managing both franchise networks and franchises within those networks.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 575 Entrepreneurship in Education 3.0 Credits**

This course focuses on the design of early-stage education ventures and on the programmatic, curricular and/or pedagogical innovations within established educational organizations or institutions. Students will design and develop their own education innovation, to include a theory of change or logic model, business/mission model canvas, assumption-testing, and culminate with a capstone/pitch.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 601 Social and Sustainable Innovation 3.0 Credits**

This course seeks to tap students' entrepreneurial mindsets to create social and sustainable market-based solutions to the global challenges identified in the United Nations Sustainable Development Goals (SDG) of 2030. Using their local communities as the context, themselves as a change agent, and relevant stakeholders as partners, students will pitch social and sustainable startups or innovations in existing firms that will help in achieving a particular SDG.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 611 Learning from Failure 3.0 Credits**

This course will define failure, analyze the causes of it, and present students with a framework they can use to help them be better prepared for learning from failure in order to drive the entrepreneur's level of entrepreneurial preparedness for further enterprising activities. Through a series of in-depth reflections of personal and professional "failures" and challenges, graduate students will develop a portfolio of resilience mechanisms to better prepare them for an entrepreneurial life.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 621 Innovation & Ideation 3.0 Credits**

This course provides students with tools, methods, and self-reflection techniques necessary to bring new ideas to reality while also providing them with ways to learn about how to test the viability of and response to their ideas in the market. Learning through iteration is a key component of this course as it is expected that the first version of any idea is not likely the last. Human-centered design methodologies will be front-and-center in this course from the perspective of how to innovate based not on the ideas of the innovator but based first on the needs of the customer. This course reviews the importance of innovation, not only in new products and services, but also in the underlying business models where unexpected sources of innovation can be found.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 631 Building Internal & External Relationships 3.0 Credits**

This course focuses on how early relationships, roles, and reward decisions cause tensions within the founding team. It also covers founders' recurring tension between keeping control of their ventures and attracting the resources needed to build the venture, initially, using founder/CEO succession as a microcosm of that tension and then broadening to key decisions throughout the founding process. This course introduces the next key players in the venture: cofounders and non-founding hires.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 641 Innovation in Established Companies 3.0 Credits**

This course develops skills that are important for students who are interested in pursuing careers in an entrepreneurial setting and corporate venture activities. This course should be of interest to anyone who wants to develop their entrepreneurial thinking on various innovation approaches.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 651 Leading New Ventures 3.0 Credits**

Starting and leading a new venture creates unique challenges for the entrepreneur as typically, this will be the first time they are in a leadership position. Some of these challenges stem from the context of the new venture itself – a company with scarce resources, little or no history and in many cases an unproven business model. Other challenges are more personal as they involve finding the appropriate leadership style and decision making models to employ in such a context. This course is designed to illustrate the leadership opportunities and challenges that face entrepreneurs and to provide them with the skills and competencies to effectively lead new ventures.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 660 Early Stage Venture Funding 3.0 Credits**

This course provides students with an understanding of the process, opportunities, and challenges associated with early-stage venture funding. It exposes you to the concepts, practices, and tools related to the funding needs of early-stage ventures with a focus on bootstrapping, friends/family financing, and angel-stage investment. Of particular focus will be the understanding of how angel investors and angel investment groups operate and how they make investment decisions.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 670 Clean Venture Lab 3.0 Credits**

This course provides the groundwork to understanding new-venture development in clean-technology markets. A project-based course, students partner with a start-up clean-technology firm or research laboratory in the region and work together on a technology project. In class, students discuss challenges facing the entrepreneurial energy venture, examine technologies shaping the clean-tech industry, and hear from industry experts.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENTP 501 [Min Grade: C] and ENTP 621 [Min Grade: C]

**ENTP 671 Life After Launch 3.0 Credits**

This course is a comprehensive examination of the knowledge and skills that younger startups need to operate and grow their small and/or growing ventures within today's dynamic business environment. Included are practical concepts typically faced in small to medium-sized businesses, including: financing, marketing, strategic planning, inventory control, cash flow, and recruiting and retaining talent. Legal issues, forms of ownership and strategies for growth are also addressed.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 681 The Startup Way: How to Drive Innovation in Entrepreneurial Companies 3.0 Credits**

In this course, students will learn tools to facilitate continuous transformation in their organizations i.e., the ability to employ entrepreneurship to ignite innovation in response to new and diverse challenges and to be prepared to do this repeatedly. Students will benefit by learning how to create an innovative culture and environment grounded in the establishment of an entrepreneurial mindset in high-growth organizations, industries, and contexts.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP 690 The Lean Launch 3.0 Credits**

In this course students will work on launching their own business. Students will spend the term de-risking their business assumptions through various tasks, such as surveying their customer base, meeting with partners and competitors, building prototypes, and validating a market need. Students will learn the iterative process of how a start-up actually works by using the Lean Start-Up model of new-venture development. Finally, students will see how to rapidly iterate a product or service to build something customers will use and buy.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENTP 501 [Min Grade: C]

**ENTP I599 Independent Study in Entrepreneurship 1.0-12.0 Credit**

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP I699 Independent Study in Entrepreneurship 1.0-12.0 Credit**

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP I799 Independent Study in Entrepreneurship 1.0-12.0 Credit**

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP I899 Independent Study in Entrepreneurship 1.0-12.0 Credit**

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP I999 Independent Study in Entrepreneurship 1.0-12.0 Credit**

Provides directed, individual study of topics within the field of entrepreneurship at the graduate level.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**ENTP T580 Special Topics in Entrepreneurship 1.0-12.0 Credit**

This course covers various topics of particular relevance to the study of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

**ENTP T680 Special Topics in Entrepreneurship 1.0-12.0 Credit**

This course covers various topics of particular relevance to the study of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

**ENTP T780 Special Topics in Entrepreneurship 1.0-12.0 Credit**

This course covers various topics of particular relevance to the study of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

**ENTP T880 Special Topics in Entrepreneurship 1.0-12.0 Credit**

This course covers various topics of particular relevance to the study of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

**ENTP T980 Special Topics in Entrepreneurship 1.0-12.0 Credit**

This course covers various topics of particular relevance to the study of entrepreneurship.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Cannot enroll if classification is Freshman or Pre-Junior or Sophomore

# Environmental & Occupational Health

## Courses

### **EOH 510 Principles and Practice of Environmental and Occupational Health 3.0 Credits**

This interdisciplinary course gives an overview of environmental and occupational health (EOH) issues and an introduction to approaches for prevention and control of environmental hazards. The course will cover both traditional EOH topics such as air pollution, drinking water and sanitation, and occupational health and safety, as well as salient issues of global concern such as climate change and emerging infectious diseases. The goal is to provide students with knowledge of the basic scientific principles of EOH, as they apply to the practice of public health. Throughout the course, students will examine environmental injustice and racism, particularly how policies and systems marginalize specific populations and contribute to health disparities.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

### **EOH 517 The World's Water 3.0 Credits**

Water is essential for life. Worldwide, 25% of people lack safely managed drinking water services and nearly 50% lack safely managed sanitation services. Safe and sufficient water, sanitation and hygiene services (WASH) are key for health and human rights. WASH services are a critical component of responses to infectious disease epidemics and ensuring infection prevention in healthcare facilities. Contaminated drinking water, inadequate water supply, or poor sanitation and hygiene all contribute to disease burden and decreased quality of life, particularly among the most vulnerable populations. This course will discuss a wide variety of topics related to WASH around the globe and the U.S. and will explore how WASH problems are compounded by emerging infectious diseases, climate change and rapid urbanization.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

### **EOH 550 Introduction to Urban Health 3.0 Credits**

It is estimated that by 2050, 66% of the world's population will live in urban areas. Promoting population health and health equity is a key challenge, but also a key opportunity for cities and broader urban areas that surround them. This course is designed to provide an overview of urban health including theory, methodology, and empirical evidence. The course will explore urban health strategies, including programs and policies aimed at impacting the social determinants of health, and how these strategies affect health outcomes of populations in urban settings.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

### **EOH 562 Global Air Pollution and Health 3.0 Credits**

Global air pollution is an important determinant of human health, causing millions of deaths worldwide each year. This course will examine how air pollutants are emitted into or form in the atmosphere, how people are exposed to air pollutants, and how these pollutants contribute to the burden of death, disease and disability in human populations. The course will provide an understanding of the properties of air pollutants, relevant atmospheric chemistry and physical processes, and how pollutants are measured. Students will consider inequities in the impact of air pollutants on human populations across the globe. Students will learn about national programs and policies for the control of air pollutants, and about the international agencies working to solve air pollution as a global health problem.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if major is ENVE

### **EOH 563 Injury Prevention and Control 3.0 Credits**

Unintentional injury is the leading cause of death for people in the United States between the ages of 1 and 44. Homicide and suicide are the second and third leading cause of death for people aged 15-34. The cost of medically treated injuries is estimated at over \$100 billion annually. This course examines injury as one of the core public health problems in the United States. Causes such as motor vehicles, opioids, interpersonal and self-inflicted violence, and work are some of the topics examined, including their physical and psychological outcomes. The subsequent costs and burdens to the healthcare system are explored. Policy and behavioral interventions are addressed. Where possible, extensions to international settings are made.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

### **EOH 564 Safety in Healthcare 3.0 Credits**

This course examines the history of healthcare safety as an emerging public health problem in the United States. Topics such as patient safety, nurse injury, and other outcomes will be studied. Effects of safety climate, organizational culture, and clinical knowledge on patients, healthcare workers and the healthcare system are discussed. The subsequent costs and burdens to the healthcare system are explored using current information from the academic literature, local and national interest groups, and government agencies. Policy interventions and alternatives are addressed. Emphasis is given to safety interventions regardless of preventability, lack of existing solutions, or consensus of priority.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

### **EOH 580 Fundamentals of Industrial Hygiene 3.0 Credits**

This course provides students with a general understanding of the recognition and evaluation of a variety of hazards in the workplace, as well as approaches for the prevention and control of workplace hazards.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit



**EOH 605 Evidence Evaluation for Identification of Environmental Hazards 3.0 Credits**

The hazard identification step of environmental risk assessment is meant to answer the question, "Is exposure X a cause of human health outcome Y?" Answering this question involves evaluation of a body of research, often including conflicting results. In this course, students will discuss and practice evidence evaluation, using different types of evidence (human epidemiology, animal experiments, mechanistic data), and various methods for evidence synthesis (systematic review, meta-analysis) and evaluation (e.g., risk-of-bias tools). Determination of an overall weight-of-evidence for a particular hazard will also be discussed. Through case studies, students will consider strengths and limitations of evidence, the types of biases that may be present, and how differences in interpretation may occur.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 610 Environmental and Occupational Toxicology 3.0 Credits**

This course will focus on the applications of environmental and occupational health (EOH) and toxicology, along with the necessary fundamentals of toxicology as a science. Major classes of toxicants and the relevant physiology of toxicity will be covered. Students will learn the challenges and opportunities in toxicology and how toxicology interacts with other disciplines at the population and individual level. Traditional topics and approaches to EOH (water and air quality, occupational health, industrial hygiene and injury prevention) will be integrated with toxicological approaches.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 612 Environmental Exposure Science 3.0 Credits**

This course provides students with an overview of methods for measuring and evaluating both chemical and non-chemical environmental exposures. Particular emphasis will be placed on exposure assessment methods applicable to environmental epidemiology studies. Students become familiar with exposure science study design and commonly-used methods for monitoring and modeling pollution exposures in environmental settings, through participation in classroom exercises, lectures, and group work.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 615 Environmental and Occupational Health Policy 3.0 Credits**

This course provides an overview of the origins and development of environmental and occupational health policies, primarily in the United States. It utilizes an evidenced-based framework to assess the effectiveness of these policies within a context of a political climate towards public health. There is a focus on the role of economics, legal/regulatory processes, and ethical issues. Cross-cultural and international differences will be explored.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 625 Occupational and Environmental Epidemiology 3.0 Credits**

Students will develop an understanding of occupational and environmental epidemiologic methods. Particular emphasis will be placed on the critical analysis of published occupational epidemiologic studies. Students will gain an understanding of the most appropriate methods for assessing exposure/disease relationships for several occupational and environmental exposures and diseases.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and BST 571 [Min Grade: B]

**EOH 642 Healthy Housing & Built Environment 3.0 Credits**

The importance of housing and the built environment is recognized in the United Nations' Sustainable Development Goal #11 to make places where people live inclusive, safe, resilient, and sustainable. This course provides an overview how housing and the built environment affect health, with attention to pathways through which both harmful exposures and health-supportive opportunities affect populations. Students will be guided to contribute to the breadth of topics and perspectives discussed, to access and appraise relevant evidence, to reflect on social and historical factors that have led to place-based inequities, to juxtapose and compare plans with regards to their effects on health and health equity, and to articulate ways that health benefits of built environment change can be amplified.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 646 Environmental Health in Vulnerable Populations 3.0 Credits**

Policy instruments and tools in place to protect the health of vulnerable populations will be critically examined as well as issues related to equity and justice. A number of case studies will be examined to exemplify why certain populations are vulnerable to various environmental hazards.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 648 Public Health and Disaster Preparedness 3.0 Credits**

This course will cover key topics in the evolving field of public health emergency preparedness. The practice of public health involves a range of skills and knowledge areas that are used on a daily basis to improve the health of communities. During or emergencies public health agencies have important roles to protect the health of the public that extend the skills and responsibilities of day-to-day public health practice.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 649 Occupational and Environmental Cancers 3.0 Credits**

This course will provide students with a basic understanding of the biology of cancer, its causes, its epidemiology, and prevention methods. Legal implications of workplace and environmental exposures will be discussed.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 650 Microbes in Public Health Practice I: Overview of Bacterial Pathogens 3.0 Credits**

This course will cover the important bacterial pathogens that cause disease in humans, including bacterial virulence factors, disease mechanisms, and immunologic responses. The curriculum will focus on selected bacteria of clinical and public health importance, reviewing the clinical syndromes they produce, and appropriate treatment and control measures. The course will also address laboratory diagnostics for infectious diseases, including culture and non-culture methods for the diagnosis of infections caused by bacteria. Students will also learn about antimicrobial agents and resistance testing methods. It is highly recommended that students enrolled in this course have taken college-level biology and immunology classes.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 651 Microbes in Public Health Practice II: Overview of Viral and Other Pathogens 3.0 Credits**

This course will cover the important viral pathogens that cause disease in humans, including virulence factors, disease mechanisms, and immunologic responses. The curriculum will focus on selected viruses of clinical and public health importance, reviewing diagnostic considerations, the clinical syndromes they produce, and appropriate treatment and control measures. The course will also address selected parasitic and fungal infections. Prerequisite may be waived with instructor permission on a case-by-case basis.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 650 [Min Grade: B-]

**EOH 653 Environment of Care 3.0 Credits**

This course will review the role that the healthcare environment has in the transmission of infectious diseases. Students will learn about the importance of maintaining a safe and clean environment via engineering controls, maintenance of air handling and water systems, cleaning, disinfection, and sterilization. Students will learn about specific environmental vectors and vehicles for disease transmission, how to monitor the environment to prevent disease, and how to respond to outbreaks associated with the environment in healthcare.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 651 [Min Grade: C] and EOH 655 [Min Grade: C]

**EOH 655 Infection Prevention and Control in the Healthcare Environment 3.0 Credits**

This course will review the major risks for infection in healthcare settings and surveillance and prevention strategies for healthcare associated infections (HAIs). The course will also review important concepts in infection prevention and control in the healthcare environment. Students will learn about legal mandates and the major regulatory agencies, organizations, and professional standards for infection prevention and control within healthcare facilities. A college-level biology and/or microbiology class is highly recommended.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 656 Surveillance of Healthcare Associated Infections 3.0 Credits**

This course will cover surveillance for healthcare associated infections (HAIs), including use of standardized definitions, public health reporting requirements for HAIs, and tracking and monitoring infections in healthcare to prevent and respond to nosocomial outbreaks. Important concepts include the use and evaluation of electronic surveillance tools, standardized definitions established by the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) and the development, use, and evaluation of surveillance plans. Students will learn about how to define, monitor, and report infection data as well as data analysis tools used to compare healthcare data both for internal and external benchmarking and performance metrics.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 651 [Min Grade: C] and EOH 655 [Min Grade: C]

**EOH 657 Public Health Impacts of Global Climate Change 3.0 Credits**

This course will provide an overview of the public health impacts of a changing global climate. The course will briefly review the scientific basis of observed and projected changes in the climate system. Then the course will survey the direct and indirect impacts of climate change on human health and adaptation strategies to reduce these impacts, including those due to heat waves, floods and storms, infectious agents and disease vectors, air pollutants, the food supply, occupational health, and population displacement and conflict. There will be particular attention to vulnerable populations and differences in projected health impacts among populations.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 658 Crisis and Risk Communication in Public Health 3.0 Credits**

Students will learn to create effective risk communication messages that are both theoretically grounded and based upon key lessons learned from the field of public health preparedness. Using a case study approach, and with an emphasis on developing skills including message design and evaluation, this course aims to give students an applied experience that will serve as a foundation for a career in public health or health communication.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 665 Quantitative Risk Analysis for Environmental Health 3.0 Credits**

This course will provide an overview of the fundamentals of risk analysis for environmental health. Students will develop a critical understanding of the steps for quantitative assessment of risk (dose-response assessment, exposure assessment, and risk characterization) through a series of examples and applied problems. Methods for risk analysis will be taught, including use of software tools. The course will emphasize identification of data sources for use in risk calculations and interpretation of risk analysis results, including robust discussion of the variability and uncertainties. Students will examine how quantitative assessment of risk can inform regulation for protection of human health from environmental hazards. Completion of a college-level statistics course with a minimum grade of C is required.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 695 Applied Human Health Risk Assessment 3.0 Credits**

Students work independently to apply risk assessment concepts to a problem approved by the course instructor. Application may involve literature review, quantitative evaluation, or development of methodology for any of the principal steps of human health risk assessment (hazard identification, dose-response assessment, exposure assessment, risk characterization).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 605 [Min Grade: B-] and (EOH 665 [Min Grade: B-] or ENVE 727 [Min Grade: B-])

**EOH 698 Infection Prevention and Control Capstone I 1.5 Credit**

The Capstone Project comprises the culminating experience for MS students in Infection Prevention and Control. Students engage in a project that emphasizes practical applications of concepts and skill development. The Capstone is organized as a 3-credit project over two quarters. Students will engage in discussion and peer-mentoring, providing feedback and support to their peers via an online classroom experience. In the first course of the two-course sequence, students will work on project development and design.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 699 Infection Prevention and Control Capstone II 1.5 Credit**

The Capstone Project comprises the culminating experience for MS students in Infection Prevention and Control. Students engage in a project that emphasizes practical applications of concepts and skill development. The Capstone will require students to synthesize and apply concepts related to infection control and prevention in either a healthcare or other selected setting. Students will engage in discussion and peer-mentoring, providing feedback and support to their peers via an online classroom experience. Students will conduct and complete a project demonstrating mastery of the program's competencies. Students are required to complete a high-quality written product and presentation at the end of this course.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 710 Advanced Methods in GIS for Public Health 3.0 Credits**

This course will familiarize students with the applications of Geographic Information Systems (GIS) to understand how the places that people live, work and play either add to or detract from health. Methods to assess the relationship between aspects of our environments (e.g. housing, transportation, food/nutrition, crime, chemical pollution, parks, and vegetation) and health in Philadelphia and beyond will be discussed. Students will learn through a multidisciplinary approach drawing from public health, geography, epidemiology, planning, medicine, and the social sciences.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HMP 703 [Min Grade: B] or ENVS 708 [Min Grade: B] or URBS 630 [Min Grade: B]

**EOH 725 Seminar in Environmental Epidemiology 3.0 Credits**

This course is aimed at graduate students undertaking independent research in preparation for thesis defense or to aid in completion of the Integrated Learning Experience (ILE) requirement of MPH degrees. Topics may include research methodologies; research ethics; the results of research and issues in specific areas relevant to students' research. Emphasis will be placed on engaging with current literature in occupational and environmental epidemiology and exposure assessment.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 625 [Min Grade: B+] or EPI 560 [Min Grade: B+]

**EOH 750 Integrative Learning Experience: Environmental and Occupational Health I 3.0 Credits**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year MPH students majoring in Environmental and Occupational Health (EOH). Organized as a 6-credit project over two quarters in year two, students engage in an in-depth research project or project-based internship that emphasizes practical applications of concepts and skill development. Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product and presentation at the end of the experience. This is the first course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 751 Integrative Learning Experience: Environmental and Occupational Health II 3.0 Credits**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year MPH students majoring in Environmental and Occupational Health (EOH). Organized as a 6-credit project over two quarters in year two, students engage in an in-depth research project or project-based internship that emphasizes practical applications of concepts and skill development. Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product and presentation at the end of the experience. This is the second course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 750 [Min Grade: C]

**EOH 752 Urban Health Integrative Learning Experience Capstone 3.0 Credits**

The Integrative Learning Experience (ILE) comprises the culminating experience for MPH students majoring in Urban Health. Students engage in a project that emphasizes practical applications of concepts and skill development. Students will engage in discussion and peer mentoring throughout the course providing support and feedback to their peers via an online classroom. Students are required to complete a high-quality written product and presentation at the end of the experience.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 799 Master of Science Thesis Research in Environmental and Occupational Health Sciences 3.0 Credits**

Directed guidance of thesis research, preparation for presenting thesis research to colleagues at a seminar, and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 3 times for 12 credits

**EOH 800 Professional Development 3.0 Credits**

This course is a professional development seminar for doctoral students and candidates in the environmental and occupational health program. Students will develop the presentation and professional skills necessary to enter the academic and professional job market.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 805 Evidence Evaluation for Identification of Environmental Hazards 3.0 Credits**

The hazard identification step of environmental risk assessment is meant to answer the question, "Is exposure X a cause of human health outcome Y?" Answering this question involves evaluation of a body of research, often including conflicting results. In this course, students will discuss and practice evidence evaluation, using different types of evidence (human epidemiology, animal experiments, mechanistic data), and various methods for evidence synthesis (systematic review, meta-analysis) and evaluation (e.g., risk-of-bias tools). Determination of an overall weight-of-evidence for a particular hazard will also be discussed. Through case studies, students will consider strengths and limitations of evidence, the types of biases that may be present, and how differences in interpretation may occur.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 810 Environmental and Occupational Toxicology 3.0 Credits**

This course will focus on the applications of environmental and occupational health (EOH) and toxicology, along with the necessary fundamentals of toxicology as a science. Major classes of toxicants and the relevant physiology of toxicity will be covered. Students will learn the challenges and opportunities in toxicology and how toxicology interacts with other disciplines at the population and individual level. Traditional topics and approaches to EOH (water and air quality, occupational health, industrial hygiene and injury prevention) will be integrated with toxicological approaches.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 812 Environmental Exposure Science 3.0 Credits**

This course provides students with an overview of methods for measuring and evaluating both chemical and non-chemical environmental exposures. Particular emphasis will be placed on exposure assessment methods applicable to environmental epidemiology studies. Students become familiar with exposure science study design and commonly-used methods for monitoring and modeling pollution exposures in environmental settings, through participation in classroom exercises, lectures, and group work.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 815 Environmental and Occupational Health Policy 3.0 Credits**

This course provides an overview of the origins and development of environmental and occupational health policies, primarily in the United States. It utilizes an evidenced-based framework to assess the effectiveness of these policies within a context of a political climate towards public health. There is a focus on the role of economics, legal/regulatory processes, and ethical issues. Cross-cultural and international differences will be explored.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 825 Occupational and Environmental Epidemiology 3.0 Credits**

Students will develop an understanding of occupational and environmental epidemiologic methods. Particular emphasis will be placed on the critical analysis of published occupational epidemiologic studies. Students will gain an understanding of the most appropriate methods for assessing exposure/disease relationships for several occupational and environmental exposures and diseases.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and BST 571 [Min Grade: B]

**EOH 830 Seminar in Environmental Epidemiology 3.0 Credits**

This course is aimed at graduate students undertaking independent research in preparation for thesis defense or to aid in completion of the Integrated Learning Experience (ILE) requirement of MPH degrees. Topics may include research methodologies; research ethics; the results of research and issues in specific areas relevant to students' research. Emphasis will be placed on engaging with current literature in occupational and environmental epidemiology and exposure assessment.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EOH 625 [Min Grade: B+] or EPI 560 [Min Grade: B+] or EOH 825 [Min Grade: B+]

**EOH 835 Occupational Health Psychology 3.0 Credits**

The course examines psychosocial factors in the workplace that affect health and productivity. The goal of the course is to explore the impact of workplace social, psychological and organizational stressors on productivity, physical and psychological health. And also, how work stressors can be ameliorated through workplace redesign alternatives and other social policy interventions. Specific focus will be on psychosocial stressors, organizational climate and culture, contextual factors, measurement methodologies, research methods and interventions in Occupational Health Psychology.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EOH 997 Dissertation Guidance in Environmental and Occupational Health 1.0-9.0 Credit**

Directed guidance of dissertation research. Guidance will include preparation for presenting dissertation research and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EOH T580 Special Topics in Environmental & Occupational Health 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EOH T680 Special Topics in Environmental & Occupational Health 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit



**EOH T780 Special Topics in Environmental & Occupational Health  
0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EOH T880 Special Topics in Environmental & Occupational Health  
0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EOH T980 Special Topics in Environmental & Occupational Health  
0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

## Environmental Engineering

### Courses

**ENVE 516 Fundamentals of Environmental Biotechnology 3.0 Credits**

This is an introductory course in environmental biotechnology for upper-level undergraduates and graduate students in engineering. The fundamentals of microbiology and molecular biology important to environmental engineering applications will be emphasized.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 529 Environmental Noise 3.0 Credits**

Covers the fundamentals of acoustic propagation, instrumentation, noise descriptors, hearing damage and other health effects, occupational noise, noise abatement techniques, modeling the noise near highways and airports, and EPA strategy for reducing environmental noise exposure.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 534 Industrial Ventilation 3.0 Credits**

Covers principles of air movement related to ventilation and air-conditioning facilities for the maintenance of suitable environmental conditions in work areas. Includes principles of industrial processes and air pollution abatement equipment, including air flow, ducts, fans, motors, and hoods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 535 Industrial Safety 3.0 Credits**

Examines the impact of accidents, liability considerations, legislation and regulation of safety, osha codes and standards, hazards and their analysis and control, risk assessment, major types of accidents and their impacts, and accident investigation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 546 Solid Waste Systems 3.0 Credits**

Analyzes the public health, economic, and political aspects in the operation and design of storage, collection, and disposal of solid waste materials.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 550 Recycling of Materials 3.0 Credits**

This course will examine the selection criteria for recycling component materials. Recycling involves both reusing materials for energy applications and reprocessing materials into new products.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 555 Geographic Information Systems 3.0 Credits**

The course provides grounding in fundamental principles of GIS, and achieves understanding through hands on practical laboratories. Course topics include: spatial reference systems, geographic data theory and structures, spatial analysis tools, functions and algorithms, GIS data sources, compilation and quality, and GIS project design and planning.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 560 Fundamentals of Air Pollution Control 3.0 Credits**

Fundamental topics with regard to the formation and control of air pollutants are studied. This course provides strong foundation for engineers who will be involved in the development of engineering solutions for industrial air pollution prevention and design, development or selection of air pollution control devices and systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 570 Industrial Ecology 3.0 Credits**

Industrial Ecology (IE) is an evolving view of industrial operations which seeks to design processes and manufacture products in such a way to minimize and optimize their environmental interactions. IE borrows the analogy from nature that "waste" from one organism is "food" for another. Within the "technosphere", the organization in which economic processes and activities are conducted by humans, IE uses the evolving tools life cycle assessment (LCA), material flow analysis (MFA), and economic valuation, to explore novel approaches to minimizing waste stocks and flows at both micro and macro levels.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIVE 240 [Min Grade: B-] and ENVE 300 [Min Grade: B-]

**ENVE 571 Environmental Life Cycle Assessment 3.0 Credits**

This course provides graduate engineering students with an enhanced skill set to permit them to cooperate more fully in the sustainable design and planning of engineering systems. Students will be introduced to the systems analysis modeling approaches life cycle assessment (LCA) and material flow analysis (MFA), and will explore research-oriented aspects of the methods and their application in engineering design, decisions, and public policy.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 300 [Min Grade: B-] and CIVE 240 [Min Grade: B-]

**ENVE 602 Water Quality Control Lab 3.0 Credits**

Introduces analytical procedures in the assessment of water quality as applied to the analysis of natural waters and wastewaters, and to the control of water and waste treatment processes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C]

**ENVE 603 Hazardous Waste Analysis Lab 3.0 Credits**

Introduces methods of sampling and analysis of hazardous environmental pollutants. Emphasizes inorganic and organic pollutants found at hazardous waste disposal sites. Includes application of leachability and extraction tests.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C]

**ENVE 604 Solid Waste Analysis 3.0 Credits**

Uses chemical and physical techniques to analyze the composition of solid waste material. Emphasizes combustible, organic, and toxic fractions of solid wastes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C]

**ENVE 607 Environmental Systems Analysis 3.0 Credits**

Surveys system concepts, theories, and analytical techniques, and their application to urban and environmental problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 642 Control of Gas and Vapor Pollutants From Industrial and Mobile Sources 3.0 Credits**

In this course, students will learn how different physical and chemical mechanisms can be used to prevent, separate, recover or destroy the gas/vapor air pollutants. The control mechanisms are studied in detail. Students then learn how to apply those mechanisms in the design of conventional, or new, devices and systems for control of gas/vapor air pollutants.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD or Senior.

**Prerequisites:** ENVE 460 [Min Grade: D]

**ENVE 644 Design of Particulate Control Devices 3.0 Credits**

Students will learn how different mechanisms can control characteristics, formation, transport, separation and destruction of airborne particulate pollutants. Students learn how to apply the studied material in the first part of this course to design conventional or new devices and systems for control of particulate air pollutants.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 460 [Min Grade: D]

**ENVE 646 Advanced Solid Waste Systems 3.0 Credits**

Introduces and analyzes the newest advances in solid waste technology, with an emphasis on design, treatment, and processing techniques.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C] and ENVR 546 [Min Grade: C] and ENVR 636 [Min Grade: C]

**ENVE 657 Incineration 3.0 Credits**

Covers destruction of solid and liquid hazardous wastes at high temperature in a combustion device, including requirements for destruction of toxic materials and control of discharges to the atmosphere.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C]

**ENVE 660 Chemical Kinetics in Environmental Engineering 3.0 Credits**

Covers chemical and biological kinetics, mass-transfer considerations and hydraulic regimes in water and wastewater treatment, and water quality management. Includes absorption and stripping of gases and volatile organics and applications to aeration and ozonation processes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 661 Env Engr Op-Chem & Phys 0.0-3.0 Credits**

Provides a theoretical study of the chemical and physical unit operations of environmental engineering, including sedimentation, coagulation, precipitation, adsorption, oxidation-reduction, ion exchange, disinfection, membrane processes, and filtration.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 660 [Min Grade: C]

**ENVE 662 Enviro Engr Unit Oper-Bio 3.0 Credits**

Provides a systematic study of the microbiological and biochemical processes for the treatment of aqueous and solid wastes, including aerobic and anaerobic processes and composting.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 660 [Min Grade: C]

**ENVE 665 Hazardous Waste & Groundwater Treatment 3.0 Credits**

Covers principles of hazardous waste and groundwater treatment and in situ technologies. Presents application of processes, including solvent extraction, steam and air stripping, adsorption, ion exchange, oxidation, dechlorination, stabilization, wet air and supercritical oxidation, incineration, soil washing, and soil vapor extraction.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 660 [Min Grade: C]

**ENVE 681 Analytical and Numerical Techniques in Hydrology 3.0 Credits**

This course provides an introduction to some of the analytical and numerical methods that are widely used to solve problems in hydrology, including translating physical processes into partial differential equations and solving these problems using both analytical and numerical solution methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 200 [Min Grade: D] and ENGR 232 [Min Grade: D]

**ENVE 682 Subsurface Contaminant Transport 3.0 Credits**

This course covers principles governing contaminant movement in aquifers. It includes advection, dispersion, reactive transport, microbial and colloidal transport, matrix diffusion, density-coupled transport, and multiphase flow. It also emphasizes field-scale applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 681 [Min Grade: C]

**ENVE 683 Stochastic Subsurface Hydrology 3.0 Credits**

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVE 682 [Min Grade: C]

**ENVE 684 Water Resource Systems Analysis 3.0 Credits**

This course covers mathematical optimization techniques as applied to water resource systems. Example applications include water supply management, irrigation planning and operation, water quality management and ground water management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 702 Adv Enviro Instrumentatn 0.0-3.0 Credits**

Uses instrumental analysis to assess environmental quality.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 602 [Min Grade: C] and ENVR 604 [Min Grade: C]

**ENVE 726 Environmental Assessment 3.0 Credits**

Examines the National Environmental Policy Act of 1969 and its implementation according to the regulations of the Council on Environmental Quality. Discusses air, water, noise, biological, cultural, and socioeconomic impacts. Includes methods of impact analysis and means to compare alternative actions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 727 Risk Assessment 3.0 Credits**

Covers quantitative relations between environmental exposures and effects. Includes computer methods for risk analysis and development of environmental guidelines and standards.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ENVE 750 Data-based Engineering Modeling 3.0 Credits**

This course covers empirical methods to understand and model engineering systems. Students will learn to develop evaluate statistical models and use three common statistical software packages, Excel, SPSS, and R.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman or Junior or Pre-Junior or Sophomore

**ENVE 761 Enviro Engr Unit Oper Lab 0.0-3.0 Credits**

Covers application of unit operations including filtration, adsorption, oxidation, coagulation, and biodegradation to the treatment of potable water, wastewater, and hazardous waste.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 661 [Min Grade: C] and ENVR 662 [Min Grade: C]

**ENVE 766 Waste Wtr Treat Plant Des 3.0 Credits**

Covers application of principles of environmental engineering unit operations to the treatment of municipal, industrial, and hazardous wastes by biological, physical, and chemical means. Includes applications of computers to the design process.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 662 [Min Grade: C] and ENVR 751 [Min Grade: C]

**ENVE 767 Surface Water Mixing Processes 3.0 Credits**

This course covers the hydrodynamic mixing and transport processes in free-surface flows. Basic mixing processes including molecular diffusion, turbulent diffusion and dispersion are also covered. Emphasis will be on the solution of the advection-diffusion equation with various boundary conditions. Additional topics include boundary exchanges, non-ideal mixing in rivers, and analysis of jets and plumes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIVE or major is ENVE.

**Prerequisites:** CIVE 664 [Min Grade: C]

**ENVE 768 Sediment & Contamin Trnsport 3.0 Credits**

This course covers the transport of sediments and reactive solutes in surface waters as well as the classic theory for bed-load and suspended sediment transport. The interplay of stream flow, frictional resistance, and sediment transport is also covered. The biogeochemical processes that influence contaminant mobility and the integration of physical and chemical processes in contaminant transport models are also discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIVE or major is ENVE.

**Prerequisites:** CIVE 767 [Min Grade: C] or ENVE 767 [Min Grade: C]

**ENVE I599 Independent Study in ENVE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE I699 Independent Study in ENVE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE I799 Independent Study in ENVE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE I899 Independent Study in ENVE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE I999 Independent Study in ENVE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE T580 Special Topics in ENVE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE T680 Special Topics in ENVE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE T780 Special Topics in ENVE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE T880 Special Topics in ENVE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ENVE T980 Special Topics in ENVE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Environmental Policy

## Courses

**ENVP 522 Environmental Law 3.0 Credits**

Examines administrative law applicable to the management of environmental programs, including constitutional constraints on the responsibilities of administrators and major court decisions on environmental issues. Covers due process, inspection, citizen actions, evidence and other matters.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVP 552 Political Economy of Climate Change 3.0 Credits**

Climate change is one of the most debated issues in recent decades. It is increasingly accepted that climate change is one of the major threats for the stability and development of human society. Without going into the depths of geoscience and historical climatology, this course analyzes the evidence of climate change, the causes of it, the politics of controversies about climate change, and the proposals to deal with it.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVP 555 Cities and Climate Change 3.0 Credits**

Climate change poses a host of challenges for American cities, ranging from what trees to plant, to increases in heat-related deaths, to critical infrastructure protection in the face of increasingly severe weather events. And it is an open question as to whether American city governments have the organizational capacity, resources, and political will, to engage in the type of long-term planning that climate change will require. What are the most likely effects that climate change will have on different American cities? What should American cities be doing, and what have American cities done so far, to prepare themselves for climate change? What responsibilities do cities have to try to mitigate the causes of climate change? What factors likely determine American cities' responses to climate change?.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVP 572 Environmental Policy 3.0 Credits**

This interdisciplinary seminar investigates how interests and ideas interact in environmental policymaking. Students will explore how conceptual and political innovations play out across several environmental issues, including wildlife management, energy development, and the regulation of environmental risks.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit



**ENVP 575 Environmental Justice 3.0 Credits**

This seminar course provides an introduction to Environmental Justice. At the end of this course, students should be able to demonstrate their understanding of the concept of environmental justice/injustice; methods of environmental justice research; environmental health issues, including the latest scientific advances, and critiques of environmental epidemiology and knowledge gaps; theories of the development of environmental injustice; an overview of the deficiencies of the regulatory and legal remedies for environmental justice in the U.S.; the unequal impact disasters; the neoliberal global economy as a source for environmental injustice; and emerging issues currently addressed by social movements for environmental justice.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

## Environmental Science

### Courses

**ENVS 501 Chemistry of the Environment 3.0 Credits**

Covers principles of physical and organic chemistry applicable to the study and evaluation of environmental conditions, especially the pollution of air, water, and soil (including chemical changes and reactions in the environment).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 506 Biostatistics 3.0 Credits**

Covers measures of biostatistics, including central value and dispersion, sampling and distribution, statistical inference, analysis of variance, regression and correlation, and time series. Emphasizes application.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 511 Evolutionary Ecology 3.0 Credits**

Studies the basic principles of evolution and ecology, including natural selection, the ecological niche ecological succession, and the food web, and effects of human activities on ecosystems. Views humans as a species.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 512 Systematic Biology 3.0 Credits**

This course is an introduction to systematic biology, the science of discovering, describing and classifying organisms to construct a reference system for life on earth. Topics include concepts of species and higher taxa; sources and application of evidence for inferring phylogenetic relationships, including nucleotide sequences, morphology and fossils; characters, homology and parsimony; phylogenetic tree construction and classification; overview of nomenclature and taxonomy; and using phylogenies to discover pattern and process in evolutionary and comparative biology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 515 Plant Animal Interaction 3.0 Credits**

Plant-animal interactions provide us with some of the most remarkable examples of adaptation and co-evolution. They are also key determinants of ecosystem functions. This course will provide a survey of the diversity of plant-animal interactions, the multidisciplinary approaches used to understand their ecology and evolution, and their importance to ecosystem services that sustain human societies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 522 Tropical Ecology 3.0 Credits**

Covers the ecology of tropical forests, including biogeography, history, current processes, and effects of economic developments of rain forest and dry forest of the Old and New World tropics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 523 Tropical Field Studies 3.0 Credits**

This is a study abroad course focusing on the ecology of tropical forest ecosystems. We will visit and compare forest ecosystems in several ecological life zones. The course will combine lectures, natural history surveys, faculty-led field research problems, and learning experiences with local residents to explore the biological diversity and function of tropical forests, including the effects of human impacts. Some background in Biology or Ecology is useful.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 526 Molecular Ecology 3.0 Credits**

Through a combination of lecture, discussion, and computational exercises, students will learn how molecular tools have been used to study genetic variation. They will then learn how these studies have provided answers to previously unanswered questions in fields including ecology, evolution, behavior, conservation, and forensics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 527 Molecular Ecology Lab 2.0 Credits**

Through a combination of laboratory and computational exercises, students will develop a toolkit for applied molecular studies of ecology and evolution. The course will focus on initiating or continuing a novel research project relating to one of several topics within the field of molecular ecology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 528 Conservation Biology 3.0 Credits**

This course will detail the loss of biodiversity and explore related issues, including the theories and practices of conservation biology and the solutions currently being formulated to enhance the preservation of species on our planet. The course will explore potential limitations to these strategies and provide an appreciation of the relevance of ethics, economics and politics to biodiversity conservation while promoting the potential for individual action to influence conservation efforts.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 530 Aquatic Ecology 3.0 Credits**

Studies the relationships between aquatic plants and animals and their environment. Introduces the study of the ecology of lakes, rivers, ponds, and streams.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 533 Wetland Ecology 3.0 Credits**

Examination of the structure, function, and dynamics of wetland ecosystems. Topics include geomorphology, hydrology, biogeochemistry, plant and animal adaptations to wetland environments, and wetland policy.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 535 Aquatic Insects and Water Quality 3.0 Credits**

Healthy water quality has always been an essential part of human survival and culture. This course outlines the importance of using aquatic macroinvertebrates (principally insects) for assessing water quality and its wide use by government, consulting businesses and citizen groups. Nearly 90 groups of aquatic macroinvertebrates used in stream assessment and in sampling will be identified.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 538 Biodiversity 3.0 Credits**

This course explores major patterns of biodiversity that biologists have documented across the planet. The course begins with an overview of major types of biodiversity, focusing on species diversity, and methods for measuring and analyzing biodiversity. Next it explores major patterns of biodiversity that are fundamental to ecology and conservation, and theories for the causes of biodiversity patterns.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 552 Ornithology 3.0 Credits**

Birds are among the most ubiquitous, diverse, and charismatic animals and we know a great deal about their biology. This course aims to teach students who are enthusiastic about natural history about the biology of birds and covers a variety of topics including evolution, ecology, behavior, conservation, and diversity of birds and uses the world renowned specimen collections housed in the Academy of Natural Sciences of Drexel University.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 553 Field Ornithology Lab 2.0 Credits**

The Delaware Valley is the cradle of North American Ornithology. This course aims to give students a hands-on lab and field experience in identifying birds found in the Delaware Valley. Half of the classes are held outside at local parks and refuges and the remainder are in the lab where students will study specimens from the world renowned collections housed at the Academy of Natural Sciences of Drexel University.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 554 Ichthyology 3.0 Credits**

This course will explore fish and the link between their diversity in form and ecological function. This combined lecture-lab course will cover the basic systematics, evolutionary relationships, biogeography, structure, physiology, life history, and ecology of fishes and lampreys.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 555 Biogeography 3.0 Credits**

This course is a survey of the field of Biogeography, the study of biological diversity across space and time. Factors and evolutionary history that influence both the ecology and evolution of organismal diversity will be covered. Topics will range from how species distributions arise to how we define species and how we reconstruct the influence and importance of both ecology and evolutionary history on their distributions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 562 Urban Ecology 3.0 Credits**

This course seeks to understand urban areas as meaningful ecological and socio-ecological systems. This acknowledges that humans are biological organisms that are not only members of ecological communities, but also organisms that are unique in their ability to alter and influence the nature of their interactions with the environment. This course examines the study of ecology in urban landscapes, as well as how organisms respond to and influence the abiotic and biotic nature of urban areas.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 564 Animal Behavior 3.0 Credits**

The mechanisms, ecology and evolution of the activities of animals in relation to their natural environment. Topics include development and control (neutral and hormonal) of behavior, adaptations for survival, feeding, and predator avoidance, strategies of habitat selection, communication, reproduction, and social behavior.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 572 Environmental Assessment 3.0 Credits**

This course will introduce students to the types of ecological and environmental assessments commonly used to predict and determine environmental impacts. The importance of environmental regulation as it relates to the design, implementation, analysis and interpretation of environmental studies will be discussed. Content topics include environmental assessment of water, soil, and vegetation, as well as considerations that must be accounted for in preparing environmental assessments and analyses including land use, scale, economic factors, public health, and historic & archeological resources.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 576 Environmental and Ecological Remediation 3.0 Credits**

Many sites have been contaminated by past activities, including both intentional and accidental releases of chemicals and toxic wastes. As such, these sites are generally assessed and characterized for risk and health hazards of contaminants to both humans and the environment. This course examines legislative/regulatory mechanisms and strategies for the 'clean-up' and remediation of sites for future safe utilization (e.g. brownfields).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 582 Field Botany of the New Jersey Pine Barrens 4.0 Credits**

This course focuses on plant identification skills that are necessary to conduct scientific botanical surveys. The vascular flora of the New Jersey Pine Barrens, including rare plant species, is emphasized with special reference to habitat and community analyses. Non-vascular species are examined but not emphasized.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 5 credits

**Prerequisites:** ENVR 511 [Min Grade: C] or ENVS 511 [Min Grade: C]

**ENVS 583 Ecology of the New Jersey Pine Barrens 4.0 Credits**

Course focuses on the ecology of the New Jersey Pine Barrens. Students learn field survey methods, identify index species (flora and fauna), perform community analyses, and use equipment for measuring abiotic variables (soil and water). Field exercises focus on key aspects of the regional ecology: fire, soil and water.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVS 511 [Min Grade: C] or ENVR 511 [Min Grade: C]

**ENVS 585 Systems Ecology 3.0 Credits**

Systems Ecology will provide the tools to integrate and synthesize disciplines of sciences to understand the development, disruption, and dynamics of ecosystems. Students will learn general systems theory about how elements of an ecosystem interact with other parts of the system and how exogenous or external variables drive ecosystem processes. The course will show how to combine field data with simple mathematics in step by step calculations to describe, study, and emulate complex systems.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 587 Restoration Ecology 3.0 Credits**

Ecological restoration is an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity or sustainability. Using a combination of lectures, readings, field trips, and project work, this course covers conceptual and theoretical foundations that underlie restoration efforts, and link these to the real-world application of principles used in past and ongoing restoration projects.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 588 Marine Field Methods 4.0 Credits**

Course focus is on the ecology of local marine environments. Students learn marine field survey methods, identification of marine organisms, habitat analyses, and use of equipment for measuring abiotic variables. Students sample fish, plankton and invertebrate species aboard the 25 foot Drexel research vessel, Peter Kilham.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVS 511 [Min Grade: C] or ENVR 511 [Min Grade: C]

**ENVS 590 Marine Ecology 3.0 Credits**

This course studies major processes in the marine environment, especially relationships between organisms and the factors that influence their abundance.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 591 Freshwater and Marine Algae 3.0 Credits**

Origin and evolution of various algal groups, principles and methods of algal systematics, algal ecology, and use of algae as environmental indicators. Field trips to local streams, ponds and wetlands where students will collect algal samples and record environmental data. Lab work will include sample processing and algal identification.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 593 Entomology 3.0 Credits**

This course introduces students to some of the major topics in the field of entomology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 594 Entomology Lab 2.0 Credits**

This course introduces students to some of the major practical topics in the field of entomology. The course consists of lab work, collecting trips, and creation of an insect collection.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 601 Advanced Environmental Chemistry 3.0 Credits**

Covers thermodynamic and kinetic principles and their application to the study of chemical changes and reactions in the water or air environments.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVR 501 [Min Grade: C] or ENVS 501 [Min Grade: C]

**ENVS 605 Atmospheric Chemistry 3.0 Credits**

Introduces the principles of atmospheric physics and photochemical kinetics as a prelude to understanding the atmospheric chemical system. Examines the chemistry of the natural atmosphere to prepare for the understanding of how pollutants interact with natural species. Considers pollution of the stratosphere and the troposphere.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 609 Environmental Surveying and GIS 3.0 Credits**

This course is a field intensive course that gives students hands on training on state-of-the-art surveying gear. Students will learn the principals of surveying used by field ecologists or geoscientists, including types of surveying gear, how to use it in the field, and how to analyze collected data.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 610 Physiological Ecology 3.0 Credits**

Examines mechanisms by which physiological factors affect and limit the distribution and abundance of animals, including physiological and behavioral thermoregulation, heat and cold tolerance, acclimation, metabolism, osmoregulation and dehydration tolerance, feeding strategies, digestion and feeding patterns, energy and water budgets, toxins and optimality theory.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 612 Biophysical Ecology 3.0 Credits**

Covers energy balances and methods of heat transfer in organisms, including convection, conduction, radiation, evaporation, and metabolism and steady-state and transient energy balances, including mass balances, water uptake and evaporation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 615 Advanced Environmental GIS 3.0 Credits**

This course is structured to build upon techniques and skills learned in an introductory level GIS class. This advanced course is technically oriented and will introduce high-level geospatial analyses in an environmental science context. Provides instruction and theory of geospatial modeling, mapping, and future trends.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ENVS 708 [Min Grade: D] or ENVE 555 [Min Grade: D]

**ENVS 617 Stream Assessment 3.0 Credits**

Most stream and river ecosystems are stressed by human activities, and aquatic ecologists are frequently called upon to assess problems, make scientific evaluations and provide management recommendations. A main goal of this course is to provide problem-solving experiences in stream assessment based on example real-world environmental questions. The assessments will provide students opportunities to address issues they may face as ecologists, engineers, managers and policy makers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 618 Coastal Biogeochemistry 3.0 Credits**

This course covers fundamental biogeochemical and ecological concepts necessary to critically examine influential and current relevant literature. Topics include eutrophication, hypoxia, ocean acidification, climate change, and greenhouse gas exchange in nearshore coastal waters such as estuaries, coastal rivers and watersheds, mangroves, seagrasses, salt marshes, wetlands, mud and sand flats, and coral reefs. Analytical tools such as stable isotopes, ecosystem models, and process measurements will be used.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 670 Advanced Topics in Evolution 3.0 Credits**

Discusses and evaluates selected topics such as population and quantitative genetics, genomics in evolutionary analysis, fitness concepts and modes of selection, species concepts and modes of speciation, evolution of development and complex adaptations, biological diversification over space and time, adaptive radiation and extinction, historical biogeography. Topics for each term will be selected based on current research and interest.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 708 Environmental GIS 3.0 Credits**

This introductory course is technically oriented and will provide a foundational understanding of GIS in an environmental context. Covers GIS principles and practices and applies spatial investigation procedures to analyze geographic data, including mapping and computer systems, attribute and spatial data models, data organization in GIS, GIS data analysis, and future trends for this technology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 797 Research 0.0-20.0 Credits**

Requires actual formulation and investigation of a research problem and a written report.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 864 Graduate Research Seminar 1.5 Credit**

The BEES Graduate Research Seminar is a weekly series of scientific presentations by faculty, graduate students and outside speakers. The seminars are opportunities for learning about and discussing ongoing research in the Department and current issues in biodiversity, earth and environmental science.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 891 Research Methods I 3.0 Credits**

Introduces research methods and literature, procedures for the collection and analysis of data, and preparation of technical papers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS 898 Master's Thesis 0.0-20.0 Credits**

Master's thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 998 Ph.D. Dissertation 0.0-20.0 Credits**

Requires each student working on a dissertation to file a written report each term with his or her supervisory committee and the program graduate advisor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS I599 Independent Study in ENVS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit



**ENVS 1699 Independent Study in ENVS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 1799 Independent Study in ENVS 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 1899 Independent Study in ENVS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS 1999 Independent Study in ENVS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS T580 Special Topics in Environmental Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS T680 Special Topics in Environmental Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS T780 Special Topics in Environmental Science 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**ENVS T880 Special Topics in Environmental Science 0.0-9.0 Credits**

Covers topics of current interest to faculty and students. Specific topics for each term are announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**ENVS T980 Special Topics in Environmental Science 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

# Epidemiology

## Courses

**EPI 550 Applied Survey Research in Epidemiology 3.0 Credits**

This course addresses theoretical and practical aspects of conducting survey research in human populations. We will discuss various types of self-report data, including questions to assess knowledge, attitudes, behaviors, and perceived health and well-being. Design issues include wording of items and response scales, sampling, and respondent and staff burden. Implementation issues include methods of administration, interviewer training, and participant recruitment. Analysis issues include data processing, psychometric measurement (scaling, reliability), missing data, and basic descriptive statistics. Interpretive issues include guidelines for reports and manuscripts. The primary focuses of this course are observational study designs using probability and non-probability sampling.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 551 Epidemiology of Cancer 3.0 Credits**

This course will provide students with training in the methods and topics specific to the epidemiology of cancer. Students will learn about cancer surveillance, etiologic studies, therapy trials, and prevention/screening studies of cancer.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 552 Epidemiology for Public Health Practice 3.0 Credits**

This course is designed to provide an overview of qualitative and quantitative epidemiology in public health practice, with an emphasis on the practical application of analytic epidemiology methods in public health and primary healthcare. The course covers a variety of topics, including national and global public health surveillance systems, disease mapping, and data analysis techniques for large-scale population-based study with complex survey designs, outcomes research, and introduction to Epi Info software. The class will engage the students in an active and collaborative learning environment through individual projects, team projects and a variety of in-class discussion and exercises.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 553 Infectious Disease Epidemiology 3.0 Credits**

Course will provide training in the methods specific to infectious disease epidemiology within the context of the study of several major classes of infectious diseases with global impact on public health. Students will learn about population-level data sources and surveillance methods and techniques in outbreak investigations.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 555 Vaccine Design, Testing, & Implementation 3.0 Credits**

The emergence of new pathogens, decreased uptake of vaccines in some populations, and increased transmission opportunities caused by globalization has led to a rising prevalence of new infectious diseases as well as reemergence of older diseases. In this course, students will learn basic immunology and infectious disease epidemiological concepts important for understanding how vaccines work both at the individual and population level. Students will also learn the history of many important vaccines currently used today and some of the controversies surrounding those vaccines. Students will learn reasons for vaccine hesitancy and refusal and will then be tasked with developing strategies to overcome these barriers.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 556 Perinatal Epidemiology 3.0 Credits**

Perinatal Epidemiology provides an overview of maternal and child health during the perinatal period, from mid-pregnancy through the first month of infancy. Many perinatal outcomes, however, have processes that begin earlier in the prenatal and even preconception periods. Some of these outcomes and processes will also be discussed. The first half of the course focuses on the epidemiology of the main outcomes that affect the mother, fetus, and newborn, including methodological challenges in studying these outcomes. The second half of the course examines specific aspects of maternal and child health that have an impact on how we study and prevent adverse perinatal outcomes. Current research areas in perinatal epidemiology and future directions for research are also discussed.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-] and BST 571 [Min Grade: B-]

**EPI 557 Cardiovascular Disease Epidemiology & Prevention 3.0 Credits**

This course provides a forum for in-depth discussions of one of the main public health issues. Topics include the pathophysiology of atherosclerosis and cardiovascular disease (CVD), trends in coronary heart disease, stroke, hypertension and heart failure mortality/morbidity, well-established and emerging CVD risk factors, and major strategies for CVD prevention/control.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 558 Making Sense of Data 3.0 Credits**

The focus will be on descriptive and exploratory methods often employed in the early phase of epidemiologic analysis of complex datasets.

Students will work with datasets in class under the guidance of the instructors. Topics include: Descriptive and exploratory data analysis, graphical methods for data summarization and exploration, variable transformations, methods of assessing missing data patterns.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and (BST 555 [Min Grade: B] or EPI 564 [Min Grade: B] or BST 571 [Min Grade: B])

**EPI 559 Pharmacoepidemiology 3.0 Credits**

The aim of the course is to equip students with a basic understanding of the concepts and practice of pharmacoepidemiology. By the end of the course, students should be able to: Demonstrate an understanding of the important pharmacoepidemiological concepts and methods, and how these methods can be applied to specific drug utilization in real-life settings in specific populations; Define disease burden in terms of prevalence, incidence and potential complications associated with the use of specific medications; Examine patients' characteristics and drug utilization, and address health disparities in medications associated health outcomes; Examine patients with multiple-comorbidity, multiple drug uses and drug-disease effects on health outcomes.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 560 Intermediate Epidemiology 3.0 Credits**

This course expands on basic methods used in epidemiologic thinking and research - with a focus on observational studies of disease risk factors. Topics covered include: basic principles of causal inference, observational study designs, bias, confounding, effect modification, stratified analysis, and the epidemiologic approach to multivariable modeling. Course material assumes that students have completed introductory-level courses in biostatistics and epidemiology. Students typically have taken or are currently enrolled in Intermediate Biostatistics 1 (or equivalent). Students who have not met pre-requisites may request permission of the instructor.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 571 [Min Grade: B] and EPI 570 [Min Grade: B]

**EPI 561 Pathophysiologic Basis of Epidemiologic Research 3.0 Credits**

This course will examine the causes of many human diseases at a molecular level, paying particular attention to the role of inflammation in disease processes and examining the role of cell cycle dysregulation in the etiology of many human cancers. In order to understand the pathologic basis for disease, the course will also cover the normal structure and function of many body systems, that when compromised lead to diseases of public health importance.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B-]

**EPI 562 The Changing US HIV Epidemic and the Responses of Affected Communities 3.0 Credits**

This course is intended as a comprehensive epidemiologic overview of the evolving US HIV epidemic over time, along with parallel responses by communities affected by AIDS and artists to express their sense of loss and strength through various media. These include written word, spoken word, and visual arts including painting, photography and film. We will follow the pandemic over time, making weekly stops along the way to observe the culture and expression of loss and resiliency by specific cultures within America and throughout the world. More importantly, the HIV epidemic, as portrayed in literature and the arts, will be dovetailed with formal social epidemiologic considerations of the spread of infection and barriers to accessing healthcare/treatment.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 563 Interprofessional Collaboration for Urban Health 3.0 Credits**

This course is designed to guide public health professionals in working across disciplines, sectors, and settings. Strategies will be presented for working with leaders who transform local health systems and other determinants of health, including those from a range of clinical, policy, legal, community, engineering, and design backgrounds. Crucial to successful collaborations will be understanding fundamentals of these other professions, as well as articulating the distinct characteristics and potential contributions of public health to heterogeneous teams.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 564 Data Science Using R 3.0 Credits**

This course is designed to provide students with sufficient programming knowledge and analysis experience in R to solve data science problems that a data analyst with a master's degree in epidemiology or biostatistics might encounter in the workforce. The focus of the course is an understanding of the R computing platform with application to data analysis problems of a public health nature. The interactive classes will feature a lecture component and a laboratory component. The RStudio environment will be the interface used for all classroom discussion, and is strongly recommended.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 569 Disease Outbreak Investigations 3.0 Credits**

The emergence of new pathogens and drug resistance, as well as increased transmission opportunities caused by globalization has led to a rising prevalence of new infectious diseases as well as reemergence of older diseases and health problems due to environmental toxins. This course will focus on the surveillance, identification, control, and prevention of selected infectious diseases and environmental associated disease, of Public Health importance both globally and within the United States. Specific areas that will be addressed include the causative agents, the routes of transmission, the host responses, environmental factors, unique risk factors, outbreak investigations, surveillance and strategies for control and prevention, as well as application of epidemiological methods used to control an outbreak.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 570 Introduction to Epidemiology 3.0 Credits**

Introduction to Epidemiology provides an understanding of basic concepts and methods in epidemiology needed to conduct public health research and practice. This course will cover epidemiology as a methodology for thinking about and designing research to address basic questions of interest in health and medicine and to address specific hypotheses regarding risk factors. Specifically, students will understand the science concerned with the occurrence, distribution, and causality of diseases and other health-related conditions.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 572 Design and Analysis of Epidemiological Studies 3.0 Credits**

This course will demonstrate the applicability of the goals and approaches from descriptive and analytical methods in biostatistics and epidemiology courses to real world problems. The project will provide the student with the opportunity to use methods in an area of their choice.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and BST 571 [Min Grade: B]

**EPI 573 Autism as a Public Health Challenge 3.0 Credits**

Demonstrates how to apply public health concepts to an important societal challenge that is quite distinct from those more commonly thought of as public health problems (like infectious diseases, chronic diseases, and injuries). Students will be introduced to autism spectrum disorders from a variety of perspectives and will gain skill and experience distilling and communicating information relevant to understanding and explaining the public health challenges related to autism spectrum disorders and the ways we are working toward solutions.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 610 Public Health Surveillance 3.0 Credits**

One of the most critical functions of public health practice and intervention is monitoring the health of populations. In this introductory survey course, students will be introduced to both the principles and practice of public health surveillance, as well as statistical methods for monitoring the health of populations. Topics focused on surveillance practice will include planning a surveillance system, identifying sources of health-related information, management of surveillance information systems and quality control of data, descriptive epidemiology, evaluating public health surveillance, state and local public health surveillance, and surveillance of quality in healthcare.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: B] and BST 571 [Min Grade: B]

**EPI 621 Social Epidemiology 3.0 Credits**

This course will introduce students to the field of social epidemiology. Readings and discussion will address history and theories of social epidemiology, as well as the roles of social exposures in population health and health disparities (social class and inequality, working and living environments, discrimination, social relationships and psychosocial mechanisms, social and economic policies). Challenges of causal inference in social epidemiology and methodological considerations will also be discussed.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 571 [Min Grade: B] and EPI 570 [Min Grade: B]

**EPI 633 Urban Inequality and Health: Theory, Evidence, and Action 3.0 Credits**

This course will explore dimensions of urban inequality including residential segregation, gentrification and displacement, and racialized violence and trauma in urban settings and examine the pathways linking them to health and health inequalities. These issues will be explored using an explicit anti-racist lens and will draw on literature from sociology, history, and epidemiology. Finally, the course will explore various models for action in addressing urban inequalities and the impact policies and interventions have on health and health inequalities in urban settings.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 677 Health and Design Research 3.0 Credits**

In this inter-professional course, students will explore concepts and methodologies of design, health research, and design thinking. The course is cross-listed between the disciplines of public health and design, and students will be drawn from both disciplines to examine the reciprocal relationship between health research and human centered innovation and creative thinking.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**EPI 699 Master of Science Epidemiology Project 1.0-12.0 Credit**

This course is designed to provide guidance of the MS Epidemiology project. Working with a faculty advisor, students will design and conduct an epidemiologic study that poses and tests a research question using a sufficiently robust data set. Components of the project will include data collection as necessary, data management and analysis and the preparation of a manuscript for publication or a research report that is consistent with accepted thesis and publication standards in epidemiology.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 3 times for 48 credits

**EPI 700 Advanced Epidemiology 3.0 Credits**

This course covers more advanced methodologic issues in analytic epidemiology including: in-depth discussions of cohort, case-control, and case-cohort studies, missing data and methods of single/multiple imputation, theoretical basis of and analytic methods for using intermediate endpoints/surrogate markers, repeated measures analysis, the use of DAGS, and propensity scores to mitigate confounding.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CHP or major is EOH or major is EPID and classification is PhD.

**EPI 749 Research and Practice in Epidemiology 3.0 Credits**

This course will engage students in the culminating experience required of second-year master's students in epidemiology. Students will either develop a hypothesis based on a public health problem and perform a multi-variable analysis to test the hypothesis using an appropriate dataset and describe how that addresses the public health problem or conduct a rigorous systematic literature review that both critiques and synthesizes the existing public health literature that addresses the public health problem. Students must work individually on this project and are required to complete a high-quality written product and an oral presentation at the end of the experience.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 555 [Min Grade: B] and BST 560 [Min Grade: B] and EPI 560 [Min Grade: B]

**EPI 751 Integrative Learning Experience in Epidemiology 3.0 Credits**

The Integrative Learning Experience comprises the culminating experience required of MPH students. Students will develop a hypothesis based on a public health problem and perform a multi-variable analysis to test the hypothesis using an appropriate dataset and describe how that addresses the public health problem. Students must work individually on this project and are required to complete a high-quality written product and an oral presentation at the end of the experience. With this class, the students are expected to transition from student (directed learning) to professional (self-directed learning) and should expect guidance from their faculty mentor rather than instruction.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 749 [Min Grade: B]

**EPI 801 Causal Inference in Epidemiology: Theory 3.0 Credits**

Provides an in-depth theoretical foundation on epistemology and models of disease causation in epidemiology. Students will be expected to answer the question how can we know that A causes B from diverse perspectives ranging from theoretical models, statistical conventions around identifying causation, and mitigating bias.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 560 [Min Grade: B] and BST 560 [Min Grade: B]

**EPI 803 Proposal Writing Seminar 3.0 Credits**

This course is designed to assist doctoral students in the preparation of a research proposal. The focus of the course is synthesis and application of prior coursework to the development of a feasible and informative epidemiological study. The seminars consist of student presentations of research questions, literature review, plans for collection and analysis of epidemiological data, with discussion by students and faculty. Students will prepare a research proposal for study in a human population using the form developed by the National Institutes of Health. The course also offers students opportunities to critically evaluate the adequacy and scientific merit of research protocols through on-going peer-review.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 560 [Min Grade: B] and BST 560 [Min Grade: B]



**EPI 804 Causal Inference in Epidemiology: Application 3.0 Credits**

This course is designed to provide a theoretical foundation and the practical tools necessary for addressing challenges to causal inference in epidemiological research.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 700 [Min Grade: B] and (BST 620 [Min Grade: B] or BST 820 [Min Grade: B])

**EPI 805 Advanced Topics in Epidemiologic History, Theory and Biases 3.0 Credits**

This advanced seminar is designed to offer doctoral students an opportunity to synthesize theories and methodologies in epidemiology. The emphasis will be on the combination of theoretical and methodological ideas and tools. Existing controversies in the field will be highlighted. Topics to be covered include: (a) history of epidemiology, (b) the role of theory in epidemiology, (c) philosophy of science as it pertains to epidemiology, and (d) current discussions about causal inference in epidemiology. Students will discuss hypothesis generation and testing, causal reasoning, and the interplay between theories, models and data.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is EPID and classification is PhD and program is PHD.

**EPI 806 Bias and Validity in Epidemiology 3.0 Credits**

This course is a doctoral-level seminar where students engage in discussions and debate about the concepts of bias and validity in epidemiology. The course will cover the theoretical basis of bias and confounding and its implications in practice. Students will perform quantitative bias analysis to explore its impact. The course will review the seminal as well as contemporary papers in bias and validity. Students will learn practical skills that are essential to any rigorous epidemiological investigation and can be used when applying for funding and conducting dissertation research.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 700 [Min Grade: B]

**EPI 861 Pathophysiologic Basis of Epidemiologic Research 3.0 Credits**

This course will examine the causes of many human diseases at a molecular level, paying particular attention to the role of inflammation in disease processes and examining the role of cell cycle dysregulation in the etiology of many human cancers. In order to understand the pathologic basis for disease, the course will also cover the normal structure and function of many body systems, that when compromised lead to diseases of public health importance.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**EPI 864 Data Science Using R 3.0 Credits**

This course is designed to provide students with sufficient programming knowledge and analysis experience in R to solve data science problems that a data analyst with a master's degree in epidemiology or biostatistics might encounter in the workforce. The focus of the course is an understanding of the R computing platform with application to data analysis problems of a public health nature. The interactive classes will feature a lecture component and a laboratory component. The RStudio environment will be the interface used for all classroom discussion, and is strongly recommended.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 560 [Min Grade: B]

**EPI 999 Thesis Research: Dissertation Guidance in Epidemiology 1.0-9.0 Credit**

Directed guidance of dissertation research, preparation for presenting dissertation research to colleagues at the dissertation seminar and preparation for the final defense.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EPI T580 Special Topics in Epidemiology 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EPI T680 Special Topics in Epidemiology 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EPI T780 Special Topics in Epidemiology 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EPI T880 Special Topics in Epidemiology 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**EPI T980 Special Topics in Epidemiology 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

## Fashion Design

### Courses

**FASH 500 Sustainable Practice in Fashion 3.0 Credits**

Introduction to responsible/sustainable practices for ethical design, development, and marketing of fashion product. Course includes the exploration of global and regional markets engaged in these practices.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**FASH 504 Materials Exploration 3.0 Credits**

This course examines the relationship of fibers, processes and textile creation and form as it relates to the body. Students will learn how to transform and manipulate fabric by uncovering processes that allow the metamorphosis of planar materials into three-dimensional works.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Prerequisites:** (VSST 104 [Min Grade: C] or VSST 101 [Min Grade: C]) and (VSST 105 [Min Grade: C] or VSST 102 [Min Grade: C]) and (VSST 106 [Min Grade: C] or VSST 103 [Min Grade: C]) and VSST 110 [Min Grade: C] and VSST 111 [Min Grade: C]

**FASH 509 Visual Communication in Fashion 3.0 Credits**

Introduces digital skills and presentation techniques used for communication in the fashion industry. Students will be introduced to research-based design practice.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 504 [Min Grade: C] or FASH 604 [Min Grade: C]

**FASH 512 Surface Design for Textiles 3.0 Credits**

Investigates traditional and digital techniques of surface design. This course explores aesthetics, color theory, motif development and layout for use in multiple fashion categories.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is FASH or major is IAD.

**Prerequisites:** VSST 102 [Min Grade: C] or VSST 105 [Min Grade: C]

**FASH 514 Fashion Portfolio I 3.0 Credits**

Requires the creation of a portfolio of original designs executed in a medium of choice. Explores various market segments of the industry and includes project reviews by critics who are specialists in these areas.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 212 [Min Grade: C]

**FASH 515 Computer Aided Design for Patternmaking 3.0 Credits**

Develops skills in digital patternmaking, grading and marker-making using Clo 3-D Software. Process is tested with a muslin prototype and a final garment.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 342 [Min Grade: C] or FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

**FASH 518 Technical Design for Industry 3.0 Credits**

Fashion data visualization for use in the design and manufacturing of fashion product. Students create accurate flat sketches and detailed technical packs for product life cycle management.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

**FASH 519 Fashion Design in 3-D Space 3.0 Credits**

Students explore clo 3-D virtual garment simulation. Draping directly on the avatar, individual designs are realized through a zero-waste process. Material properties are tested on the avatar in motion.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**FASH 524 Advanced Fashion Design in 3-D Space 3.0 Credits**

This is an advanced level of Fashion Design in 3D Space. Students will work on special 3D Fashion projects and/or a self-directed project.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** FASH 519 [Min Grade: D]

**FASH 528 Patternmaking II 3.0 Credits**

Differences in the material properties of fabric require the designer to use a variety of approaches to take a design concept to realization. Advances skills of FASH-341 and includes an introduction to basic draping and how to translate on to paper.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 341 [Min Grade: C] or FASH 541 [Min Grade: C]

**FASH 534 Virtual Costume Design 3.0 Credits**

Using 3D virtual design software, students create historic and futuristic 3D costume design to enhance a virtual story. Through historical costume research students will learn how to use costume design to develop narrative. This course is open to students across the University.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** VSST 111 [Min Grade: D]

**FASH 541 Patternmaking I 4.0 Credits**

Explores basic patternmaking techniques and manipulations and establishes comparisons between drafting and draping techniques in the development of standard slopers.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 241 [Min Grade: C]

**FASH 543 Tailoring 3.0 Credits**

In this course, building on skills mastered in FASH 341-Flat Pattern Design and FASH 528-Draping Design, the student is instructed in the complex pattern-making, draping, construction and fitting techniques necessary to produce a tailored suit or coat.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 529 [Min Grade: C] or FASH 629 [Min Grade: C] or FASH 548 [Min Grade: C]

**FASH 548 Fashion Design I: Fabric to Form 3.0 Credits**

Exploring unconventional sources for design research, students use problem solving in design to take concepts from 2-D to 3-D with an emphasis on materials.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 528 [Min Grade: C] or FASH 628 [Min Grade: C]

**FASH 553 Fashion Design II: Knitwear 3.0 Credits**

Survey of knitwear design development includes yarn identification and knitted structures. Students hands-on experience learning digital knitting technology with SES Apex software and Shima Seiki electronic knitting machines in the design process.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 548 [Min Grade: C] or FASH 529 [Min Grade: C] or FASH 629 [Min Grade: C]

**FASH 554 Fashion Design III: Sustainable Design 3.0 Credits**

Using responsible eco-friendly concepts, students design original collections for men's and women's wear. Zero waste design, up-cycling and de-reconstruction methods are considered in the circular design process.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 553 or FASH 530 or FASH 630

**FASH 555 Fashion Design IV: Collection Research & Development 3.0 Credits**

Expands and broadens technical skills and lays the groundwork for development of the senior collection. This includes design research and prototype development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 554 [Min Grade: B-] or FASH 550 [Min Grade: B-] or FASH 631 [Min Grade: B-]

**FASH 600 Fashion Industry Internship 0.0 Credits**

Provides relevant off campus employment for students; they experience design and production processes in an industrial setting.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is FASH.

**FASH 633 Couture Techniques 3.0 Credits**

Emphasizes a particular limit of time, cost, or material and expands development of technical solutions to construction and production problems.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 550 [Min Grade: C] or FASH 730 [Min Grade: C] or FASH 555 [Min Grade: C]

**FASH 650 Machine Knitting 3.0 Credits**

Machine Knitting is an introduction to knitwear design specialization. Students learn to style and draw knit garments to develop a professional portfolio. Technical information regarding yarn analysis, stitch construction, pattern and garment construction are the focus of this class.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 12 credits

**Prerequisites:** FASH 241 [Min Grade: C] and (VSST 112 [Min Grade: C] or VSST 113 [Min Grade: C])

**FASH 651 Accessory Design 3.0 Credits**

This course provides students with concepts and skills to design traditional and contemporary fashion accessories with emphasis in embroidery; applique; hand painting; and clay, plastic and ceramic work.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 241 [Min Grade: C]

**FASH 653 Intimate Apparel Design 3.0 Credits**

This course will offer an introduction to the foundations and sleepwear marketplace. Primary focus will be on the design and execution of two pieces for this market. Students will learn how to construct a bra (molded cups) and how to incorporate these details into their final looks for this market. In addition, students will learn the safe operation of the specialty sewing machines for knit construction.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 629 [Min Grade: C] or FASH 529 [Min Grade: C] or FASH 548 [Min Grade: C]

**FASH 655 Advanced Machine Knitting 3.0 Credits**

Advanced Machine Knitting is a further exploration into the software and machinery used in knit product production. Students will participate in all stages of product development from yarn and stitch selection, swatch sampling, gauge analysis, pattern writing, knitting output, and assembly methods.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** FASH 650 [Min Grade: D]

**FASH 664 Fashion Portfolio II 3.0 Credits**

This course will involve research, development and execution of a finished fashion designer portfolio. Students will create a physical and electronic portfolio for the global market place.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 514 [Min Grade: C] and FASH 553 [Min Grade: C]

**FASH 666 Business of Fashion 3.0 Credits**

Presents the following topics in seminar: fashion merchandising as a link between producer and final consumer, retail distribution, interpreting consumer demand, merchandise assortment planning, unit and inventory control, and pricing; fashion marketing and manufacturing, including the marketing process, components of the fashion industry, market evaluation, demographic and psychographic factors, manufacturing components and processes, and case studies.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**FASH 685 Collection I 3.0 Credits**

Requires proposal, design, and execution of related garments to form a collection. Emphasizes the designer's goals. Includes professional critique.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 550 [Min Grade: C] or FASH 730 [Min Grade: C] or FASH 555 [Min Grade: C]

**FASH 686 Collection II 3.0 Credits**

Continues FASH 685 Collection I. Includes professional critique.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FASH 685 [Min Grade: C] or FASH 865 [Min Grade: C]

**FASH 699 Comprehensive Examination in Fashion Design 0.0 Credits**

Provides a comprehensive examination in the field of fashion design. Required of candidates for the M.S. degree upon satisfactory completion of the coursework for the degree.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Not repeatable for credit

**FASH I599 Independent Study in Fashion Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH I699 Independent Study in Fashion Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH I799 Independent Study in Fashion Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH I899 Independent Study in Fashion Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH I999 Independent Study in Fashion Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH T580 Special Topics in Fashion Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH T680 Special Topics in Fashion Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH T780 Special Topics in Fashion Design 1.0-4.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH T880 Special Topics in Fashion Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

**FASH T980 Special Topics in Fashion Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design  
**Repeat Status:** Can be repeated multiple times for credit

## Finance

### Courses

**FIN 601 Corporate Financial Management 3.0 Credits**

The objective of this course is to develop the intuition and tools to analyze corporate financial decisions. The topics to be covered include the time value of money, capital budgeting, stock and bond valuation, the link between risk and return, the cost of capital, and business valuation.

**College/Department:** LeBow College of Business  
**Repeat Status:** Not repeatable for credit  
**Prerequisites:** BUSN 501 [Min Grade: C] or ACCT 510 [Min Grade: C]

**FIN 602 Advanced Financial Management 3.0 Credits**

Provides an in-depth treatment of long-term financing decisions, including estimation of the cost of capital, financial leverage, dividend policy, and capital structure determination.

**College/Department:** LeBow College of Business  
**Repeat Status:** Not repeatable for credit  
**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 605 Business Valuation 3.0 Credits**

This course provides a framework to understand value creation and maximization. The primary focus is on the valuation of equity in a public corporation, but the methods also apply to the valuation of private companies and small businesses. Topics include the analysis and projection of financial performance and the application of discounted cash flow and price-multiple valuation models.

**College/Department:** LeBow College of Business  
**Repeat Status:** Not repeatable for credit  
**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 610 Corporate Governance 3.0 Credits**

Corporate governance determines how strategic financial decisions are made in a firm. Topics include how incentives are set for executives in compensation contracts; the role of external constituents such as regulators, security analysts, and activist investors; the structure and purpose of the board of directors; and the consideration of environmental, social, and governance (ESG) factors on corporate structure and policy. The course will explore the success and failure of strategic decisions and the role governance plays in shaping them. The material will be delivered via lecture, student-driven discussion, and real-world case analysis.

**College/Department:** LeBow College of Business  
**Repeat Status:** Not repeatable for credit

**FIN 615 Environmental and Social Issues in Finance 3.0 Credits**

This course focuses on how policies related to environmental and social (ES) issues affect firm performance. Using a mix of case studies, readings, discussions, and assignments, this class critically assesses ES issues affecting corporations today. Specific topics include activist and regulatory pressure, motivation for ES policies, greenwashing, and consequences for corporations that do and do not address these issues.

**College/Department:** LeBow College of Business  
**Repeat Status:** Not repeatable for credit  
**Prerequisites:** FIN 601 [Min Grade: C]



**FIN 622 Financial Institutions & Markets 3.0 Credits**

Analyzes the economic functions of financial markets and intermediaries. Examines monetary policy formation and its impact on financial markets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 624 Risk Management 3.0 Credits**

Provides a fundamental understanding of risk and return, modern portfolio theory, asset pricing models, performance evaluation, and the use of derivatives to hedge and manage risk.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C] and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C] or ECON 540 [Min Grade: C])

**FIN 626 Investment Management 3.0 Credits**

Covers theoretical and analytical frameworks used to value securities such as common stocks and bonds.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 635 Entrepreneurial Finance 3.0 Credits**

The purpose of the course is to bring financial management decision, tools and techniques typically applied in corporate contexts into the realm of entrepreneurship. This course presents the importance of understanding and applying entrepreneurial finance methods and tools to help ensure a successful venture.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 639 FinTech 3.0 Credits**

This course focuses on the growing area of fintech, defined as the set of new technologies and innovations that strive to compete with traditional financial methods in the delivery of financial services. Specific topics include cryptocurrencies, peer-to-peer lending, crowdfunding, initial coin offerings, the technology-based alternatives to personal advising / trading, and regulatory issues. For each, we will consider both the benefits of these 'fintech' innovations, as well as their limitations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 640 Mergers and Acquisitions 3.0 Credits**

Covers internal vs. external growth, forces of expansion, analysis of relevant quantitative factors, accounting and tax problems, and forms of expansion.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 602 [Min Grade: C]

**FIN 642 Business Conditions and Forecasting 3.0 Credits**

Introduces various techniques such as trend analysis, time series analysis, and econometric methods to forecast business fluctuations and financial asset prices.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C] and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or STAT 510 [Min Grade: C] or ECON 540 [Min Grade: C])

**FIN 645 Behavioral Finance 3.0 Credits**

This course provides an introduction to the topic of behavioral finance. Much of traditional economics and finance is based on market participants and managers behaving rationally. However, financial decisions in the laboratory and in the field systematically deviate from rational benchmarks, despite large monetary incentives to get it right. Behavioral finance examines these deviations and their implications for investor welfare and asset prices.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 626 [Min Grade: C]

**FIN 648 International Financial Management 3.0 Credits**

Uses analytical tools and data to formulate optimal financing and investment strategies in global markets. Analyzes exchange rate determination and international asset price linkages.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 649 Comparative Financial Analysis 3.0 Credits**

The analysis of financial statements for the purposes of valuation and the assessment of creditworthiness and liquidity; financial ratio analysis.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C] and FIN 626 [Min Grade: C]

**FIN 650 Derivative Securities 3.0 Credits**

The analysis and pricing of derivative securities including futures and options; applications to risk management and portfolio management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 624 [Min Grade: C]

**FIN 660 Advanced Portfolio Management 3.0 Credits**

The course is designed to provide the student with a fundamental understanding of portfolio management; introduce the student to international investing and alternative investment strategies; foster intuitive understanding of the material; and integrate theoretical concepts with practical investment applications.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: B]

**FIN 670 Applied Portfolio Management 3.0 Credits**

This course is the second in the sequence of experiential courses for MS students in which students will develop a business plan for offering financial service products with particular emphasis on portfolio management strategies. A majority of your work will be outside of the classroom in the development and preparation of the business plan to be presented in class.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 601 [Min Grade: C]

**FIN 790 Seminar in Finance 3.0 Credits**

Requires students to present the results of research on the application of financial theory to the establishment of financial policy. Requires oral report and written paper of graduate quality.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 602 [Min Grade: C]

**FIN 794 Seminar in Investments 3.0 Credits**

Requires students to present the results of research on the application of theory to portfolio management problems.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FIN 626 [Min Grade: C]

**FIN 910 Doctoral Seminar in Corporate Governance 3.0 Credits**

Doctoral Seminar on research in Corporate Governance. Topics include board composition, executive compensation, and governance effects on mergers and acquisitions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 920 Doctoral Seminar in Asset Pricing 3.0 Credits**

Provides an introduction to techniques used in asset pricing.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 921 Doctoral Seminar in Behavioral Finance 3.0 Credits**

Much of finance research is based on market participants and managers behaving rationally. Financial decisions in the lab and the field systematically deviate from rational benchmarks, despite pecuniary incentives to get it right. Behavioral finance examines these deviations and their implications for welfare and prices. This course provides an introduction to the field for doctoral students in financial economics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 922 Doctoral Seminar in Corporate Finance 3.0 Credits**

Covers theoretical and empirical topics in corporate finance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 924 Doctoral Seminar in Financial Markets 3.0 Credits**

The course provides a theoretical framework to analyze the behavior of prices in financial markets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 928 Doctoral Seminar in Financial Econometrics 3.0 Credits**

The course provides econometric techniques for empirical analysis of financial economics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 931 Seminar on Current Issues in Finance 3.0 Credits**

This course explores the role that market participants, namely analysts, investment banks and advisors, and insiders play in providing information to the market, while investigating conflicts of interest that potentially alter the information produced by these agents.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**FIN 998 Dissertation Research in Finance 1.0-12.0 Credit**

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN I599 Independent Study in FIN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN I699 Independent Study in FIN 0.0-5.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN I799 Independent Study in FIN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN I899 Independent Study in FIN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN I999 Independent Study in Finance 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 12 credits

**FIN T580 Special Topics in Finance 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN T680 Special Topics in Finance 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN T780 Special Topics in Finance 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN T880 Special Topics in Finance 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**FIN T980 Special Topics in Finance 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Food Systems and Studies

### Courses

**FOOD 503 Global Cuisine Studio 3.0 Credits**

This course will serve as a foundation for a variety of regional and traditional cuisines, including French, Italian, Chinese, Korean, Indian, and Caribbean and Island cuisines. Graduate students will master both the fundamental culinary skills for these cuisines and explore the rich academic literature on their historical, sociological, scientific, and technical aspects.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 12 credits

**FOOD 520 Culinary Studio 3.0 Credits**

This course focuses on improvisational, interactive exercises designed to build culinary skills rather than replicate recipes. The emphasis is on culinary arts as an integrative creative enterprise synthesizing food science, aesthetics, management and performance. Activities are structured around five competencies: problem solving, speed, flavor and palate development, leadership and teamwork, and communication.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 525 Garde Manger Laboratory 3.0 Credits**

Introduces students to techniques used in the fabrication, selection and preparation of cold buffet production. Items include cold appetizers, canapes, garnishes, hors d'oeuvres, salads, and sandwiches; with additional focus on decoration, form, and presentation of cold food items.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 530 Charcuterie 3.0 Credits**

Students learn about the chemistry and techniques of curing, brining, and smoking. Items covered include classic and modern, forcemeats, pates, galantines, terrines, and sausages (fresh and dry).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 600 Advanced Studies with a Master Chef 3.0 Credits**

This course is a structured program that allows students the opportunity to practice the skills and competencies learned in coursework with an acknowledged culinarian in a qualified foodservice operation. Students are monitored by their direct supervisor, by Culinary Arts faculty, and by evaluation of written reports, workbooks, journals, and portfolios prepared during the course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 605 Culture and Gastronomy 3.0 Credits**

This course is devoted to the study of and the wide range of sociological and anthropological implications of foodways on society and culture. Food — finding it, growing it, raising it, having it or not, what, where, how and with whom you dine are all historical and cultural determinants. No single item is more significant to the evolution of a civilization, no single item provides a more revealing window on any culture — anywhere anytime. Food fascinates and is essential. To have a knowledge and understanding of the sociological/anthropological implications of what we eat and why we ate it throughout history will serve students throughout their careers.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 606 The Contemporary Food System 3.0 Credits**

This course will explore the structure and function of the contemporary food system, and compare it to some alternative historical models to ask: how did this system develop? What problems does it try to solve? What unintended consequences flow from this current food system?.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 612 Food Writing 3.0 Credits**

This course will explore the many categories of food writing – reviews, memoirs, journalism – and the many outstanding practitioners in the many forms. In this course we examine the role that food plays and how food is used both as an element of expression and as a transforming agent in long form food journalism, book form food focused fiction, memoir, mystery, non-fiction single-item history, foodways studies, biography, and original research Culinary Science academic papers.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 626 Kitchen Garden 3.0 Credits**

This course introduces students to the seasonal preparation and maintenance of the plot and raised beds of the sustainable/organic urban Kitchen Garden situated in the Summer-Winter Community Garden. Students will sow seeds indoors, and nurture vegetable plants in preparation for transplanting into the garden, and conduct literature research into the principles and practices of urban gardening. Produce will be used in food production courses, and in menu preparations in the student operated restaurant.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 699 Thesis Research in Culinary Arts and Science 0.0-9.0 Credits**

Students pursuing a thesis consult with a faculty advisor to identify a suitable problem in food science and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** FDSC 501 [Min Grade: B-] or SCTS 502 [Min Grade: B-]

**FOOD 801 Food Systems Practicum/Project 2.0 Credits**

This course will provide students with work experience in culinary production while under faculty supervision. Students obtain industry jobs, work a minimum of 60 hours, log their experiences, and write a final analysis. The networking opportunities often lead to rewarding part time, or full time employment opportunities. Alternatively, students may embark on an independent project with both an industry and faculty mentor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FOOD 890 Seminar in Culinary Arts and Science 1.0 Credit**

In this course, current topics in food studies will be studied with presentations by invited speakers and students. Students receiving credit for this course must present their work at least once during the quarter.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

## Food Science

### Courses

**FDSC 501 Research Methods for Food Science 3.0 Credits**

This course introduces students to common research tools and skills in the field of food science and studies, as well as to basic concepts in data analysis and research ethics.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 506 Food Composition & Behavior 3.0 Credits**

Examines the composition of foods and chemical and physical changes in food components occurring during food preparation and processing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 550 Food Microbiology 3.0 Credits**

Discusses factors affecting microbial growth in foods. Also covers methods of enumeration of food-borne organisms, microbial spoilage of foods, foods and ingredients from fermentation, food-borne pathogens and their control, and sanitation and HACCP in food processing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 551 Food Microbiology Laboratory 2.0 Credits**

Companion laboratory course to FDSC 550. Covers methods of isolation and enumeration of microorganisms important in foods, food fermentations, and methods of control of microorganisms.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FDSC 550 [Min Grade: C], NFS 650 [Min Grade: C] (Can be taken Concurrently)

**FDSC 554 Microbiology & Chemistry of Food Safety I 3.0 Credits**

Covers the study of microbiological and toxicological factors affecting the safety of food, including natural toxicants, food additives, and food-borne diseases, toxicoses, and parasites.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FDSC 550 [Min Grade: B] (Can be taken Concurrently)

**FDSC 556 Food Preservation Processes 3.0 Credits**

Covers fundamentals of food processing and preservation, including techniques and methods employed to extend the useful life of food products, and the significance of changes in the composition of foods due to processing, enzymatic activity, microbial action, and chemical change.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 557 Advanced Food Product Development 3.0 Credits**

The course covers the advanced stages of new food product development, food ingredients and functionality, and new product management and marketing. The course also provides in-depth understanding of various thermal and non-thermal food processing techniques used to extend the shelf-life of food. Effect of these processing techniques on food quality will also be discussed. During the lab portion of this class, students will design a new food product suitable for specific markets while considering taste, texture, stability and packaging.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FDSC 350 [Min Grade: C] (Can be taken Concurrently)

**FDSC 558 Nutritional Impact of Food Processing Methods 3.0 Credits**

Covers the effect of processing on foods emphasizing nutritional and chemical aspects. Includes synthetic foods, food additives, current food processing methods, nutrition policy, consumer dietary patterns, and food production trends.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 560 Food Chemistry 3.0 Credits**

Covers chemical and physical behavior of food constituents and application of physicochemical principles to processed food systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 561 Food Analysis 3.0 Credits**

Covers the application of chemical analysis techniques to food. Food composition analysis (lipids, proteins, carbohydrates) and measurements of chemical reactions in foods (browning, lipid oxidation, starch hydrolysis, protein denaturation) are studied. Also focused upon the maintenance of food quality during processing and storage.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 568 Functional Foods 3.0 Credits**

This course covers a range of functional foods and food components, their health conferring benefits, mechanisms of actions, and possible applications in the food industry.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**FDSC 570 Meat Science 3.0 Credits**

Meat science covers a range of technical information on meats including their muscle characteristics and composition, microbiology, nutritional content and processing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 577 Food Engineering 3.0 Credits**

This course deals with understanding and implementing basic engineering concepts to solve quantitative problems in food engineering and processing. Concepts such as units and dimension, mass and energy balance, heat transfer, mass transfer, psychometrics and fluid flow will be covered.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 610 The Science of Wine 3.0 Credits**

Wine production is a very interdisciplinary field, at the crossing of agronomy (grape growing), chemistry, microbiology (wine making), sensory science (wine tasting) and cultural studies. The class will discuss the application of each discipline to wine production, with an emphasis on how scientific knowledge and technologies have impacted wine making and wine consumption around the world, and what empirical knowledge and practices developed over centuries has brought to science. Some of the key concepts developed during the course will be experienced through tasting of synthetic solutions and wines. Students must be 21 years or older prior to the first day of class.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 654 Microbiology & Chemistry of Food Safety II 3.0 Credits**

Advanced study of chemical of food safety significance with emphasis on the effects of components normal to food. Risk assessment, regulations and control will be covered.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** FDSC 454 [Min Grade: D] or FDSC 554 [Min Grade: C]

**FDSC 662 Sensory Evaluation of Food 3.0 Credits**

This course, Sensory Evaluation of Food, discusses historical and current theories addressing the anatomy and mechanisms of human chemical sensing systems (taste, odor, and flavor perception). The course will provide 1) a deep understanding of the anatomy and function of chemical senses, and 2) how diets, metabolic disorders, as well as environmental and psychological factors influence the relationship between chemical senses and food choice. Finally, the course will give an overview of the functional methods of subjective or organoleptic testing involving human subjects (psychophysics).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**FDSC 669 Readings in Food Science 3.0 Credits**

Covers current research and its practical application in food production, processing storage, and preparation. Encourages individual investigation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 6 credits

**FDSC 890 Seminar in Food Science 1.0 Credit**

Current topics in food science will be studied with presentations by invited speakers and students. This course may be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 3 credits

**FDSC 997 Research in Food Science 1.0-12.0 Credit**

Students consult with a faculty advisor to identify a suitable problem are in food science and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 12 credits

**FDSC I599 Independent Study in FDSC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC I699 Independent Study in FDSC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC I799 Independent Study in FDSC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC I899 Independent Study in FDSC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC I999 Independent Study in FDSC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC T580 Special topics in FDSC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC T680 Special topics in FDSC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC T780 Special topics in FDSC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC T880 Special topics in FDSC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**FDSC T980 Special topics in FDSC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

## Forensic Science

### Courses

## Game Art and Production

### Courses

**GMAP 501 Game History 3.0 Credits**

This course explores the history of video games from their analog roots and examines the video game industry from the earliest arcade entertainments to modern digital distribution networks. It will investigate the people who made technical, design, and business decisions that have had lasting, industry-wide effects that are still with us today.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**GMAP 545 Game Development Foundations 3.0 Credits**

This course introduces students to the computer game design process. Students also learn how the individual skills of modeling, animation, scripting, interface design and storytelling are coordinated to produce digital game experiences for various purposes including entertainment as well as applications in research and development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 506 [Min Grade: B]

**GMAP 547 Serious Games 3.0 Credits**

This course explores the field of serious games. Students will learn about serious games both through extensive readings on different areas of serious games and through the design and development of serious games projects.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 506 [Min Grade: B]

**GMAP 548 Experimental Games 3.0 Credits**

This course explores new ideas and innovative gameplay through constraints of team size and shortened development cycles. The students will work in small groups to rapidly prototype and develop novel games projects.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DIGM 506 [Min Grade: B]

**GMAP 560 Game Design from the Player's Perspective 3.0 Credits**

This course is an introduction to game design from a player's perspective. Students will experience a variety of games and analyze them with respect to the use of game design principles and their consequences for game play.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

## General Business

### Courses

**BUSN 501 Measuring and Maximizing Financial Performance 3.0 Credits**

This course is an introduction to the concepts of financial accounting and financial management. The content of this course includes preparation and analysis of financial statements. Also covered are the time value of money, risk and return, and corporate financing choices.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 502 Essentials of Economics 3.0 Credits**

Topics in macroeconomics and microeconomics, including market equilibrium, monetary and fiscal policy, profit maximization, and market future.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 602 Business Strategies in Drug Development 3.0 Credits**

The course covers the basic steps of the drug development process for students with an understanding of the management principles for new product introduction and the economics supporting product development. Lectures will cover drug development fundamentals, clinical development plans, management decision-making, regulatory strategy development and planning for product launch and post-approval marketing stages.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 603 Market Policies and Practices 1.0 Credit**

This course provides a comprehensive introduction to project management, client based consulting engagements, research techniques and the skills required to solve unstructured business problems.

The frameworks, methods, and opportunities to practice will improve participant's decision-making skills in their current roles, as well as provide a strong critical thinking discipline that will assist them in their ongoing and future program coursework. This course acts as a springboard to Master of Science practicum experiences which give students an introduction to marketing research.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 614 Foundations of Career & Professional Development 0.0 Credits**

This course provides foundational instruction in professional etiquette and career development. Students will learn through lecture, small group activities, and one-on-one meeting with their career advisor the tools to create a professional resume and cover letter, LinkedIn profile, and learn how to network effectively within their industry. Upon successful completion students will be able to commence their internship/job search with the correct tools and knowledge.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 615 Graduate Internship 0.5-3.0 Credits**

Graduate-level internships provide an opportunity for practical application of theories learned in the classroom. Students typically spend three months employed at a business that is linked to their academic interests. Full-time employment is up to 40 hours/week while part-time employment is up to 20 hours/week. Variable credits based on duration of internship.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 2 times for 9 credits

**Restrictions:** Can enroll if program is MBA or MS.

**BUSN 651 Healthcare Business Practice I: Foundations 3.0 Credits**

This is an introductory course in the business aspects of the delivery of health services and pharmaceutical/life sciences. This course will offer an overview of the healthcare marketplace and focus on the unique features of this industry. It is a multi-disciplinary survey course that will establish a foundation to develop the skills necessary for a successful business career in the healthcare, pharmaceutical, and life sciences industry.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 652 Healthcare Business Practice II 3.0 Credits**

This is a continuation in the business aspects of the delivery of health services and pharmaceutical/life sciences. This course is designed to develop more specialized knowledge and skill necessary for a successful business career in the healthcare, pharmaceutical, and life sciences industry.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 651 [Min Grade: C]

**BUSN 653 Healthcare Business Practice III: Capstone 3.0 Credits**

This is the third course in the LeBow Healthcare concentration focusing on the business aspects of the delivery of health services and pharmaceutical/life sciences. This course is designed to finalize students' preparations for a successful business career in the healthcare, pharmaceutical, and life sciences industry by focusing on specialized knowledge areas and by providing an intensive experiential learning experience that will integrate students' knowledge of the business of healthcare.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 651 [Min Grade: C] and BUSN 652 [Min Grade: C]

**BUSN 910 Applied Organizational & Consumer Behavior 4.0 Credits**

The course provides an interdisciplinary and integrative understanding of various theoretical perspective on how to organize effectively. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored for ways to leverage both internal and external data to compete in the 21st century economy and build business strategy and translate that into organizational knowledge strategy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 911 Opportunities in a Data Driven Economy 4.0 Credits**

This course explores the growing role of data in Business. It examines the critical skills and capabilities an organization needs for success, including leadership, culture, methods and tools for becoming data driven, while also balancing human judgment. Lectures, readings, cases, and guest speakers consider the impact and challenges of gathering, storing, analyzing and providing access to data to facilitate effective decision making.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 910 [Min Grade: B]

**BUSN 912 Corporate Growth and Risk Strategies 4.0 Credits**

This course will discuss competitive advantage aspects as they relate to organizational growth and risk management including in contexts related to intercompany relationships. Theories, research and practice from the areas of strategic management, organizational behavior, human resource, management, MIS and marketing will be explored to learn theories frameworks on corporate development and growth and risk management studies associated with such development and growth.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 910 [Min Grade: B] and BUSN 911 [Min Grade: B]

**BUSN 913 Driving Innovation and Design 4.0 Credits**

This course explores the latest thinking on competitive strategies for innovation, innovation culture, product design & design thinking, creative insights and stimulating creativity behavior and such measurements using an interdisciplinary approach.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 912 [Min Grade: B]

**BUSN 914 Navigating the Changing Business Environment 4.0 Credits**

This course provides the foundation to apply current economic, consumer behavior and HR capital trends guided by scholarly based findings and analysis to apply to business issues in the new digital and global economy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 913 [Min Grade: B]

**BUSN 921 Applied Behavioral Research 4.0 Credits**

This course introduces behavioral research thinking. The course will provide an overview of applied behavioral research methodologies, including experimental, quasi-experimental, and survey research techniques. Students will learn the advantages of each methodology and when to apply it. Students will also be introduced to measurement theory, validity, reliability, and how to conduct research ethically. There will be detailed discussions on the data and how it was collected as well as hands-on demonstrations of the statistical methodologies that were applied. Students will learn what the statistical assumptions are, what the parameters mean, and how to practically interpret the results.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 923 Qualitative Inquiry Methods 4.0 Credits**

This course introduces students to approaches in social science and humanistic research known as qualitative inquiry. These approaches include ethnography, grounded theory, phenomenology, case study, and narrative research, and employ methods of interviewing, discourse/content analysis, and participation observation. Students will explicate studies that employ these approaches; discuss assumptions of qualitative inquiry; discuss standards of sampling, ethics, and validity, and design a qualitative research proposal.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 921 [Min Grade: B]

**BUSN 924 Analyzing Quantitative Data 4.0 Credits**

In this course, students will learn to test hypotheses and assess theory in business and behavioral contexts as those relate to analyzing survey data, archival data, and experimental data. Through hands-on exercises that revisit and reconstruct published research, students will learn commonly used statistical methods that test hypotheses and learn how to interpret the results, as well as look for problems as revealed through the statistical testing that might lend support to alternative models. Methods discussed include linear regression, dimension reduction, analysis of variance and GLM, and logistic regression models.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 922 [Min Grade: B] or BUSN 925 [Min Grade: B]

**BUSN 925 Survey Research 4.0 Credits**

This course will introduce students to the art and craft of survey research. Students will become familiar with the theoretical underpinnings of survey research and at the same time get hands-on experience designing, deploying, and analyzing surveys. The course will cover all aspects of conducting survey research: selecting a sample, formulating individual questions, measurement scales, designing a questionnaire, and analyzing the collected data.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 921 [Min Grade: B]

**BUSN 941 Dissertation Research, Applied Methodology Workshop 4.0 Credits**

This applied methodology workshop focuses candidates on development of well-defined research questions, appropriate methodology approaches, outline of the Hypotheses, and elucidation about the Importance of the research topics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BUSN 942 Dissertation Research, Data Collection Strategy 4.0 Credits**

This applied dissertation research course focuses candidates on the development of well-defined data collection strategy. This may include, but is not limited to, analyzing archival data, designing the survey to be used, or determining how to use existing organizational changes in a quasi-experimental design to assess phenomena. This will include IRB permission as necessary.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 941 [Min Grade: B]

**BUSN 943 Dissertation Research, Literature Review and Proposal Defense 4.0 Credits**

This applied dissertation research course focuses candidates on the development of the literature review section that will be included in the dissertation. The literature review should present the theoretical background of the dissertation and support the propositions and hypotheses.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 942 [Min Grade: B]

**BUSN 944 Dissertation Research, Data Collection Process 5.0 Credits**

This applied dissertation research course focuses candidates on the development of the data collection process for the dissertation. The data can be collected through surveys, quasi-experimental designs, panel data, or any other source approved by the dissertation chair and committee.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 943 [Min Grade: B]

**BUSN 945 Dissertation Research, Data Analysis 5.0 Credits**

This applied dissertation research course focuses candidates on completing the data analysis for the dissertation. It is expected that the student will consult with the Dissertation Chair and professors on the appropriate analyses methods that should be applied.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 944 [Min Grade: B]

**BUSN 946 Dissertation Research, Discussion and Contribution Chapter 1.0 Credit**

This applied dissertation research course focuses candidates on completing the Discussion and Contribution chapter of the dissertation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 945 [Min Grade: B]



**BUSN 947 Dissertation Research, Final Defense 1.0 Credit**

This applied dissertation research course focuses candidates on completing the Dissertation and after consultation and approval by the Dissertation Chair to submit it for Final Defense before the Committee.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 9 times for 10 credits

**Prerequisites:** BUSN 946 [Min Grade: B]

**BUSN 996 Summer Research Activity for PHD Students 0.5-9.0 Credits**

During the Summer Quarters, PhD students in Business and Economics are expected to undertake research activity with a faculty mentor(s).

This course is designated to record that activity during the summer quarter only. The research undertaken should advance the PhD student's research towards passing the candidacy exam requirements. This course is only open to PhD Students at LeBow including those in the School of Economics. The course is not open to PhD candidates or non-LeBow students.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 1 times for 18 credits

**Restrictions:** Can enroll if classification is PhD.

**BUSN 997 Research Activity for PhD Students in LeBow College of Business 0.5-9.0 Credits**

PhD students in Business and Economics may undertake research activity with a faculty mentor in lieu of a course. This course is designated to record that activity. The research undertaken should advance the PhD student's research towards passing the candidacy exam requirements.

This course is not open to PhD candidates or non-LeBow students.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 2 times for 27 credits

**Restrictions:** Can enroll if classification is PhD.

**BUSN 998 Dissertation Research Business 1.0-12.0 Credit**

Dissertation Research Business.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 9 times for 120 credits

**BUSN I599 Independent Study in BUSN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN I699 Independent Study in BUSN 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN I799 Independent Study in BUSN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN I899 Independent Study in BUSN 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN I999 Independent Study in BUSN 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**BUSN T580 Special Topics in BUSN 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN T680 Special Topics in BUSN 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN T780 Special Topics in BUSN 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN T880 Special Topics in BUSN 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BUSN T980 Special Topics in BUSN 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Geography Education

### Courses

## Geoscience

### Courses

**GEO 510 Sedimentary Environments 4.0 Credits**

Students in this course develop an understanding of sedimentary processes and the ability to interpret paleoenvironments based on sedimentological parameters. Topics include current flow, bedforms, siliciclastic and carbonate rocks, fluvial, coastal, and Aeolian environments, taphonomy, and paleosols.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**GEO 520 Invertebrate Paleobiology and Paleocology 3.5 Credits**

This course focuses on the evolution, ecology, and environmental interactions of invertebrates with hard parts from the Cambrian period to today. Topics include paleoecology, paleodiversity, mass extinction, taphonomy, biostratigraphy, and taxonomy. Natural selection, functional morphology, extinction and adaptation are emphasized.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**GEO 522 Vertebrate Paleontology 4.0 Credits**

This course focuses on the evolution of vertebrates from the Cambrian Period to today. Topics include cartilaginous and bony fishes, amphibians, turtles, crocodiles, pterosaurs, birds, and mammals. Natural selection, cladistics, functional morphology, adaptation and extinction are emphasized.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**GEO 550 Volcanology 3.0 Credits**

Volcanology is a study of the origin, properties, and processes involved in the formation and eruption of volcanoes. The student taking this course will be introduced to the various types of volcanism on Earth and in the Solar System, methods of volcano monitoring, and human and environmental impacts of volcanic eruptions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**GEO 644 Plate Tectonics 3.0 Credits**

Plate tectonics is one of the Earth Sciences' foundational theories, underlying much of our understanding on the origin and distribution of volcanoes, earthquakes, ocean basins, and mountain chains. This course discusses vector analysis approaches as they apply to plate tectonics theory, plate rotation poles, analysis of triple-junction stability, mantle flow, plate motion reconstructions, and the driving forces of plate tectonics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**GEO 797 Research 0.5-12.0 Credits**

Research in geoscience.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO I599 Independent Study in GEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO I699 Independent Study in GEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO I799 Independent Study in GEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO I899 Independent Study in GEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO I999 Independent Study in GEO 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO T580 Special Topics in Geoscience 1.0-9.0 Credit**

In this course, students will explore specific areas not covered in the regularly offered Geoscience courses. The course will be taught by teaching faculty members of the Geoscience Program, Drexel professors who are members of the Geoscience Faculty Committee, or by visiting professors. May be repeated for credit if topics vary.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO T680 Special Topics in Geoscience 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO T780 Special Topics in Geoscience 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO T880 Special Topics in Geoscience 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**GEO T980 Special Topics in Geoscience 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Global & International Education

### Courses

**EDGI 503 Global, International & Comparative Education 3.0 Credits**

This course will introduce students to the field of global, international and comparative education. Students explore the ways in which education is shaped by the interaction of local, national, and global factors. The course provides a common theoretical and substantive base that will enable students to understand the historical, conceptual, and methodological challenges in global international education. Students develop a critical understanding of dominant and alternative paradigms and how they translate into educational policy and practice in communities, schools, and classrooms across the globe. Each week, we explore a substantive area as well as a theoretical perspective often utilized in global international education research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 506 Comparative Higher Education Systems 3.0 Credits**

Examination of higher education systems around the world including the cultural and historical bases of these systems and their spread across the globe.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 510 Culture, Society & Education in Comparative Perspective 3.0 Credits**

Exploration of global education through concepts of culture, cultural relativism and ethnocentrism from a comparative perspective.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 512 Globalization and Educational Change 3.0 Credits**

Exploration of issues related to economic globalization, politics of globalization, educational change, and the ways individuals and groups of people have changed and must further change to meet new global challenges in the 21st Century.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 514 Education and National Development 3.0 Credits**

Exploration of the role of education as a primary agent of the socio-economic, cultural and technological advancement of developing countries in world regions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 518 Analysis of Policy Issues in Global & International Education 3.0 Credits**

Analysis of current public policy issues using various models of policy analysis across cultures and the globe with specific emphasis in creating, monitoring and evaluating frameworks to guide education sector policy work.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 520 Political Economy of Education Reform 3.0 Credits**

Focus on the principal issues in the economics of education and in education and economic development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 522 Education for Global Citizenship, Sustainability, and Social Justice 3.0 Credits**

Through the theoretical lens of global citizenship, the course investigates the role that education plays in sustainable development and examines the ways individuals, communities, organizations, businesses, and educational institutions are responding to the complex intersection of the local and global in the 21st Century. Students critically explore and evaluate educational approaches to global citizenship in the areas of sustainability and social justice. Students examine educational policies and responses relating to citizenship and sustainability, and develop the capacity to conceptualize global issues through global citizenship. In the end, students investigate the interplay of global citizenship, policy, and teacher education in response to global climate change and mass population migration.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 524 Measuring the World: Education and National Development 3.0 Credits**

This course critically examines the role of education as a primary agent of the socio-economic, cultural and technological advancement of nations. In the first part of the course, we familiarize ourselves with development more broadly, and in doing so conceptualize various measures of development progress and review theoretical perspectives often utilized in this work. Next, we consider the linkages between education and national development through the exploration of two country case studies of national development. The course concludes by considering the ways in which investments in health, alternative measures of well-being and development cooperation both promote national development and shape the relationship between education and development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 533 Culture and Learning: From Violence Toward Peace 3.0 Credits**

This course provides students with a critical understanding of the role of "culture" in influencing the dynamics of conflicts, including those that can be manifested in physical violence, as well as strategies for resolving or transforming such conflicts. Expressions of forms of discrimination, including prejudices, stereotyping, xenophobia, ethnocentrism and racism will be considered as important basic conceptual tools for peace educators in resolving intercultural conflicts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 534 Conflict Resolution in an International Context 3.0 Credits**

Examination of conceptual underpinnings of peace and conflict resolution and the paradigmatic models of conflict resolution currently practiced, as well as the substantive enquiry into a variety of approaches to building peace at local, national and global levels.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 536 Action Strategies for Peace Education 3.0 Credits**

The major assumption of this course is that peace education is a challenge and a need to face not only in formal educational systems but also in community settings, non-formal and informal education. This course will examine the implementation of peace education programs linked to various settings, and analyze the challenges and issues of the different approaches of governments, communities, and other institutions. The course explores concepts such as citizenship, respect, learning community and interactive dialog.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 541 Special Issues in Sustainability 3.0 Credits**

The environmental movement of the 1960s and 1970s started as a reaction to the ecological degradation of the environment; in the 1980s and 1990s the sustainability revolution emerged, but what is sustainable development and how does it apply to education? Through readings, videos and board discussions, this class will examine concepts that include ecological footprint, ecocriticism, advertisement awareness, technology appraisal, ecological intelligence, systems thinking, etc. There are various schools of thought regarding sustainability in three areas – the environment, the economy, and society.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 550 Educating for Peace, Social Justice, and Human Rights 3.0 Credits**

This course provides an overview of peace education and human rights education including history, theories, concepts and pedagogy. Peace and human rights education programs are situated within the larger field of global and international education as well as within a context of education for social change. By exploring both theory and practice as well as case studies, research, and lesson plans, students will examine the role of education within formal institutions, non-formal community-based organization and non-governmental organizations in addressing issues of violence, conflict, and security while promoting social justice, human rights and peace. Students engage in applied learning activities through the construction of peace education initiatives and curriculum.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 552 Gender, Education, and International Organizations 3.0 Credits**

This course focuses on international organizations, foreign assistance, and their influence on educational policy and practice. We focus our analysis on organizations working at the intersection of gender equality and inclusive education, and particularly the role they play in global policy dialogues to develop a critical perspective of their work. Students examine how various multilateral, bilateral, financial, and civil society organizations work to shape policy, program planning, financing, implementation, and monitoring and evaluation of gender equality and education goals that are part of the Sustainable Development Goals (SDGs). Using a critical perspective, students discover how gender and education activists work to shape their institutions and the development agenda locally and globally.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 560 Colloquium in Global Education 1.5 Credit**

The multifaceted global issues that face today's educators and students represent unique opportunities and challenges to develop global, international and intercultural awareness, knowledge and perspective. This course provides a monthly forum for students to engage with Drexel faculty and visiting scholars about these issues, and to promote critical intellectual reflection and exchange between the academy and the broader society.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 600 Study Abroad Experience 3.0 Credits**

From a city-base in a foreign country, student actively engages in a country's literary, artistic, and cultural traditions through firsthand encounters with literary specialists, authors, artists, and artisans. Homestay model serves as portal for enhanced opportunities for language acquisition, cultural analysis and interpretation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is GIED.

**EDGI 604 Quantitative Literacy: Interpreting and reporting data for educational policy and research 3.0 Credits**

The course will focus on both the art and science of quantitative methods by identifying how to draw careful insights from quantitative analyses. Students will read & discuss existing educational studies as well as review the results from quantitative analysis with a focus on 1) understanding the analytic approach, 2) interpreting the quantitative results, 3) best practices for visually displaying findings in figures and tables, and 4) using quantitative data to tell a compelling narrative. The course addresses the types of questions that can be addressed through quantitative methods, the importance of samples & describing a sample; summary data, patterns, and trends; the comparison of groups; the results from multiple regression analysis, experimental, and quasi-experimental research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDGI 610 International Ecotourism & Education 3.0 Credits**

From a city-base in a foreign country, student integrates the different perspectives of diverse natural, biological and social science disciplines to improve understanding of relationships between human societies and the natural environment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is GIED.

**Corequisite:** EDGI 600

**EDGI I599 Independent Study in EDGI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI I699 Independent Study in EDGI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI I799 Independent Study in EDGI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI I899 Independent Study in EDGI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI I999 Independent Study in EDGI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI T580 Special topics in EDGI 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit



**EDGI T680 Special topics in EDGI 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI T780 Special topics in EDGI 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI T880 Special topics in EDGI 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDGI T980 Special topics in EDGI 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Health & Rehabilitation Sciences

### Courses

**HRSC 541 Introduction to Scholarly Inquiry and Communication in Health and Rehabilitation Sciences 3.0 Credits**

This course prepares students to be informed and critical consumers of the scientific research literature and introduces graduate level scholarly communication skills. These skills include searching, reviewing, and interpreting the peer-reviewed literature, and communicating findings in oral and written formats.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC.

**HRSC 671 Research Practicum I 3.0 Credits**

Research practicum provides students with an opportunity to develop various components of their research interests. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC.

**HRSC 672 Research Practicum II 3.0 Credits**

This research practicum builds on HRSC 671 research practicum I. Research practicum provides students with an opportunity to develop various components of their research interests. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 671 [Min Grade: B]

**HRSC 673 Research Practicum III 3.0 Credits**

This research practicum builds on HRSC 672 research practicum II. Research practicum provides students with an opportunity to develop various components of their research interests. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 672 [Min Grade: B]

**HRSC 690 Final Project I 3.0 Credits**

Through the final project a student demonstrates implementation of skills in the health and rehabilitation sciences that were developed during the program. The final project will demonstrate the synthesis of graduate level expertise in health and rehabilitation sciences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC.

**HRSC 691 Final Project II 3.0-6.0 Credits**

This final project course is a continuation of HRSC 690 final project I. Through the final project a student demonstrates implementation of skills in the health and rehabilitation sciences that were developed during the program. The final project will demonstrate the synthesis of graduate level expertise in health and rehabilitation sciences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 18 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 690 [Min Grade: CR]

**HRSC 695 Thesis Research I 3.0 Credits**

Through the thesis a student demonstrates skills in the research process and produces an original contribution of knowledge. The thesis process provides the student with the foundation for conducting research in the field of interest. The stages of the thesis include: formation of thesis committee, development of a research question, thesis proposal, Institutional Review Board Approval, conducting the research study, data analysis, interpretation of results, writing the thesis, and oral thesis defense.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC.

**HRSC 696 Thesis Research II 3.0-6.0 Credits**

This thesis research course is a continuation of Thesis Research I. Through the thesis a student demonstrates skills in the research process and produces an original contribution of knowledge. The thesis process provides the student with the foundation for conducting research in the field of interest. The stages of Thesis Research II typically include: conducting the research study, data analysis, interpretation of results, writing the thesis, and oral thesis defense.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 12 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 695 [Min Grade: CR]

**HRSC 761 Foundations of Health and Rehabilitation Research 3.0 Credits**

Provides exposure to theories and models related to health and rehabilitation sciences research. Contemporary frameworks and models for health and rehabilitation research are examined. Students discuss how these theories are tied to development of research questions in line with the mission, goals, and research priorities of funding sources.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC.

**HRSC 821 Research Practicum I 1.0-6.0 Credit**

Research practicum provides students with an opportunity to develop various components of their research interests through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 24 credits

**Restrictions:** Can enroll if major is HRSC.

**HRSC 822 Research Practicum II 1.0-6.0 Credit**

This research practicum builds on HRSC 821 research practicum I. Research practicum provides students with an opportunity to develop various components of their research interests through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 24 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 821 [Min Grade: B]

**HRSC 823 Research Practicum III 1.0-6.0 Credit**

This research practicum builds on HRSC 822 research practicum II. Research practicum provides students with an opportunity to develop various components of their research interests through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 24 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 822 [Min Grade: B]

**HRSC 824 Research Practicum IV 1.0-6.0 Credit**

This research practicum builds on HRSC 823 research practicum III. Research practicum provides students with an opportunity to develop various components of their research interests through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and methods, IRB, grant writing, participant recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 24 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 823 [Min Grade: B]

**HRSC 831 Dissertation Research I 1.0-9.0 Credit**

This course focuses upon choosing a research topic for the dissertation. The topic will be chosen with ongoing faculty mentoring. Once the topic is chosen the student prepares a dissertation proposal outline that includes the identification of the problem to be studied, the research question, the purpose of the study, the rationale, and the methodology. The proposal outline must be approved by the student's major advisor. Following approval by the advisor, the student begins writing their dissertation proposal.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 18 credits

**Restrictions:** Can enroll if major is HRSC.

**HRSC 832 Dissertation Research II 1.0-9.0 Credit**

In this course, with faculty mentoring, the student prepares and submits an IRB, collects preliminary data, and writes the dissertation proposal. In addition, the student finalizes their dissertation committee and meets with the committee members. The proposal is submitted to the dissertation committee and the oral defense of the proposal takes place. The student must pass the oral proposal defense in order to register for HRSC 833.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 36 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 831 [Min Grade: CR]

**HRSC 833 Dissertation Research III 1.0-9.0 Credit**

In this course the student revises the dissertation proposal based upon the results of the Dissertation Proposal Defense and earns final approval to proceed. The student prepares and submits IRB amendments/application as needed. Once the dissertation is approved by the IRB, and with the guidance of the major advisor, the student establishes a data management system and collects data for the dissertation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 36 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 832 [Min Grade: CR]

**HRSC 834 Dissertation Research IV 1.0-9.0 Credit**

This course includes the final stages of the dissertation during which the data are analyzed and interpreted, the manuscripts and discussion chapters are written, and the final dissertation is defended in an oral examination and submitted to the University.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 36 credits

**Restrictions:** Can enroll if major is HRSC.

**Prerequisites:** HRSC 833 [Min Grade: CR]

**HRSC I699 Independent Study in Health & Rehabilitation Sciences  
1.0-6.0 Credit**

Independent study provides students with an opportunity to develop various components of their interests in health and rehabilitation sciences. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 6 times for 42 credits

**Restrictions:** Can enroll if major is HRSC.

## Health Management and Policy

### Courses

**HMP 500 Health Management and Policy I 3.0 Credits**

This course provides students with a broad-based understanding of key management and policy topics in public health practice in the United States. The course focuses on the US public health system and explores how federal, state, and local public health agencies and their partners at corresponding levels finance, develop, and implement public health programs, services, and policies. Evolving opportunities for collaboration with the health care sector in addressing health problems of mutual concern are illuminated.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 501 Health Management and Policy II 3.0 Credits**

This course provides students with a broad-based understanding of key management and policy topics in health care in the United States. The course focuses on the US health care system and examines its history and major components, including the organization, financing, and delivery of health care services. The course provides students with a strong foundational understanding of key management and policy concepts, systems, and issues, with a special focus on health care equity.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 505 Qualitative Data and Mixed Methods Analysis 3.0 Credits**

This course provides an introduction and overview of qualitative data and analysis and the integration of quantitative and qualitative data in mixed-methods research designs. Students will be introduced to a range of qualitative primary data collection approaches and will learn how to analyze qualitative data through both hand coding and with analysis software. The course will also focus on the integration of quantitative and qualitative data and methods. Students will learn about the pragmatic approach to study design in which the research question at hand drives the selection of methods. The advantages and challenges to mixed-method research will be covered, as well as an overview of the major mixed-method study designs.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EPI 570 [Min Grade: C], NURS 531 [Min Grade: C] (Can be taken Concurrently)

**HMP 510 Evolution of United States Health Policy 3.0 Credits**

This is a reading intensive seminar in the evolution of the US health system and history of 20th century US health policy: how it adapted to internal and external forces with an emphasis on the cyclic interest - and disinterest - in universal health care coverage.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 511 Legal Aspects of Public Health 3.0 Credits**

This course covers legal and policy issues in the implementation of public health programs. It emphasizes underlying themes that frame these efforts.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 512 The Business of Healthcare: Advanced Healthcare Financial Management 3.0 Credits**

The Business of Healthcare: Advanced Healthcare Financial Management is a course designed for non-financial health care managers. Using the case study approach, it offers an introduction to the most-used tools and techniques of health care financial management. There is a particular focus on fundamental.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 513 Healthcare Planning Principles and Practice 3.0 Credits**

This course provides students with a practical guide to the concepts and practice of planning as a core function of public health and health care management. Planning is the process of identifying an organization's desired goals and creating realistic, detailed plans of action to use organizational resources to meet those goals. As a core management function, planning has multiple organizational dimensions. These include formal processes like long-term strategic planning and business planning, and short(er) term project and operational planning. In each case, the basic steps in the planning process involve creating a road map that outlines the tasks that the organization must accomplish to meet its goals. This course addresses planning as an organizational management function in these several dimensions.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 514 Policy Analysis for Population Health 3.0 Credits**

This course prepares students to conduct policy research to improve the health of populations. The content of this course is divided into two sections: one focused on policy process research and one focused on policy outcomes research. Policy process research is focused on generating knowledge about the contemporary, "real world" contexts in which health policy decisions are made. The purpose is to understand the sociopolitical complexities surrounding a policy issue so advocates can more effectively communicate research evidence and advance policy changes that improve population health. Policy outcomes research is focused on generating knowledge about the impacts that policies produce. The purpose is to determine the outcomes that are directly attributable to a specific policy, not other factors.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 515 Health Organizational Leadership 3.0 Credits**

This course will focus attention on leadership within the health industry from three perspectives: self, team and organization. Course content will include understanding our individual leadership styles, common elements of effective teams, and organizational dynamics. Students will learn core concepts of high performance among teams and organizations through case studies, readings, class exercises, journaling, and guest speakers that center around the health and health care environment. Students will learn methods and techniques to help them become more effective leaders of healthcare organizations.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 516 Health Care Organizations and Management 3.0 Credits**

This course provides an introduction and overview to leadership, management, and organizational behavior in health care, reflecting the uniqueness of this sector. The course integrates theory with practice through readings, lectures, written assignments, and guest presentations from different organizational perspectives.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 519 Maternal & Child Health Policy 3.0 Credits**

This course provides an introduction and overview of Maternal and Child Health (MCH) policy at the local, state, federal, and global level, with attention to grassroots community-centered/-led pro-grams and advocacy, all within a framework of identifying and defining the structural root causes that perpetuate inequities. Students learn about the principles of MCH policy and the impact of policy on maternal and child health. The course examines structural racism, in particular, its role as a root cause in creating and reproducing MCH inequities. Students will have the opportunity to analyze MCH policy issues and to engage with local organizations to learn more about current policy efforts within their chosen area.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 550 Health Disparities: Systemic, Structural, Environmental & Economic 3.0 Credits**

This course explores racial and ethnic disparities in health status and access to health care, while examining interventions to eliminate them. Students learn to define and describe racial, ethnic and gender-related disparities, discuss underlying mechanisms, think critically about existing research on health disparities and develop proposals for reducing them.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 551 Historical and Contemporary Developments in Social Justice 3.0 Credits**

Courses will cover direct and indirect links between public health policies, political circumstances, social and economic conditions and effects on health of individuals and populations using the human rights framework.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 552 Perspectives on Gender, Race, Ethnicity, and Social Class 3.0 Credits**

This course will explore the history of concepts of gender, race, ethnicity and social class and probe the biology, sociology and constructed meanings of these deeply situated ideas.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 554 Issues in United States Health Policy 3.0 Credits**

This course introduces students to a selected set of health policy issues facing the US today, and that will challenge the nation in the foreseeable future. Emphasis is placed on effective problem definition and the identification of politically feasible solutions to the policy issues being studied.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 555 Violence, Trauma and Adversity in Public Health 3.0 Credits**

This course will provide an introductory focus on the public health policy and practice aspects of trauma, violence and adversity. The course will explore the history, epidemiology and psychobiology of trauma and adversity, look at exposure to adversity across the lifespan, and examine the impact of emerging knowledge on individuals, communities and systems. Students will have opportunities to examine trauma-informed approaches being applied to individuals, communities and systems and will analyze the policy and practice implications of these models as well as the translation from research to practice.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 556 Public Health Leadership 3.0 Credits**

Effective leadership is essential to the success of public health organizations charges with promoting, protecting, and improving community health. The course will explore the ways in which today's fields of public health and health care challenges leaders. Students can benefit from assessment of their individual leadership qualities and public health related case studies utilized by this course.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 557 Public Health and the Complexity of Mental Health Policy: Exploring Past, Present, and Future 3.0 Credits**

This course examines the past, present, and future of American mental health policy. It is impossible to understand mental health policy as it exists in the present or work on policies applicable to the future without an understanding of how we have ended up where we are today. The polarizing splits in discourse take many forms, all of which determine policy and are examined in this course thorough the questions of Who, What, When, Where, Why, and How.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit



**HMP 558 Organizational Stress through a Trauma-Informed Lens 3.0 Credits**

This course prepares students to become knowledgeable and capable employees and managers. Regardless of where one works, the impact of chronic stress is inevitable, and the toll it takes on individuals as well as members of families and various communities is high. This course will focus on group dynamics and all that goes awry when organizations experience acute stress, traumatic experiences, and chronic stressful conditions. The course prepares students to understand the dynamics and impacts of organizational stress and develop ideas for responding to it when they are in management positions.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 600 Public Health Advocacy and Activism 3.0 Credits**

Advocacy and activism play a critical role in translating public health findings into policy, practice, and supportive public opinion. This course will address specific advocacy skills including, but not limited to framing projects, planning advocacy campaigns, identifying partners, developing skills in traditional and new media, understanding the role of lawyers and the legal system, legislative advocacy and lobbying, and understanding grassroots/community organizing.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 601 Seminar in Fire Arms and Public Health Policy 3.0 Credits**

The seminar will focus on firearms and their impact on the public's health. Using recent events of mass firearm violence and urban violence, the seminar will seek to put into perspective the evolving policy discussion about the role of firearms in affecting the health of a range of populations through homicide, intentional injury, domestic violence, suicide, as well as general issues of population safety.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 602 The Politics of Food & Gender 3.0 Credits**

This course will examine the global food crisis and community nutrition in context of maternal and child health. Using current events and news stories, students will be introduced to the complex and diverse nature of the politics of food and agriculture, and how these dynamics manifest in the health and well-being of young children and their families.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 603 Health Systems Policy Analysis 3.0 Credits**

This course examines alternative approaches to structuring a nation's health system and reforming existing systems. Development of an analytic framework to explore health systems of different nations and performance evaluation of those systems.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 604 Resource Allocation and Budgeting for Government and Non-Profits 3.0 Credits**

This is a course in resource allocation and budgeting for non-profits and government. It is intended to give students an understanding on how budgets are created, what they mean, and how they reflect an organization's values and mission. It is not a finance course. Students will be asked to read, analyze, discuss and create budgets within a larger context of planning, program development, and management in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 610 Abolition Frameworks for Public Health: Transformative Policies for a New Society 3.0 Credits**

An abolitionist framework utilizes liberatory policy approaches to create the conditions for health and wellbeing. Through recognizing the United States' history and public health impact of colonization, slavery, Anti-Black racism, structural racism, capitalism, imperialism, ableism and patriarchy, an abolitionist framework views prisons, policing, standardized education, for-profit health care, and other systems as interconnected means of oppression and exploitation. Abolition seeks to dismantle those sources of control and to simultaneously envision and build new social, political and economic structures that ensure that power is with the people and communities to help all of us to live and flourish in a healthy society that promotes dignity for all.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HMP 802 [Min Grade: C] or HMP 550 [Min Grade: C]

**HMP 650 Management of Healthcare Outcomes 3.0 Credits**

This course addresses the management of healthcare outcomes from several perspectives: patient, patient care and health systems. It explores how absolute clinical outcomes are impacted by intermediate outcomes in healthcare delivery and how these are evaluated from an economic outcomes perspective. It also addresses disparities observed in achieving health outcomes.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 651 Managing a Public Health Agency 3.0 Credits**

Managing a Public Health Agency is a course designed to expose students to the practice of public health at the local level. The course focuses on the application of public health management and policy into public health practice. Through a series of modules and drawing upon the experience and expertise of colleagues at the Philadelphia Department of Public Health, Regional County Health Departments and other Federally Qualified Health Centers (FQHCs), this course explores both policy and management issues in practicing public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 657 Health Care Strategy and Operations: Creating Change 3.0 Credits**

During this case study-driven course, students will work independently as the senior management team of a health organization. A case specific to a particular health organization and community will be assigned and, in teams, students will be expected to develop a five year strategic plan for the organization that includes an integrated five year financial plan. The instructor will act as the CEO and to simulate as closely as possible the actual practice of management, the healthcare organization will have a real Board of Directors comprised of experts in a variety of fields, which will interact with the teams throughout the quarter.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HMP 512 [Min Grade: C]

**HMP 658 Trauma-Informed Leadership 3.0 Credits**

A paradigm shift is underway in understanding human beings and human groups and for want of a better term, this has become known as "trauma-informed" knowledge. The course integrates a knowledge base aimed at preparing leaders in any public health organization to create trauma-informed organizational cultures. This course is organized around key trauma-informed concepts and values embodied in using the word P.R.E.S.E.N.C.E as an acronym, with each letter representing two interconnected principles: Partnership and Power; Reverence and Restoration; Emotional Wisdom and Empathy; Safety and Social Responsibility; Embodiment and Enactment, Nature and Nurture, Culture and Complexity, and Emergence and Evolution.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 660 Public Policy and Advocacy 3.0 Credits**

This course covers the theory and practice of making policy in public health and in health care: what it is, who makes it, and how and when it is made successfully. It is also about U.S. health policy itself, focusing on several important policy issues and their historical context. This is all intended to help students in making decisions about, or advocating for, policies that reflect values that they hold and/or societal values that they support.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 661 Disability and Measurement 3.0 Credits**

Understanding the range of definitions and methods of measuring disability is essential to formulating effective policies and programs to support individuals with disabilities, their families and caregivers, and service providers. This course is grounded in the diverse methods for measuring the concept of disability and the presentation of disability across individuals and populations. Since the measurement of disability is a fundamental building block for the creation of policy, the linkage to policy processes and content will be a backdrop for discussion and course activities. The measurement of disability has a long history and is rapidly changing in the current policy environment. Historical and present-day approaches to disability measurement will be presented and discussed.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 662 Medicaid and Disability Policy 3.0 Credits**

People who qualify for Medicaid based on a disability include adults and children with disabilities that they have had since birth and others who have disabling conditions acquired through illness, injury, or trauma. Medicaid beneficiaries enrolled through disability pathways include those with physical conditions; intellectual or developmental disabilities; and serious behavioral disorders or mental illness. As such, Medicaid is the essential public program providing life-sustaining benefits to the disabled in the U.S. This course examines the public policy components of the Medicaid program related to eligibility, coverage, financing, and administration. The course also examines the history of the program to provide the context for understanding its present and future challenges.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 667 Professional Seminar for the Executive MPH Program 1.5 Credit**

This Seminar is a requirement of all students completing their MPH degree in the Executive program, providing a cohort-based component to the MPH experience. Using DSPH faculty and external partners, this seminar will enhance EMPH coursework and enable students to build connections between their academic experience and their public health careers.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 2 times for 15 credits

**Restrictions:** Can enroll if major is PHEX.

**HMP 701 Health Care Data Analytics 3.0 Credits**

This course is an introduction to health care data analytics concepts and methods for students who have had little previous data analytics coursework or experience. Topics to be covered in this course include: the creation of datasets, the structure of datasets, an introduction to data warehousing and working with large databases, an introduction to public health and healthcare datasets, methods for descriptive analytics, and an introduction to methods for predictive analytics.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 703 Introduction to GIS for Public Health 3.0 Credits**

This course will provide students with a solid foundation in acquisition, manipulation, analyses, and presentation of spatial data using geographic information system (GIS). This course emphasizes hands-on use of data from Philadelphia and other contexts to develop methodological expertise, explore spatial patterns in health, and understand issues of health disparities and social justice. Topics covered in this course include: acquisition of spatial data, data management, geocoding, symbolizing features, coordinate and projection systems, making maps for presentation, and introduction to spatial analyses.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 704 Using Data to Drive Policy and Practice 3.0 Credits**

Public policy is driven by advocates, lobbyists, consultants, and other stakeholders. Data is an important tool that is used by all of these groups to drive arguments/positions and inform public officials. This course is an intermediate course designed to teach graduate-level public health students techniques in gathering, analyzing and presenting data, including the use of basic statistical measures, to use an evidence base to inform public policy. This course exhibits a heavy applied component, teaching students how to collect, synthesize and report data, how to engage stakeholders with effective communication.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BST 555 [Min Grade: C]

**HMP 750 Integrative Learning Experience 3.0 Credits**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year MPH students. Organized as a 6-credit project over two quarters in year two, students will have the option to complete an internship, research project or culminating thesis to fulfill this requirement. Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product at the end of the experience. This is the first course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 751 Integrative Learning Experience II 3.0 Credits**

The Integrative Learning Experience (ILE) comprises the culminating experience required of full-time second-year MPH students. Organized as a 6-credit project over two quarters in year two, students will have the option to complete an internship, research project or culminating thesis to fulfill this requirement. Students may choose to work on an individual or group-based project. Students are required to complete a high-quality written product at the end of the experience. This is the second course in the sequence.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HMP 750 [Min Grade: C]

**HMP 752 EMPH Capstone I 2.5 Credits**

This course is the first of a 3-course sequence designed to fulfill the requirement that all Master of Public Health degree candidates have the opportunity, as described by the Council on Education for Public Health, "to synthesize and integrate knowledge acquired in course work and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice". In this course, students will learn the component tasks involved in case analysis, such as stakeholder analysis and the development of an action plan. Students will work in groups to analyze a case study of public health practice and policy, applying general and discipline-specific public health knowledge from their course work to the effective resolution of a public health problem.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PHEX.

**HMP 753 EMPH Capstone II 2.5 Credits**

This course is the second of a 3-course sequence designed to fulfill the requirement that all Master of Public Health degree candidates have the opportunity, as described by the Council on Education for Public Health, "to synthesize and integrate knowledge acquired in course work and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice". In this course, students will work in groups to analyze a case study of public health practice and policy, identify an effective resolution, develop an action plan for implementation, and articulate an evaluation strategy. Group presentations of the case analysis will be required. Students will then work in groups to identify and develop topics for new cases.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PHEX.

**HMP 754 EMPH Capstone III 2.5 Credits**

This course is the third and final course of a 3-course sequence designed to fulfill the requirement that all Master of Public Health degree candidates have the opportunity, as described by CEPH, "to synthesize and integrate knowledge acquired in course work and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice". In this course, students will work in groups to develop and write a new case study of public health practice and policy. The case will focus on a current and/or continuing public health challenge and will incorporate researched background data such as epidemiologic patterns and trends, organizational and financial data, and relevant issues such as political, cultural and social context.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PHEX.

**HMP 802 Health and Human Rights 3.0 Credits**

Health and well-being are intricately associated with fundamental human rights. This course will cover direct links between public health policies, political circumstances, and social and economic conditions and their effects on health of individuals and populations using the human rights framework.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 803 Health Systems Policy Analysis 3.0 Credits**

This course examines alternative approaches to structuring a nation's health system and reforming existing systems. Development of an analytic framework to explore health systems of different nations and performance evaluation of those systems.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH or PHD.

**HMP 808 Public Health Advocacy and Activism 3.0 Credits**

Advocacy and activism play a critical role in helping translate public health findings into policy, practice, and supportive public opinion. This course will address specific advocacy skills including, but not limited to framing projects, planning advocacy campaigns, identifying partners, developing skills in traditional and new media, understanding the role of lawyers and the legal system in advocacy work, legislative advocacy and lobbying, and understanding grassroots/community organizing.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH or PHD.

**HMP 810 Health Services Research 3.0 Credits**

Course provides an introduction to basic and "state of the art" methods for undertaking research and program evaluation within health services organizations and systems.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 811 Legal Aspects of Public Health 3.0 Credits**

This course covers legal and policy issues in the implementation of public health programs. It emphasizes underlying themes that frame these efforts.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH or PHD.

**HMP 812 Qualitative Methods for Health Policy Research and Practice 3.0 Credits**

This course will introduce the philosophy and methods of using qualitative research methods to understand and address public health policy and health services issues. The course will use the Chronic Care Model as a frame for considering the individual patient, the interaction between the patient and provider, the practice team, the community and the health systems as targets for understanding health services using qualitative methods. Within this context the course will cover development of appropriate qualitative research questions, data collection methods (including individual interviews, focus group techniques, ethnography). Analytic approaches to be covered will include grounded theory, narrative analysis, interaction/discourse analysis, content analysis as well as case-based/set theoretic methods.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 814 Research and Practice Workshop 1.5 Credit**

This course will consist of presentations of early-stage or otherwise unpolished practice or research projects in health policy and management by doctoral students and post-doctoral fellows, with discussion to determine relevant methodological, policy, practice, or implementation issues, as well as to offer constructive criticism and to identify possible collaborators. Department faculty will also be in attendance who will share their own research and practice ideas, giving doctoral students and fellows the ability to provide and receive constructive feedback.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 2 times for 4 credits

**Restrictions:** Can enroll if major is HMP or major is HSRP and classification is PhD and program is DRPH or PHD.

**HMP 815 Cost Benefit Analysis for Health Services 3.0 Credits**

This course will introduce students to various methodologies for economic evaluations of health care interventions. Great attention will be spent on understanding the differing methodologies for economic evaluation (cost-benefit cost, effectiveness-analysis, etc.), when these methodologies are appropriate, and the strengths/weaknesses of each.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 817 Public Health Workforce: Pedagogy and Development 3.0 Credits**

This course introduces doctoral students to key concepts in Public Health workforce development and training needs assessment. It will prepare students to assess training needs for their community, develop presentations, and design and teach learning modules for public health work-force development and undergraduate/graduate level courses.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 820 Methods in Implementation Science 3.0 Credits**

This course will enhance knowledge and skills to design, implement, and interpret interventions in clinical settings and health systems. This course offers learning methods to ensure that health care innovations and interventions are effective and reliable across the settings and contexts for which they are designed. The focus is designing practical experiments when the intervention(s) and the conditions under which they are being tested are changing over time.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 824 Policy Analysis for Population Health 3.0 Credits**

This course prepares students to conduct policy research to improve the health of populations. The content of this course is divided into two sections: one focused on policy process research and one focused on policy outcomes research. Policy process research is focused on generating knowledge about the contemporary, "real world" contexts in which health policy decisions are made. The purpose is to understand the sociopolitical complexities surrounding a policy issue so advocates can more effectively communicate research evidence and advance policy changes that improve population health. Policy outcomes research is focused on generating knowledge about the impacts that policies produce. The purpose is to determine the outcomes that are directly attributable to a specific policy, not other factors.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH or PHD.

**HMP 850 DrPH Practicum 0.0 Credits**

The course will provide students the opportunity to have a significant, advanced-level practice experience. Regardless of the amount or level of prior experience, all students will engage in one or more practice experiences in which they are responsible for completion of a project that is meaningful for an organization and to advance public health practice. Relevant organizations may include governmental, non-governmental, non-profit, industrial and for-profit settings.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH.



**HMP 852 Health Economics I 3.0 Credits**

This course is the first in a 2-course sequence in health economics. This course provides an introduction to the economics of health and health care. Topics covered include: the production of health, the demand for medical care, health care production and costs, determinants of the supply of medical care, payment systems, health insurance, problems in health insurance markets (adverse selection and moral hazard), and economic aspects of health care reform. Previous college-level coursework in economics is recommended but not required. Students are expected to have facility with high school algebra (including the understanding and graphing of functions).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 853 Health Economics II 3.0 Credits**

This course is the second in a 2-course sequence in health economics. Topics covered include: competition and market power in health care markets, managed care, hospitals, the healthcare workforce, an introduction to cost-benefit and cost-effectiveness analysis, pharmaceuticals and health technologies, and an introduction to behavioral economics in health. Students will have an opportunity to do an independent health economics project.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HMP 852 [Min Grade: C]

**HMP 856 Public Health Leadership 3.0 Credits**

Effective leadership is essential to the success of public health organizations charged with promoting, protecting, and improving community health. The course will explore the ways in which today's fields of public health and health care challenge leaders. Students can benefit from assessment of their individual leadership qualities and public health related case studies utilized by this course.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**HMP 857 Health Care Strategy and Operations: Creating Change 3.0 Credits**

During this case study-driven course, students will work independently as the senior management team of a health organization. A case specific to a particular health organization and community will be assigned and, in teams, students will be expected to develop a five-year strategic plan for the organization that includes an integrated five-year financial plan. The instructor will act as the CEO and to simulate as closely as possible the actual practice of management, the healthcare organization will have a real Board of Directors comprised of experts in a variety of fields, which will interact with the teams throughout the quarter.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD and program is DRPH or PHD.

**HMP 997 Pre-Dissertation Research 1.0-9.0 Credit**

This course will serve as an intensive introduction to the process of developing a dissertation proposal, leading to the student developing such a proposal based on their chosen area of focus.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP 998 DrPH Dissertation Guidance 1.0-12.0 Credit**

Candidates will conduct an investigation that is relevant to their work and career, i.e., addresses a problem or controversy faced by an organization or discipline. This project would integrate elements of a traditional research paper (e.g., background literature review, rationale, systematic approach, assessment of strengths and limitations of findings) with practice-based elements (e.g., addressing a practice-based question, use of case-study or consultation approach, emphasis on health care or public health impacts in framing conclusions and recommendations).

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP 999 PhD Dissertation Guidance 1.0-12.0 Credit**

Candidates must complete an original investigation. The dissertation must be based on the student's own work, worthy of publication, and acceptable to the student's committee. The steps in completing the dissertation should include completion of a literature review, articulation of the rationale for addressing the proposed research question(s), specification of proposed research methods, data collection/acquisition, analysis, and interpretation of the findings, including an assessment of strengths and limitations of findings and implications for future research, policy and practice.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP T580 Special Topics in Health Management & Policy 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP T680 Special Topics in Health Management & Policy 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP T780 Special Topics in Health Management & Policy 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP T880 Special Topics in Health Management & Policy 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**HMP T980 Special Topics in Health Management & Policy 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

# Health Services Administration

## Courses

### **HSAD 500 Historical Influences on the US Healthcare System 4.0 Credits**

This course provides a historical context for understanding the sociological, political, and economic forces that have shaped the evolution of healthcare in the U.S. Forces impacting health care are viewed from the perspectives of health care professionals, academic observers, economists, and the patient / consumer experience that parallels milestone periods in U.S. history.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 501 Managerial Epidemiology 3.0 Credits**

The focus of the course is on the role and use of epidemiologic tools in the field of health care administration. Epidemiologic techniques are applied to specific areas of health administration including needs assessment, planning, quality assurance, financing and economic analysis for the delivery of healthcare services to various populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 505 Ethical and Legal Issues in Healthcare Management and Policy 4.0 Credits**

Ethics and law are central to any health profession, including health administration. This course will focus on those central aspects. This course will survey classic and contemporary theories to understand the meaning of ethics and law, to make clear, effective decisions that respect both. Students will explore ethical dilemmas that often confront healthcare managers and administrators, with the ultimate goal always in mind of improving patient care. Problem-based learning will be utilized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 515 Practice issues in Healthcare Management 4.0 Credits**

Students are introduced to the applications of quality management in healthcare organizations. They will apply appropriate methods and distinguish the types of quality issues that prompt particular methods. Concepts such as team processes, patient involvement in Continuous Quality Improvement (CQI), outcome model of quality, customer satisfaction, and the role of Health Information Technology (HIT) in quality improvement will be covered in the context of current regulatory environment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 522 Applied Management Project 4.0 Credits**

The Applied Management Project ("Residency") continues work begun in HSAD 515: Practice Issues in Healthcare Management. Students work in groups for a week conducting observations and preparing a report and oral presentation of audit findings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HSAD 500 [Min Grade: B] and HSAD 505 [Min Grade: B] and HSAD 515 [Min Grade: B]

### **HSAD 525 National Health Expenditures 4.0 Credits**

This course examines the fundamental theory and tools used in determining the cost and quality of healthcare at the macro level. Students will learn what drives the cost of healthcare, government payer expenditures, and private services and care covered, health vs. illness expenditure, and cost-shifting models to conserve resources.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 527 Intro to Long Term Care & Post Acute Care Admin 4.0 Credits**

This course covers organization, administrative of long-term care services and post-acute services addressing the needs of the elderly and disabled populations. Long term care and post- acute care involves a description of the continuum of care, the types of providers and the range of services including nursing facilities, assisted living, housing, community-based services, and informal care giving. Also covered are the issues affecting integration across the continuum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 530 Politics and Policy of Healthcare Resources 4.0 Credits**

This course enables the student to delve deeply into the process of policy development at the federal, state and local levels. A review of the factors that influence actual legislation will provide a vantage point for understanding the power struggles in law-making and the role of a responsible citizenry.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 540 Resources, Recruitment and Retention in Healthcare 4.0 Credits**

The principles and functions of modern human capital management will be examined against the backdrop of a complex and evolving healthcare system. The course focuses on the role of human resources as a strategic partner in the planning, design, implementation, and evaluation of a 21st century healthcare organization. Projections of future workforce needs in response to a changing healthcare system will be analyzed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **HSAD 550 Strategic Planning for Healthcare Administration 4.0 Credits**

Combines principles of management with formal strategic planning to meet the healthcare needs of a defined population. Students learn how contemporary tools of organizational strategy are used in the health care environment, such as formulating goals and objectives, environmental scans, identifying core competencies, market analysis, strategic intent, and competitive advantage.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 555 Aging & Disability Policy in the US 4.0 Credits**

This course focuses on the public policy related to disability and aging in the United States. The first part of the course will provide a brief history of aging and disability policy, examine the fiscal effects of aging, discuss social security and entitlements, and review trends in population employment and retirement. The remainder of the course will focus on insurance reform, long term care, food insecurity, comparative analysis of strategies for aging societies, and the future of aging and disability policy reform.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 560 Advanced Healthcare Marketing 3.0 Credits**

This course examines the history of healthcare marketing, the contributions of marketing to the strategic objectives of healthcare organizations, and the effects of marketing on public relations and the consumer. It explores the fundamental concepts of marketing as applied to the health care sector and offers the student the opportunity to develop the basic marketing skill sets essential to the success of the health care administrator.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 561 Risk Management 4.0 Credits**

This course is designed to provide an in-depth understanding of healthcare risk management. Students are introduced to factors considered when creating a culture of safety, risk factors that influence the provision of evaluating levels of compliance and techniques that aid in evaluating conditions that may or may not alter desired clinical outcomes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 562 Group Dynamics & Leadership in Health Care Management 4.0 Credits**

This course explores issues of group dynamics, interdisciplinary teamwork, and leadership in the health care administration setting by focusing on the qualities, characteristics, and behaviors that successful teams and team leaders must manifest. The specific challenges inherent in today's current health care setting require broad leadership capabilities that are responsive to a fast-changing and risky global macroeconomic environment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 565 Global Health and Management Issues 4.0 Credits**

This course introduces students to key global health issues and some of the strategies for developing leadership, addressing health problems of particular populations and developing management skills for developing staff for health organizations in resource-poor regions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD 566 Evaluation and Assessment of Healthcare Systems 4.0 Credits**

This course introduces students to the processes used to identify the services, protocols, and production inputs that can strengthen medical delivery systems to improve health outcomes for both the patients and the communities they serve. Within the course, we will introduce theoretical frameworks for organizing gathered information about system processes through program evaluation methodology, the statistical tools for generating and interpreting evidence using data, and strategies for disseminating results to various stakeholders within the healthcare system.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HSAD I599 Independent Study in Health Services Administration 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HSAD T580 Special Topics in Health Services Administration 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

## Higher Education

### Courses

**EDHE 500 Foundations of Higher Education 3.0 Credits**

Study of historical growth and advancement of colleges and universities in U.S. from Colonial era to "virtual" public and private universities. Integrated overview of contemporary issues, policies and practices that characterize the operational environments of higher education institutions in the 21st century; including financial management, accreditation, curriculum, and institutional planning.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 501 Foundations of Higher Education and Governance 3.0 Credits**

This course focuses on the historical growth and advancement of colleges and universities in the United States from the Colonial era to "virtual" public/private universities and for-profit institutions. The course includes an integrated overview of contemporary issues, policies, and practices that characterize the operational and organizational environments of higher education institutions in the 21st century, including enrollment management, student affairs, financial management, institutional advancement, accreditation, curriculum, institutional research, assessment, and planning. The course introduces governance structures and the relationship between colleges and universities and the communities they serve.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 510 Governance, Management & Administration in Higher Education 3.0 Credits**

Organizational and administrative structures within the institutional hierarchy are explored as students examine the relationship between the university and the community it serves, the role of outreach in the modern university, and the role of faculty, staff, and student unions in academic operations and Risk Management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 520 Student Development & Customer Service Management 3.0 Credits**

Examines Academic Support and Student Life Services from customer satisfaction perspective including admissions, orientation, student health and counseling, and Greek life. Best practices in Customer Relationship Management are introduced.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 521 Student Development Theory and Application 3.0 Credits**

This course introduces students to student development theory and best practices that address student success in higher education. Theories examined in this course include, but are not limited to, psychosocial, cognitive-structural, person-environment, and humanistic existential. This course explores how academic and student support services are utilized throughout the student lifecycle. This course also examines the design and implementation of inclusive services and policies to improve outcomes for students across diverse, marginalized, and special populations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 530 Higher Education Law 3.0 Credits**

This course is designed to introduce students to the key laws and legal concepts that shape the operations of higher education institutions and the rights and responsibilities of administrators, faculty, staff and students. The course examines the issues involved in interpreting and applying laws and policies in a campus setting.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 531 Legal Issues & Ethics in Higher Education 3.0 Credits**

This course prepares students to navigate important education laws, legal concepts, and ethical issues relating to the operations of higher education institutions and the rights and responsibilities of administrators, faculty, staff and students. The course emphasizes the development of ethical leadership skills. Through the use of case studies and current issues in higher education, students will gain experience applying laws and policies across diverse institutional environments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 540 Outcomes, Assessments & Continuous Improvement 3.0 Credits**

Introduction to "typical" institutional accreditation process. Best practices presented for performing an institutional self-study, defining appropriate outcomes aligned with institution's strategic plan as well as introduction to appropriate quantitative and qualitative assessment methods.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 541 Institutional Assessment, Accreditation and Effectiveness 3.0 Credits**

This course introduces students to the institutional assessment and the accreditation process. Students learn to apply best practices for performing an institutional self-study. They learn to define appropriate outcomes for academic and administrative units. Students also learn to use appropriate quantitative and qualitative research methods to assess these outcomes. The course explores models for assessment of academic programs and institutional effectiveness.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 601 Strategic Planning & Evaluation 3.0 Credits**

Provides a survey of the theory and practice of planning and evaluation in higher education and nonprofit organizations. Includes development of critical issues, goals, strategies, outcomes research planning, and protocol development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 602 Managing Campus Operations 3.0 Credits**

Detailed overview of key areas affecting campus operations that fall under Finance and Administration units including parking and transportation, non-exempt HR, facilities management, construction, risk management, and environmental health. Introduction to campus master plan development process for strategic planning.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 606 Higher Education Career Development 3.0 Credits**

Provides understanding of career patterns of faculty, deans, vice presidents, provosts, and presidents while exploring academic employment markets of these professions. Traditional career paths, diverse points of entry in Higher Education and career development of faculty are explored as well as administrative roles of managing academic units, decision making and change implementation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 607 Higher Education Career Development, Leadership & Application 3.0 Credits**

This course provides an understanding of career paths within higher education and educational settings. Traditional and non-traditional career pathways are explored while developing critical skills for professional advancement or transition. The course also integrates leadership and technology to engage students in real-world practice across higher educational contexts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDHE 608 Leadership for Learning 3.0 Credits**

This course provides students with an understanding of leadership within the context of learning at the individual level and at the organizational level. Course content addresses traditional, contemporary, and alternative theories of leadership with connections to learning theories that facilitate individual and organization development in multiple contexts. E-Learning opportunities will be incorporated as mechanisms for addressing 21st century learning leadership. This course helps enhance their professional development to effectively lead in learning focused organizations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 620 Mind, Brain and Learning 3.0 Credits**

This course focuses on current and emerging research related to the learning sciences and Mind, Brain, and Education science. Neuromyths and evidence-based practices are explored. The course examines general neuroanatomy and processes associated with learning, memory, and emotion. Topics include neuroplasticity, brain imaging, differentiation, stress, and self-efficacy.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 621 Neuropedagogy and Assessment 3.0 Credits**

This course explores the connections between neuropedagogy, the learning sciences, and Mind, Brain, and Education science, and creative thinking. Evidence-based practices are examined including metacognition, Universal Design for Learning, spacing, interleaving, cognitive load, and feedback. Students are introduced to formative, interim, and summative assessment as well as technology platforms, tools, and applications that support mastery and transfer of learning. Students demonstrate their understanding of neuroplasticity, neuropedagogy, creative problem solving, and assessment through interactive real-world projects across educational and workforce environments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 622 Neurodiversity in Education and Workforce 3.0 Credits**

This course focuses on neurodiversity. The neurobiology of learning and memory is explored from the learning sciences and Mind, Brain, and Education science within the context of educational and work environments. The impact of practice, stress, and environment are examined in connection to neuroplasticity, memory, performance, and brain imaging. Students are engaged in peer-review and self-evaluation as they demonstrate technical and applied knowledge, creative critical-thinking, and communication skills through presentations and projects aligned neurodiversity and Universal Design for Learning across real-world contexts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 634 Proposal Writing & Sponsored Project Management 3.0 Credits**

Provides knowledge and skills required to acquire and manage sponsored projects from a variety of sources including learning and practicing process of developing proposal, organizational vision, goal setting, political realities, and budget in addition to compliance management and reporting.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 640 Foundations of Institutional Research 3.0 Credits**

Provides comprehensive understanding of institutional research including roles and responsibilities. Students are introduced to database systems, statistical software and research methods to explore multifaceted links of institutional research to key divisions within higher education institutions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 644 Student Assessments & Academic Program Evaluation 3.0 Credits**

Exposes research tools and theoretical models related to assessing student outcomes and student success measures. Benchmarking and importance of evaluating academic programs and curricula to proactively respond to institutional reporting requirements and accreditation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 646 Survey Tools, Statistical Software & Effective Reporting 3.0 Credits**

Introduction of latest survey tools and statistical software for institutional research. Develops skills related to data gathering and effective reporting with use of latest application and support technologies to maximize research related to institutional effectiveness, program evaluation, and student outcomes.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 650 Introduction to Enrollment Management 3.0 Credits**

Introduction to history of enrollment management and how it fits university system. Provides a strong understanding of enrollment process, organizational structure, federal and legislative issues, and importance of diverse student body.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 651 Strategic Enrollment Management 3.0 Credits**

This course introduces students to the history of enrollment management within the university structure. The course explores stages of the enrollment process, including: (a) Student Outreach: Marketing, Admissions, and Enrollment; (b) Student Engagement: Orientation, Advising, and Student Support Services; (c) Student Success: Retention, Time to Degree Completion, and Graduation Rates, and (d) Enrollment Optimization: Data, Analytics, and Reporting. Functional areas that contribute to an institution's Strategic Enrollment Management (SEM) effort are identified and reviewed. The course also examines the enrollment funnel, use of predictive data in conjunction with historical data, the link between Tuition Discount/financial aid and enrollment; and assessment metrics to use to evaluate an SEM plan.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 652 Enrollment Marketing, Recruitment & Retention 3.0 Credits**

Comprehensive overview of principles and practices of strategic process including marketing and recruitment through graduation. Exposure to contemporary issues and legal problems in enrollment management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 653 Marketing, Recruitment & Financial Aid 3.0 Credits**

This course provides a comprehensive overview of marketing and student recruitment in higher education explored within an enrollment management context. The course includes a review of the structural issues and trends affecting student enrollments. The course examines the components of a strategic enrollment management plan in alignment marketing, recruitment, and financial aid.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 654 Financial Aid & Enrollment Management 3.0 Credits**

Strategic relationships between financial aid and enrollment management are examined in order to secure desired student mix. Financial Aid guidelines and career management strategies are discussed to explore integration of traditional student financial aid and development of aid packages.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 655 Civic Engagement in Higher Education 3.0 Credits**

This course explores civic engagement in the context of higher education. Current and historical frameworks of civic engagement and research university-community partnerships are examined. Students develop skills to support engaged teaching, learning, and research within educational contexts. The course also investigates how institutions of higher education can institutionalize a civic mission.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 656 Enrollment Management Database Systems & Management 3.0 Credits**

Provides hands-on experience with database systems and programs that support enrollment management offices incorporating Microsoft suite application, SCT Banner, and People Soft. Collaborative assignments will require student manipulate, analyze and report data in different database systems. Strategies to "optimize" the recruitment mix to maximize state budget allocations are examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 661 Critical Issues & Risk Management in Student Affairs 3.0 Credits**

This course is designed to give students an understanding of contemporary critical issues and risk management in student affairs. The broad survey of critical issues will provide students exposure to a range of topics that directly affect student affairs units, including but not limited to, the student lifecycle from orientation to graduation; campus climate; student expectations; alcohol and drugs; personal, physical and environmental safety; education, training, and prevention; mental health/wellness; and crisis response and communication. The course explores new and existing approaches to proactively manage and resolve issues related to student affairs and risk management.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 662 Critical Issues in Student Affairs 3.0 Credits**

Profession of Students Affairs and most critical issues examined through use of current texts and articles. Topics include overview of the field, diversity, fiscal/budgetary issues assessment and staff training and development. Other topics include campus conduct, academic integrity, freedom of speech, sustainability and other current issues.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 663 Safety and Crisis Management 3.0 Credits**

Examination of a broad range of campus safety and crisis management issues and exploration of safety and security strategies and consideration of essential elements of a model crisis response plan. Students will work toward understanding macro and micro safety and security issues and responses, and will design a sample crisis response model as the final course assignment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 664 Strategies for Educational Success 3.0 Credits**

Examines research on historical and contemporary responses to inequality in education; includes multicultural education, culture of poverty, single race/sex schools; addresses new trends and strategies affecting equity in education, including immigrants, sexual identity, age, gender, organizations, developmental education, and special needs learners (i.e. older adult learners and students with disabilities).

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 665 Student Success: Learning and Innovative Support Services 3.0 Credits**

This course examines historical and contemporary theories and research on student success. This course also explores effective policies, practices, and services that can be implemented to promote student success throughout the student lifecycle. Students examine the fundamental principles of student learning inside and outside the classroom through current and emerging research from the learning sciences and Mind, Brain, and Education (MBE) science. Student and academic support service models are reviewed to promote transformative student success practices and strategies. Students review innovative services to support student success and enable students from diverse backgrounds to achieve their educational goals and aspirations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 668 Transformational Leadership 3.0 Credits**

Reviews research about community college leadership, with an emphasis on transformational leadership, creation and implementation of a vision; develops skills in how to identify, interact, and mobilize key community organizations and constituents with an emphasis on board relations and community development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 669 Diversity in Higher Education 3.0 Credits**

Course examines research on issues of race, class, gender and disability in education in historical and contemporary contexts; emphasizes evidence-based data analysis, specifically qualitative analysis of data; introduces qualitative analysis of data, assumptions, designs, collection, analysis, and research ethics.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 714 Introduction to Research Methods 3.0 Credits**

This course will introduce students to the process and conduct of educational research. Students will learn about the characteristics of specific research designs and will review a research study employing the specific design. Students will use established criteria given evaluate research studies. There will be an emphasis on the purpose and function of the review of the literature in educational research. Survey and interview design will also be discussed.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDHE 715 Higher Education Co-op I with Portfolio 1.5 Credit**

The HE co-op I is the first half of a two quarter sequence in which students work in administrative offices to incorporate their knowledge and develop skills learned in the HE program. The first half of the co-op is designed to prepare students to undertake the hands-on co-op projects they will begin in the second quarter of the co-op.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HE.

**EDHE 716 Higher Education Co-op II 4.5 Credits**

Students are required to participate in a part-time co-op that lasts no less than two quarters (20 weeks). The co-op is structured to provide students with real-life, hands on experience in higher education. Students work in administrative offices and incorporate the skills and tools they have garnered in the MSHE program.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HE.

**EDHE I599 Independent Study in EDHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE I699 Independent Study in EDHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE I799 Independent Study in EDHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE I899 Independent Study in EDHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE I999 Independent Study in EDHE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE T580 Special topics in EDHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE T680 Special topics in EDHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE T780 Special topics in EDHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE T880 Special topics in EDHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDHE T980 Special topics in EDHE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## History

### Courses

## Homeland Security Management

### Courses

## Hotel & Restaurant Management

### Courses

**HRM 501 Foundations of the Hospitality Industry 3.0 Credits**

This is a gateway course to provide students of various backgrounds the information and conceptual tools needed to grasp the fundamentals of the global hospitality industry as understood in its widest sense. Students will become familiar with the production and distribution of hospitality products. Trends in the industry will also be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HRM 505 Customer Service for Professionals 3.0 Credits**

This course covers the principles of managing in a service environment with an emphasis on procedures and results that are necessary for all service organizations. Analysis, planning, and problem solving strategies will be examined to empower successful customer oriented employees along with consideration of factors that influence customer service organizations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 515 Destination and Resort Management 3.0 Credits**

A study of destination and resort management from a global perspective including strategic planning and competitive analysis of domestic and international resort destinations. Students will study the various aspects of resort management in the context of high levels strategic planning that includes market research, market positioning, feasibility studies, and revenue forecasting for resort destinations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 520 Hospitality Management Information Systems 3.0 Credits**

Covers the use of technology and computer information systems in the hospitality industry. The course emphasizes high level strategic planning for leveraging technology and information systems to gain competitive advantages and improve a business's position in the marketplace. Includes structured decision making in the acquisition and implementation of technology including feasibility analysis and financial forecasting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 555 Hospitality Human Resource Management 3.0 Credits**

This course will study the human resource function from a strategic and developmental standpoint within a variety of hospitality and tourism contexts.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 565 Culinary Tourism 3.0 Credits**

This course explores culinary tourism opportunities, the role of food tourism in developing, sustaining and promoting regional identities, and draws knowledge and presents perspectives from the fields of anthropology, folklore and foodways, and food and tourism studies. Although taught online, it will include engaging field trips.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**HRM 572 Gaming Information Systems 3.0 Credits**

Covers the use of technology and computer information systems in the casino industry. The course emphasizes high level strategic planning for leveraging technology and information systems to gain competitive advantage and improve a casino's position in the marketplace. Includes structured decision making in the acquisition and implementation of technology including feasibility analysis and financial forecasting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 520 [Min Grade: C]

**HRM 575 Current Issues in Gaming 3.0 Credits**

This course will examine current issues in the casino and gaming industry. An in-depth examination of trends, policies, and impacts on gaming operations with an emphasis on casino operations will be potential topics for discussion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 595 Economics of Tourism 3.0 Credits**

This course explores the economic issues that influence the tourism industry and examines the sociological dynamics shaping the tourism environment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 610 The Global Tourism System 3.0 Credits**

An in-depth investigation of the components of the global tourism system to provide the conceptual framework for students to understand the economic dynamics of tourism. The course will familiarize students with the major areas of production and distribution of hospitality products. Future trends in tourism will be examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 612 Tourism and Sustainability 3.0 Credits**

Students in this course will examine limits to mass tourism and alternatives such as ecotourism, community-based-tourism pro-poor tourism, and their contributions to sustainable world development. Other topics include how environmental changes affect tourism and how tourism affects the environment and the role of tourism in economic development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 614 Tourism Development 3.0 Credits**

This course will provide an in-depth evaluation of the major issues in travel and hospitality development. It will review the relationships among development and tourism development, differences between attractions and products, defining target markets, elaborating development plans, destination management, and measuring success.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 616 Tourism Marketing and Branding 3.0 Credits**

This course will cover the major issues related to the marketing of travel and tourism products according to the specific nature of the travel and tourism industry. The course will include strategic marketing, travel market analysis, and the major tools available for creating successful marketing and branding of travel and tourism products.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]



**HRM 650 Strategic Management & Leadership in Hospitality 3.0 Credits**

This course covers the concepts of strategic management in the hospitality business environment and the role of strategic leadership practices. Strategic decision making principles will be examined to create competitive advantages for hospitality industry leaders and organizations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C] and PRST 503 [Min Grade: C]

**HRM 670 Casino Financial Analysis 3.0 Credits**

This course covers the unique aspects of analyzing the financial results of casino programs and product offerings including marketing promotion analysis, special even manifest analysis, player development, executive profit and loss, table game mix, and slot floor product and position analysis. Volume forecast methods will also be studied.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 520 [Min Grade: C]

**HRM 672 Security and Risk Management 3.0 Credits**

This course covers strategic issues in casino security including high-level planning and risk analysis. Students will complete an in-depth case study analysis of court cases in the casino and hospitality industry that can potentially have a significant impact on capital expenditures and operating strategies. Students will learn to analyze risk and make effective strategic decisions regarding loss prevention.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 572 [Min Grade: C]

**HRM 674 Tribal Gaming Management 3.0 Credits**

This course explores the topics of gaming, casino management, sovereignty, and other public policy issues. In addition, tribal casino management will be emphasized to examine the unique operational and developmental aspects of this type of gaming.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501 [Min Grade: C]

**HRM 676 Casino Marketing 3.0 Credits**

This course covers the unique aspects of casino marketing including player loyalty programs, promotional strategies, customer relationship marketing, branding, database marketing, player development and junket programs. The course is taught from a global perspective with an emphasis on strategy and positioning in the marketplace.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 505 [Min Grade: C]

**HRM 680 Research Methods for Hospitality and Tourism 3.0 Credits**

This course presents strategies for approaching hospitality research. Students will explore how to find, read and analyze scholarly articles, consult and conduct a literature review, read and write purpose statements and research questions; explore quantitative and qualitative research methods, strategies for data collection; strategies for analyzing and interpreting data; and reporting research results and recommendations in various presentation and publishing formats.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** HRM 501

**HRM 997 Research Project in Hospitality Management 1.0-12.0 Credit**

Students consult with a faculty advisor to identify a suitable problem area in hospitality management and develop and carry out appropriate methodology to address the problem. This course may be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 12 credits

**Prerequisites:** HRM 501 [Min Grade: C] and PRST 504 [Min Grade: C]

**HRM I599 Independent Study in HRM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM I699 Independent Study in HRM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM I799 Independent Study in HRM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM I899 Independent Study in HRM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM I999 Independent Study in HRM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM T580 Special Topics in HRM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM T680 Special Topics in HRM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM T780 Special Topics in HRM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM T880 Special Topics in HRM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**HRM T980 Special Topics in HRM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

## Human Resource Management

### Courses

**HRMT I599 Independent Study in HRMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT I699 Independent Study in HRMT 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT I799 Independent Study in HRMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT I899 Independent Study in HRMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT I999 Independent Study in HRMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT T580 Special Topics in HRMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT T680 Special Topics in HRMT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT T780 Special Topics in HRMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT T880 Special Topics in HRMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**HRMT T980 Special Topics in HRMT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Industrial Design

### Courses

## Information Science & Systems

### Courses

**INFO 505 Information Professionals and Information Ethics 3.0 Credits**

Surveys the social, ethical, and legal issues that affect information professionals and organizations. Addresses such topics as access to and ownership of information, intellectual freedom, and privacy. Studies the structure and components of the information professions and the evolving role of information professionals.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 506 Users, Services, & Resources 3.0 Credits**

Introduces the principles and practices of providing effective information services for a variety of user communities. Develops practical skills in meeting users' information needs. Focuses on current methods of providing information services and instruction in different contexts and techniques for evaluating reference sources and services.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 507 Leading and Managing Information Organizations 3.0 Credits**

Introduces basic theories, approaches, and concepts of leadership, management, and organizational behavior as they apply to libraries, archives, and other information organizations. The course explores principles, practices, and techniques needed to develop and enrich effective information organizations.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 508 Information Innovation through Design Thinking 3.0 Credits**

This introductory course provides an overview of basic phases of design processes for students in information disciplines. Design thinking is a way of engaging with the world that emphasizes creativity and constructive change; students will learn about techniques for several key design practices: empathizing with others, framing a problem, ideation, experimentation, and storytelling. By applying these techniques in a variety of contexts related to information, students will practice innovation in the information professions with an emphasis on understanding the social implications of potential innovations.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 517 Principles of Cybersecurity 3.0 Credits**

Provides the foundation for understanding the key issues associated with protecting information assets, determining the levels of protection and response to security incidents. Presents a general overview and is suitable for individuals with little exposure to IT security.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 532 Software Development 3.0 Credits**

Provides a hands-on introduction to software development. Includes programming concepts and a series of programming exercises done by students working in pairs or in small groups. Also covers general concepts and issues in software development to help students understand why creating high quality software is very difficult.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 540 Perspectives on Information Systems 3.0 Credits**

Examines various types of information systems and the ways in which these systems support activities of individuals and organizations. Investigates application architectures that occur commonly in information systems. Provides an overview of knowledge domains that comprise the information systems discipline.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 546 Data Analytics for Community-Based Data and Service 3.0 Credits**

This course utilizes in-class lectures and partnerships with a community small business or non-profit to assess the data and information needs of, design data-driven methods for, and proposal and/or develop sustainable data infrastructure to those community organizations. Through academic readings, in-class facilitation, and seminars, students will explore civic engagement, democratic participation and community change in urban settings. They will learn community information needs assessment, decision making, and information use, representation, and visualization. At the same time, students will identify a community small business or non-profit organization as their client and meet the client for two hours each week, working with community organizations in need of data analytics support.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 547 Design Thinking for Digital Community Service 3.0 Credits**

This course pairs one LIS student and one library or other information organization paraprofessional to work together to identify a community-based digital information need. Student pairs also design collaborative programs to address identified needs. Course delivery takes the form of a side-by-side community-based learning (CBL) to foster understanding of community needs assessment and methods for developing effective information services to meet community-specific needs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 552 Introduction to Web Design for Information Organizations 3.0 Credits**

Introduction to creating websites that incorporate interactive web services to support users in information organizations. Students learn to establish websites that meet usability, accessibility and intellectual property standards, via composition of text and graphic files, and use of scripts for interactive application to support community information resource needs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 560 Introduction to Archives I 3.0 Credits**

Provides an introduction to the theory and practice of archives, including an overview relating to the elements of an archival program and the role and work of archivists. Focuses on the functions of the archives, such as acquisition, appraisal, arrangement and description, preservation, reference, outreach, and technology in archives.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 561 Introduction to Archives II 3.0 Credits**

Continues the introduction to archival theory and practice begun in Introduction to Archives I. Provides additional depth in several areas, including appraisal, arrangement and description, focusing on model and standards. Addresses legal, ethical, cultural, and political issues as well as the range of historical and contemporary archival formats.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 590 Foundations of Data and Information 3.0 Credits**

Introduces and explores principles, techniques, and theoretical contexts of data, information, and digital content across a range of settings. Addresses organizing practices and knowledge, and implications for back-end system functionality, and front-end user access. Addresses existing and emerging data standards and tools applicable to data and information, as well as social and economic aspects, services, and future boundaries and contexts for data and information. Specific topics include information structures and standards, representation, metadata, knowledge organization, classification, linked data, network analysis, interface design, and AI implications.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 591 Data and Digital Stewardship 3.0 Credits**

Examines traditional and emerging approaches to data management, data curation, and data service across the full range of information organizations (including, libraries, archives, museums, data centers, software industries, etc.). Introduces foundations of data infrastructures and data representation in all the activities related to care and management of digital objects over their lifecycles. Discusses methods and issues related to accessibility, security, preservation, privacy and ethics of using and managing digital records.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 590 [Min Grade: C] or INFO 522 [Min Grade: C]

**INFO 600 Web Systems & Architecture 3.0 Credits**

This course presents the fundamentals of data communications and software architectures for distributed computing technologies. It introduces students to key web systems technologies and architectures, including hardware configurations, HTTP, HTML, XML-based data standards and other major software components.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 540 [Min Grade: C] (Can be taken Concurrently) or INFO 590 [Min Grade: C] or CS 502 [Min Grade: C] or INFO 532 [Min Grade: C]

**INFO 605 Database Management Systems 3.0 Credits**

A first course in database management systems. Covers a broad introduction to database management issues, techniques, and systems. Topics to be covered include database issues, evolution and landscapes of database systems, relational databases, database systems lifecycles, database analysis and design using the Entity-Relationship model, SQL, indexes, views, security, and transaction concepts. Emphasizes concepts and techniques related to relational database systems and hands-on experience in creating, using, and querying simple database applications using SQL.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 606 Advanced Database Management 3.0 Credits**

An advanced course for database professionals. Focus on data engineering aspects of relational database systems. Topics include advanced database design techniques using the Entity-Relationship Model, normalization and denormalization, Security and Database Administration, advanced query processing techniques using SQL, and database application developments using PL/SQL procedures, functions, triggers, and packages.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 605 [Min Grade: C]

**INFO 607 Applied Database Technologies 3.0 Credits**

Covers principles, techniques, and database systems related to managing big data. Topics to be covered include business intelligence, data warehousing, online analytic processing (OLAP), ETL, big data architectures, and hands-on experience in managing unstructured data management using a NoSQL database.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 605 [Min Grade: C]

**INFO 608 Human-Computer Interaction 3.0 Credits**

Focuses on the physiological, psychological and engineering basis of design and evaluation of human-computer interfaces covering such topics as; theoretical foundation of HCI; cognitive modeling of user interactions; task analysis techniques for gathering design information; iterative design cycles; formative and summative usability testing; and project planning and report writing.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 609 Accessible and Inclusive Design 3.0 Credits**

Introduces students to the methods, standards, and principles for designing and evaluating interactive technologies for diverse users. Focuses on people not typically considered in technology design, including people with disabilities, children, the elderly, women, and people from other vulnerable populations. Offers students hands-on experience in designing and evaluating technologies for a broad spectrum of users, and invites students to reflect on the role of design in shaping a just society. Covers models of disability, assistive technology, universal design, accessible visual design, and web accessibility standards. Additional topics may include localization, technology and mental health, feminist HCI, technological racism, and related issues.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 508 [Min Grade: C], DSRE 620 [Min Grade: C], INFO 608 [Min Grade: C] (Can be taken Concurrently)

**INFO 612 Knowledge-based Systems 3.0 Credits**

Focuses on methods, sources, and uses of knowledge, knowledge representation, and knowledge engineering (e.g., elicitation) within artificial intelligence (AI) agents and applications. This course educates students on various knowledge-based approaches such as ontologies, reasoning methods, cognitive architectures, and on the incorporation of knowledge into data-centric methods such as neuro-symbolic systems.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] or CS 501 [Min Grade: C] or CS 570 [Min Grade: C]

**INFO 615 Designing with Data 3.0 Credits**

Although user experience design has always involved collecting data about users' needs and preferences, new forms and quantities of user data have created a need for new data analysis skills and professional ethics training among designers. This class introduces students to A/B testing and statistical methods to prepare them to design and run large scale user experiments that can inform design decisions. Students practice using tools and methods as well as composing experiment reports and design recommendations.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)



**INFO 616 Social and Collaborative Computing 3.0 Credits**

Surveys theory and research literature on socio-technical issues and concepts in computer-supported cooperative work and social computing. Covers topics such as group work in collocated, distributed, and domain-specific contexts; design, implementation and evaluation of collaborative software; social media and online communities; computer-supported collaborative learning and community-learning technologies; and future directions of collaborative and social computing.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 608 [Min Grade: C], INFO 508 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 620 Information Systems Analysis and Design 3.0 Credits**

Offers an advanced treatment of systems analysis and design with special emphasis on object-oriented analysis and design techniques based on the Unified Modeling Language (UML). Discusses major modeling techniques of UML including use-case modeling, class modeling, object-interaction modeling, dynamic modeling and state diagrams and activity diagrams, subsystems developments, logical design, and physical design.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 623 Social Network Analytics 3.0 Credits**

The goals of this course are to understand the social network analysis methods and how they can be applied in studying the social network properties in both online and physical environments. The course introduces the knowledge and tools necessary for conducting social network analysis which is widely used in the social and behavioral sciences, social computing, economics, marketing, and informatics. The social network perspective focuses on relationship among social entities. It covers graph and matrix representation, centrality and prestige measures, cohesive analysis, positional and role analysis. Students gain practical experience with social network analysis and visualization tools.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 624 Information Retrieval Systems 3.0 Credits**

Covers the theoretical underpinnings of information retrieval to provide a solid base for further work with retrieval systems. Emphasizes systems that involve user-computer interaction. Covers aspects of information retrieval including document selection, document description, query formulation, matching, and evaluation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 540 [Min Grade: C], DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) or INFO 590 [Min Grade: C] or CS 502 [Min Grade: C]

**INFO 629 Applied Artificial Intelligence 3.0 Credits**

Artificial intelligence (AI) is a computing field of study dedicated to the design and development of algorithms that perform complex tasks allowing computers to reason, perceive, act, and react. This course educates students to master concepts such as which problems can be solved by AI methods, how to associate AI methods with problems and complex tasks, make informed decisions on which method is the most suitable, and analyze new methods in the literature. Mastering these concepts allows students to assess a problem context and propose adequate strategies for AI applications. The methods whose applications we discuss include neural networks, deep learning, knowledge-based methods, search algorithms, in problem contexts such as biomedical, manufacturing, driverless cars, etc.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] or CS 501 [Min Grade: C] or CS 570 [Min Grade: C]

**INFO 633 Information Visualization 3.0 Credits**

Introduces concepts and principles of information visualization from both theoretical and practical perspectives. Emphasizes the development of critical thinking and problem solving abilities in the context of information visualization. Provides exposure to current information visualization tools.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 634 Data Mining 3.0 Credits**

This course introduces the concepts and principles of knowledge discovery in databases (KDD), with a focus on the techniques of data mining and its function in business, governmental, medical or other information-intensive environments.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) or INFO 605 [Min Grade: C]

**INFO 646 Information Systems Management 3.0 Credits**

Addresses information technology-enabled change and policy issues in the management of information systems (IS). Stresses systems development, staffing and organization, technology infrastructure, project selection, justification and funding, and data. Studies the issues and their resolution in the context of an IS plan. Emphasizes communication about the issues to senior management.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C]

**INFO 648 Healthcare Informatics 3.0 Credits**

The course presents an overview of all aspects of healthcare informatics, including medical, nursing and bioinformatics. It provides an introduction to the applications of information systems in a variety of healthcare environments, including education, research and clinical settings. It includes extensive reading and critical discussion of relevant professional research literature.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 649 Library Programming 3.0 Credits**

Provides an overview of the broad range of cultural, educational, and social library programming initiatives available for children, adolescents, and adults in academic libraries, public libraries, and school library media centers. Teaches community analysis, planning and evaluation. Emphasizes the collaborative nature of developing and implementing library programs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 650 Public Library Service 3.0 Credits**

Surveys information services provided through public libraries, with attention to governmental and funding issues, determinants of use, extending services to non-users, and cooperation among libraries.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 651 Academic Library Service 3.0 Credits**

Examines the role of library service in higher education, with emphasis on problems of organization, administration, services, and the relationship of the library to the overall educational program.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 655 Intro to Web Programming 3.0 Credits**

Provides a hands-on workshop in programming for Internet information systems using an appropriate programming language (Java is used currently). Covers fundamental concepts such as object-oriented programming, client-server programming, multi-threaded programming, graphical user interface design, and application development.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 532 [Min Grade: C] or INFO 552 [Min Grade: C]

**INFO 657 Digital Library Technologies 3.0 Credits**

Introduces technologies that enable the design and implementation of digital libraries. Focuses on hands-on activities relating to content description technologies (such as XML) systems technologies, and user interface technologies. Students learn through building components of digital libraries collaboratively.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 552 [Min Grade: C] or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C]

**INFO 659 Introduction to Data Analytics 3.0 Credits**

Provides an overview of data analytics foundations and techniques for information professionals. Introduces fundamental concepts and theories of data and data science. Discusses methods and techniques of data representation, data analysis, and data visualization. Covers a range of tools and systems that can be used to discover insight and derive values from data.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or INFO 648 [Min Grade: C]

**INFO 660 Cataloging and Classification 3.0 Credits**

Introduces and provides intensive practice in the fundamentals of library cataloging and classification with primary focus on modern printed materials, but also includes reference to other media. Instruction on critical reading, interpretation, and use of current professional standards and documentation for the creation of MARC records. Encompasses discussion of relevant historical and theoretical issues in the construction of contemporary bibliographic databases.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 662 Metadata and Resource Description 3.0 Credits**

Introduces the critical roles played by metadata for resource description and discovery. Provides instruction on application and implementation of current metadata schemes and tools. Provides practice in creating metadata records, analyzing the usage of metadata elements and vocabulary schemes, and evaluating the metadata quality of digital repositories.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 665 Collection Management 3.0 Credits**

Introduces the basic steps of collection management, including community analysis, planning, policy preparation, selecting & acquiring materials, evaluating, preserving and publicizing collections. Explores a variety of related issues, including the impact of user expectations, publishing trends, electronic access, resource sharing, and outsourcing, on collection management.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 670 Cross-platform Mobile Development 3.0 Credits**

Introduces students to advanced client-server technologies for web programming and mobile application creation. Focuses on the concepts and practices of mobile development using a cross-platform framework and mobile-oriented HTML/CSS/Javascript libraries. Emphasizes client-side design and integration with server APIs. Addresses related design patterns, frameworks, and team processes for web-based mobile programming. Topics include: Web programming and mobile-oriented web/app design; Cross-platform mobile development (e.g. with Cordova/PhoneGap); Design for client and server integration with API layers; App development with mobile interfaces, libraries, and plugins; Web/mobile programming frameworks and design patterns (e.g. MVC).

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 655 [Min Grade: C]

**INFO 680 US Government Information 3.0 Credits**

Studies the nature of United States federal government documents and techniques for their acquisition, organization, and use.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 682 Storytelling 3.0 Credits**

Provides an overview of the study and practice of storytelling in face-to-face and digital environments. Familiarizes students with a wide range of print and digital storytelling resources from a variety of world cultures. Focuses on oral presentation and organization skills.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 683 Resources for Children 3.0 Credits**

Acquaints prospective professionals with the resources published for use by and with children in grades K to 8. Provides an opportunity to develop basic standards for evaluation of resources. Includes recent research concerning children and the central role of resources in the development of their reading/viewing/listening interests and tastes.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 684 Resources for Young Adults 3.0 Credits**

Acquaints prospective professionals with the materials intended for use by and with young adults. Provides an opportunity to develop basic standards for evaluation of materials and to learn about recent research concerning young adults and their information needs, reading interests, tastes, and development.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 687 Issues in Information Literacy 3.0 Credits**

This course covers two broad topics: 1) the concept of information literacy and related key issues such as information accuracy, authenticity, privacy, and how information evolves in online environments; and 2) how people learn—basic learning theories, approaches, and preferences that can be applied in a variety of information contexts, such as public libraries, academic libraries, special libraries, corporations, and government entities.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 690 Understanding Users: User Experience Research Methods 3.0 Credits**

This course introduces common user experience (UX) research methods that designers use to inform, generate, and test design ideas. Students will learn about and practice a series of research methods such as interviewing, field studies, focus groups, card sorting, and surveys, to understand users' needs, preferences, and experiences with computing systems. Students will learn about how different data collection techniques serve different purposes in the design process and select or adapt appropriate methods to meet their needs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 691 Prototyping the User Experience 3.0 Credits**

This course introduces students to prototyping techniques and tools for a range of user experience and design contexts. Students will learn about and practice a series of methods such as sketching, wire-framing, physical prototyping, functional prototyping, and wizard-of-oz approaches. Students will learn about how different prototyping techniques serve different purposes in the design process and select or adapt appropriate methods to meet their needs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 508 [Min Grade: C], INFO 608 [Min Grade: C], DSRE 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 692 Explainable Artificial Intelligence 3.0 Credits**

Machine learning (ML) are data-centric artificial intelligence (AI) methods that became popular as an approach to produce value from data. ML methods produce specific decisions that are narrow and opaque. The more mature field of interpretable ML has provided principles to the recent field of explainable AI (XAI) to produce explanations and make ML methods more transparent and to support user needs with explanations. This course will educate students on the motivations, methods, and the value of XAI. The emphasis is on approaches that help humans comprehend various facets of a ML method such as its decisions, its strengths and weaknesses, and its evaluation. The XAI methods studied are grouped in categories of perturbations, masks, gradient, propagation, intrinsic, twins, proxy, and instance attributions.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 629 [Min Grade: C] or CS 510 [Min Grade: C] or CS 613 [Min Grade: C] or CS 615 [Min Grade: C]

**INFO 693 Human–Artificial Intelligence Interaction 3.0 Credits**

As AI becomes more broadly embedded in technologies used by people, it is increasingly important to consider human-AI interaction design as part of the AI system development process. This class introduces the unique design challenges presented by AI. It explores questions of usability and user experience specific to AI systems, and it reflects more broadly on the relationship between humanity and emerging technologies. Students will practice skills in design, research, and writing relevant to the human side of AI. Topics include interactive system design, speculative design, algorithmic fairness, explainable AI, human augmentation/amplification, data ownership, and AI ethics. No programming experience required.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 710 Information Forensics 3.0 Credits**

Focuses on the principles and practices of the forensic investigation and analysis of information in modern organizations and distributed information systems. Includes studies of information processes, events, time measurement, casual factors, information volatility, technical and procedural forensic methods, rules of evidence and case law.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 502 [Min Grade: C] or INFO 517 [Min Grade: C]

**INFO 712 Information Assurance 3.0 Credits**

Describes how to protect an organization's information resources and assets within national and international context. Topics include organizational policies and assurance requirements, relationships between assurance and security, and information assurance planning assessment and management.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** DSCI 511 [Min Grade: C], DSCI 521 [Min Grade: C] (Can be taken Concurrently) or INFO 540 [Min Grade: C] or INFO 590 [Min Grade: C] or CS 502 [Min Grade: C] or INFO 517 [Min Grade: C]

**INFO 725 Information Policy and Ethics 3.0 Credits**

Introduces the philosophical, conceptual, and practical fundamentals, foundations, and issues—past and present—of information policy and ethics including computing, data, and management. Foci include policies in government documents, issues relating to the practical development and implement of information policies for a variety of organizations, companies and governments, the uses and abuses of information, human moral agency in relation to new information and communication technologies, and the meaning of social responsibility in the global information society.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 731 Managing Health Informatics Projects 3.0 Credits**

Introduces sociotechnical issues encountered when implementing informatics projects in diverse health-related settings. Students apply concepts and skills relevant to scoping, planning and executing health informatics projects in organizations.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 732 Healthcare Informatics: Planning & Evaluation 3.0 Credits**

Introduces planning and evaluation of healthcare informatics applications. Through critical reading, students learn the planning and evaluation cycle and become familiar with quantitative and qualitative methods and measures. Through lectures and assignments, students select a healthcare problem, formulate a problem statement, select evaluation methods and measures and write a proposal.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 733 Public Health Informatics 3.0 Credits**

Presents an overview of issues, methods and tools of public health informatics. Explores topics including knowledge management, literacy skills for the public health provider and the health consumer, public health surveillance systems, public health applications of clinical data, Geographic Information Systems (GIS), and eHealth/mHealth applications.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 648 [Min Grade: C] or PBHL 516 [Min Grade: C]

**INFO 750 Archival Access Systems 3.0 Credits**

Introduces students to the creation, maintenance, and evaluation of archival access systems. Covers the theoretical concepts that underlie archival description and their evolution into the current set of electronic information systems. Reviews current descriptive standards. Addresses user needs and different formats.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 755 Electronic Records Management 3.0 Credits**

Presents records management theory and practice from the perspective of the archivist. Covers the transformation of the profession and its practices as it adapts to electronic record keeping. Introduced records management principles and applies them to the contemporary digital office environment. Relates records management concepts to other information management disciplines.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 756 Digital Preservation 3.0 Credits**

Explores concepts, principles, and practice for preserving digital information resources. Topics include selection, organization, and access for materials in trusted repositories. Both technological and policy perspectives are addressed.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 800 Science of Science 3.0 Credits**

This course provides an overview and a guided practice of Science of Science, which studies the structure and dynamics of a research field as a unit of analysis. The word science is broadly defined, including social sciences and humanities as well as natural sciences. This course introduces multiple perspectives of research and research communities. The course aims to combine relevant theories and guidelines with research activities of researchers, especially doctoral students. The course introduces relevant resources and methods to facilitate the application of corresponding research strategies and procedures.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 813 Quantitative Research Methods 3.0 Credits**

Introduces research designs and methods of quantitative analysis for various problems in information systems, management of information resources, and scholarly and professional communication. Presents statistical techniques through packaged computer programs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 816 Qualitative Research Methods 3.0 Credits**

Provides doctoral students with an opportunity to explore and experience qualitative research methods, tools, and techniques, with emphasis on historical, philosophical, and theoretical underpinnings of the qualitative perspective. Concerned with analysis of the social construction and reproduction of human activity. Explores interpretive research methods that try to analyze social sense-making.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 821 Foundations in Information Science 3.0 Credits**

This class introduces students to concepts in the theory and research of information science, including the historical foundations and evolution of the field, as well as contemporary trends in theory, major areas of study, and methods of investigation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit



**INFO 823 Foundations in Human-Centered Computing 3.0 Credits**

Provides an introduction to Human-Centered Computing (HCC) theories and methods that advance our understanding of the complex and tightly coupled relationships between people and computing. Students will analyze and synthesize literature, identify gaps in HCC knowledge, and practice research design that investigates not only interactions between humans and computers, but also ways that people and societies influence and are influenced by computational artifacts such as traditional computers, handheld and mobile devices, robots, and wearable computers, at scales ranging from an individual device with a single user to complex, evolving socio-technical systems.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 825 Foundations in Data Science 3.0 Credits**

Develops foundations for research practice in data science (DS) through guided and collaborative literature review activities and light research reproduction efforts. Students will gain knowledge about current and emerging trends in DS research methodologies and disciplinary applications. Discusses how seminal works and student-selected research subjects and publications interact with different DS-related publishing venues, and how to align writing and presentation styles to meet diverse norms and standards of different venues. Specific readings and topics will be selected by students, who are must identify a DS-related research subject whose literature they wish to master.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 871 PhD Process and Practice 1.0 Credit**

PhD Process and Practice (PPP) is a one-credit seminar offered in the Fall quarter. The course sections cover topics and skills that are necessary for success as a PhD student.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**INFO 873 Special Topics Seminar 1.0 Credit**

Provides students with an opportunity to read critically and to discuss literature in the area-specific topics or methods. Aims to help doctoral students to read, discuss, and present contemporary information studies problems and research. Helps students engage in research in the covered areas.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 2 times for 3 credits

**INFO 890 Capstone Project 1.0-3.0 Credit**

Explores information practices as an open-ended team activity. Initiates and completes an in-depth individual or multi-term capstone study emphasizing information processes, design thinking, or technology to service people and/or organizations. The Capstone explores information and data-related issues and challenges involved in the application domain of the individual or team's choice. Applies a development process structure for project planning, specification, design, implementation, evaluation, final report, and individual reflective piece. Research focused capstones must have a designated faculty mentor in addition to a capstone faculty coordinator.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 1 times for 6 credits

**INFO 896 Health Informatics Experience 3.0 Credits**

The Health Informatics Experience capstone is a culminating experience that enables students to apply what they have learned to address a specific problem in an approved health-related environment. It may be research or practice-related. This course should be taken in the final term of the student's program.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 1 times for 6 credits

**INFO 998 Ph.D. Dissertation 1.0-12.0 Credit**

Provides individual work on an approved topic leading to a doctoral dissertation in information science and technology.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 1599 Independent Study in INFO 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**INFO 1699 Independent Study in INFO 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**INFO 1799 Independent Study 2.0-12.0 Credits**

Provides individual investigation in special areas of information science and technology not regularly covered in the courses offered. Topic for study must be approved, in advance of registration, by the faculty adviser, the instructor involved, and the associate dean. May be repeated for credit if topic varies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**INFO 1899 Independent Study in INFO 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**INFO 1999 Independent Study in INFO 0.0-9.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

**INFO T780 Special Topics 2.0-12.0 Credits**

May be repeated for credit if topic varies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

# Inter Professional Studies

## Courses

### **IPS 500 Healthcare Improvement Concepts and Strategies 1.0-3.0 Credit**

This interprofessional course will cover a range of topics in improvement capability, patient safety, population health, person- and family-centered care, leadership, and quality, cost, and value. Students will work independently and collaboratively to examine contemporary issues in healthcare, strategies for healthcare improvement and professional development. This course is designed as an elective for 1-3 credits that can be utilized for multiple purposes within different programs.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 501 Legal Compliance: Structure and Implementation 4.5 Credits**

This course introduces students to the concept of legal compliance, and the skills needed to implement and maintain policies that enable organizations to thrive in the current regulatory system. Particular emphasis is given to areas such as auditing, investigating, and reporting. Additional topics include corporate oversight, the role of regulators, the general flow of a compliance professional's work, as well as the compliance landscape/compliance roles.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 502 Advanced Ethical Decision Making in Health Care 3.0 Credits**

The focus of this course is to develop the student's ability to identify ethical dilemmas, apply moral reasoning, and then take action necessary to resolve the dilemma. Questions of clinical and applied ethics, including basic principles and theories that support and challenge the decision making process will be examined from various perspectives to address the moral difficulties the advance practice health care provider is likely to encounter.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 503 Confronting Issues in Contemporary Health Care Environments 3.0 Credits**

Confronting Issues in Contemporary Health Care Environments examines health care policy and politics in terms of contemporary issues relative to health care providers in advanced roles, health care access, quality, and cost. The focus of this course is the critical analysis of health policy and global health utilizing advanced professional roles in relation to the broader health landscape.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 504 Regulations in Health Care 4.5 Credits**

This course provides an overview of the rules and regulations governing the current health care system. Students will learn how to apply statutory and regulatory principals to a variety of health care situations they will encounter in the field. Topics include unearthing and prosecuting health care fraud, the complexity of the payor system, and the regulatory structure associated with nursing homes and long-term care facilities.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 505 Health Care Quality and the Legal Context 4.5 Credits**

This course will provide students with tools for analyzing and assessing levels of patient safety and the quality of care being provided in a variety of health care settings such as physician practices, manages care plans, and long-term care facilities. This course will also explore developments in patient care, utilization review, risk management, and liability.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 506 HIPAA: A Patient's Legal Right to Privacy 4.5 Credits**

This course will examine the privacy and security provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which provides the legal basis for federal protection of health care information. Students will explore the relationship between HIPAA and other privacy laws and will learn how to ensure compliance with all of HIPAA's provisions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 10 credits

### **IPS 507 Mindfulness Meditation 3.0 Credits**

Mindfulness Meditation is a powerful technique that helps to promote health and well-being of the mind, body and spirit. Mindfulness practices reduce the negative effects of stress and improve focus and awareness in order to help one live a more meaningful life. This course explores the neuroscience and physiology of Mindfulness Meditation. Through weekly experientials students cultivate a personal practice for effective stress management, resilience and reflections rooted in Mindfulness Based Stress Reduction techniques.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 510 Reproductive Women's Health Across the Life Cycle 3.0 Credits**

Using an integrated clinical and public health perspective, this course examines reproductive women's health to gain deeper understandings of the complex interplay between women and their reproductive health care needs across the lifecycle. Students will leave this course appreciating the diversity existing within women's health and how reproductive health care promotes health and wellness to women in the context of where women live, work, and play. Students across Drexel University are invited to take this course. There is not a clinical requirement to this course. For those enrolled in the maternal child health (MCH) programs offered in the Dornsife's School of Public Health, this course count towards MCH specialization.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

### **IPS 511 Collaboration with Vulnerable Populations 3.0 Credits**

This course addresses the following questions: Why is zip code a more significant determinant of health than genetic code for most people? How can patients/clients, practitioners from different professions, and other people in a community become partners in quests for good health, given the vulnerability inherent in illness, injury, inequities, and differences of many kinds? The course will empower students to develop a practical understanding of social determinants of health and the potential for interprofessional collaboration to improve health, especially with vulnerable populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 519 Forensic Science Foundations 3.0 Credits**

This course examines the defining characteristics of offender behavior including the importance of obtaining complete victim histories, investigation of a motive and suspects as it relates to healthcare and practice. Investigative and therapeutic factors and approaches including examination of environment, place, time and crime scene indicators will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 528 Victimology – Contemporary Trends 3.0 Credits**

This course examines the wide range of victimization experiences from the perspective of the crime victim, the offender, families, and the healthcare community. Basic tenets of assessment and intervention with victims and survivors are explored. Emphasis will focus on understanding the etiologic and motivation issues as well as response patterns to victimization and perpetration dynamics from a healthcare provider perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 531 Epidemiology in Action: Tracking Health and Disease Outcomes 3.0 Credits**

Assists students to examine and actualize the processes for development and measurement of outcomes in health care in the context of evidence-based practice. Explores epidemiologic theories and models to promote understanding of risks and disease pathogenesis. Examines the dynamic balance between health and illness. Understanding of health assessment, risk identification and outcomes measurement is emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 533 Forensic Mental Health 3.0 Credits**

This course examines the various foundations of offender behavior including theory, research and motivational models. Basic tenets of assessment and intervention with offenders will be examined from a healthcare perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 540 Introduction to Autism Spectrum Disorder (ASD) 3.0 Credits**

This course will provide an overview of the public health problem of autism spectrum disorder, including natural history, etiology, rising prevalence, risk factors, and core features of ASD. The course will introduce the important and evolving role of the interprofessional healthcare team in the life-long care of people with ASD.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 541 Health and Behavioral Care Planning and Intervention for Children and Adolescents 3.0 Credits**

This course will provide an overview of the range of treatments for ASD and pharmacotherapy for symptom managements of the pediatric population across the lifespan. A family-centered approach to care is emphasized to develop an understanding of an interprofessional approach to management of the range of functional problems and core features across the lifespan. Students will explore ways to integrate concepts of ASD care with their professional practice across a variety of service settings for pediatric patients and their families.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 542 Health and Behavioral Care Planning and Intervention for Adults with ASD 3.0 Credits**

Students acquire in-depth knowledge of integrated, interprofessional treatment approaches to ASD and learn strategies for managing acute and chronic health and behavioral problems experienced by adults with ASD. Core features manifest differently based on age and environmental stressors, therefore the students learn how to predict and prevent problems in a variety of health care settings and circumstances as individuals with ASD require treatment for other medical and mental health conditions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 543 Leadership and Advocacy for ASD 3.0 Credits**

Students will examine the role of an interprofessional team in the life-long care of people with ASD and identify ways to expand the scope of care for this vulnerable population. Practical issues of collaboration and reimbursement for services will be explored. Students will explore the availability of services in the community and discuss approaches to patient advocacy. Students will identify and implement an independent project.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 544 Quality and Safety in Healthcare 3.0 Credits**

This course provides a broad introduction to the essential competencies required by healthcare professionals to improve practice and health care delivery. Based upon the quality and safety standards, class activities are designed to build the knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 562 Comparative Health Systems 1.0-6.0 Credit**

The course will examine and compare the major models of health systems globally. Topics will include historical, political, social, ethical and economic context for selected countries. Standard measures of health outcomes will be analyzed. This course is designed as an elective that can be utilized for multiple purposes within different programs of study and may include an optional study abroad immersion experience. The study abroad experience will be either one week (1 credit) or two weeks (2 credits).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 564 The Business of Healthcare 3.0 Credits**

This course provides a forum for the exploration and evaluation of financial management and the financial environment of the healthcare industry. The student will develop an understanding of the budgeting and accounting process and how a fiscally responsible budget works in a climate of decreased government funding, shared cost mechanisms and decreased personnel resources in addition to basic financial management principles and tools.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 584 Analysis of Performance Standards in Healthcare Quality 3.0 Credits**

This course provides an introduction to the essential skills of data analysis. Students gain an understanding of how to apply strategies to measure selected indicators, manage data and apply statistical analysis principles to drive quality improvement and evaluation of program outcomes. This course will focus on how to develop and revise effective outcome measures for an organization to determine progress in meeting quality measures of accreditation and regulatory bodies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 544 [Min Grade: B] or NURS 544 [Min Grade: B]

**IPS 585 Science of Safety, Human Factors, and System Thinking 3.0 Credits**

This course provides a broad introduction to the science of safety, human factors and systems thinking as it relates to healthcare and safety. Students will examine system and design principles for safety and outcome improvements. Students will build knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 586 Creating a Culture of Safety 2.0 Credits**

This course will focus on strategies to create a culture of safety in the healthcare environment. The course incorporates established standards of practice and strategies designed to promote a safe care environment, build team competencies, leadership and communication skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 585 [Min Grade: B] (Can be taken Concurrently)

**IPS 587 Safety Culture in Healthcare 3.0 Credits**

This course will focus on strategies to create a culture of safety in the healthcare environment. The course incorporates established standards of practice and strategies designed to promote a safe care environment, build team competencies, leadership and communication skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 585 [Min Grade: B] (Can be taken Concurrently)

**IPS 591 Foundations of Healthcare Education 3.0 Credits**

This course prepares the prospective healthcare educator with the foundational principles necessary for teaching in various settings: classroom, clinical and college laboratories, and health care agencies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 601 Quality, Safety and Risk Management Capstone 5.0 Credits**

The practicum provides an opportunity for the student to apply content that has been learned in previous coursework and operationalize the role of the Quality, Safety and Risk Management professional in appropriate healthcare organizations and facilities. In this course, the student will complete and present the capstone project to health care systems administration and other stakeholders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 586 [Min Grade: B]

**IPS 602 Portfolio Development 1.0-1.5 Credit**

In this course, graduate nursing students will be given an opportunity to reflect on both their academic work at Drexel University and their professional experience. Through a series of learning activities and assignments, students will build a robust professional portfolio using online technology that can be shared electronically when applying for advanced role positions in nursing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 617 Simulation in Healthcare Education 4.5 Credits**

This course will provide the learner with the theory and application of case development in a variety of simulation-based educational modalities, as well as clinical educational settings. A 3-day virtual simulation experience is required for students to be able to apply the didactic content in the simulation setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 618 Standardized Patients 3.0 Credits**

Standardized Patients (SP) have been used extensively in medical education for over 50 years. The expansion into other health care professions has been seen in the last decade. This course will provide the simulation-based educator with the core skills to design an SP encounter, train SPs and evaluate the outcome.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 619 Advanced Debriefing and Reflective Practice 3.0 Credits**

Debriefing is a key component of reflective practice and simulation based education. This course will build on foundational concepts of debriefing and engage the learner in a self-reflective process as a debriefing. Challenging debriefing situations, peer feedback and the skills to develop a peer faculty development model will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 617 [Min Grade: B]

**IPS 620 Simulation Center Leadership 3.0 Credits**

This course explores models of leadership for simulation Centers or Programs. The Learners will evaluate current policies and procedures using the benchmark of accreditation models for the Society of Simulation in Healthcare. Individual "frames" around feedback and negotiation will be explored through experiential learning and expert feedback.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**IPS 621 Evaluation in Simulation-Based Education 3.0 Credits**

This course will explore the evidence-based tools for assessing outcomes in simulation-based education. Outcome evaluations will be approached from the learner, process and debriefer perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 617 [Min Grade: B]

**IPS 622 Simulation Capstone 5.5 Credits**

This is the final course in the plan of study for the MS/MSN: Healthcare Simulation. The topic of the implementation project will be learner driven and decided in collaboration with your assigned mentor. This course is the integration of simulation-based education, patient safety and educational principles culminating in an implementation capstone.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 617 [Min Grade: B] and IPS 618 [Min Grade: B] and IPS 619 [Min Grade: B] and IPS 620 [Min Grade: B] and IPS 621 [Min Grade: B]

**IPS 663 Communication and Self-Awareness for Leadership 4.5 Credits**

This course focuses on the central role that self plays in leadership and communication skills. By performing self-observations and analyses, students will analyze the role of self in communication and gain an appreciation of the complexities of interpersonal communication. The course also explores enhanced communication skills for use in teams and organizational settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 670 Interdisciplinary Perspectives of Health Law 3.0 Credits**

This course introduces students to areas of law and legal theory that serve as the basis for the U.S. health care system. Students will examine statutes, regulations, and case law that regulate health care practice. Students will observe a courtroom proceeding, integrate professional knowledge with health law principles, and analyze testimony of a clinical expert witness. Some of the areas to be studied include: torts, administrative law, provider liability, defenses, health policy, access to care, federal regulations, the patient safety movement, distinction between criminal and civil action with an emphasis on domestic violence (DV) law and interpersonal violence (IPV) case studies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 763 Teaching Strategies and Learning Technologies in Health Professions Education 3.0 Credits**

This course focuses on approaches for engaging health professions students through active teaching strategies. Learners will explore key elements for course alignment, appropriate use of technology, integration of authentic assessment and best practices in teaching health professions students. Approaches for motivating and handling the challenging learner will be highlighted.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NHP 762 [Min Grade: B]

**IPS 765 Assessment, Measurement, and Evaluation in Health Professions Education 3.0 Credits**

This course explores the theories and practices that are the basis of measurement, assessment, and evaluation in higher education in a health professions program. Emphasis is placed on test development, written assignments, clinical/performance evaluation, and psychometrics. Contemporary issues related to measurement, assessment, and evaluation encountered by higher education faculty teaching in a health professions academic program will also be examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** IPS 763 [Min Grade: B]

**IPS 860 Interprofessional Research Experience 3.0 Credits**

This course involves students from various health professions who learn about the history and goals of the Interprofessional Education and Research (IPER) movement. Students work in pairs or larger groups to immerse themselves in an IPER experience with an emphasis on one or several of the stages of the research process. Students engage in projects such as designing a pilot study, conducting a descriptive study, or conducting a program evaluation. Emphasis is placed on research projects that help to realize the goals and objectives of IPER generally or to advance how one health profession can realize an objective(s) of IPER in pre-professional formation or continuing professional education.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS 861 Interdisciplinary Approaches in Aging Research 3.0 Credits**

This course uses an interdisciplinary lens to examine special topics in aging research. The state-of-the science, research methodology, and measurement issues related to each topic are explored. Phenomena of interest to aging researchers measured in large data sets on aging (e.g. Cardiovascular Health Study, Baltimore Longitudinal Study on Aging, National Retirement Survey, etc.) are examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**IPS T580 Special Topics in Intra Professional Studies 1.0-6.0 Credit**

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**IPS T680 Special Topics in Intra Professional Studies 1.0-5.0 Credit**

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**IPS T780 Special Topics in Intra Professional Studies 1.0-5.0 Credit**

This course covers special topics of relevance and significance to healthcare professionals. Topics decided upon by faculty will vary from term to term within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

# Interdisciplinary STEM

## Courses

### ISTM 511 Foundations in Evidence-Based STEM Pedagogy 3.0 Credits

A graduate level introduction to evidence-based approaches to teaching STEM undergraduates. Evidence-based pedagogies have been demonstrated to be successful in promoting student learning and success. Students in this course will discuss, research, and practice a number of evidence-based pedagogical approaches and think about implementation strategies for the classroom. Through classroom activities we will engage with a survey of evidence-based teaching approaches so that students can make informed implementation decisions after the course is over. There will be an emphasis on understanding why changes to STEM teaching are important for promoting retention and diversity in STEM fields.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### ISTM 512 Advanced Undergraduate STEM Pedagogical Techniques 3.0 Credits

Students in this course will discuss, research, and practice a number of evidence-based pedagogical approaches and think about implementation strategies for the classroom. Through classroom activities we will engage with the vocabulary of evidence-based teaching so that students can continue to learn about these topics after the course is over. There will be an emphasis on understanding why changes to STEM teaching are important for promoting retention and diversity in STEM fields. In this course, students will address approaches to utilizing technology tools to support implementation of active-learning, confront how learning involves more than content and includes metacognition, epistemology, and affective features.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### ISTM 513 Improving STEM Education Through Research 3.0 Credits

This course will allow students to learn the essentials of STEM education research so they can understand how to: search, read and understand the education literature to improve their approach to their teaching; develop viable research questions in STEM education; design studies to address STEM education research questions; interface with education researchers effectively; think about what is needed for effective grant writing and publication in STEM education.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### ISTM 514 STEM Program Evaluation and Assessment 3.0 Credits

This course will allow students to learn and apply best assessment practices in STEM learning environments so that they are able to: develop their own cognitive and effective STEM assessments aligned with learning objectives; utilize rubrics and scoring keys to provide students with appropriate formative feedback and grades reflective of STEM learning; suggest modifications to STEM instructional practices based on assessment data.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### ISTM 515 Seminar in UG STEM Education 1.0 Credit

This course provides graduate students in Undergraduate STEM Education with an anchor for their capstone experiences (rotations or projects). The course will expose students enrolled in the 1.0 credit section to literature on undergraduate STEM education, organized around the broad course themes of Scholarship of Teaching and Learning, Instructional Innovation, Curriculum Development, Assessment and Evaluation and provides them an opportunity to engage with these ideas against the background of their specific STEM disciplines.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 2 times for 3 credits

**Prerequisites:** GRAD 511 [Min Grade: B] or ISTM 511 [Min Grade: B]

### ISTM 516 Rotations in STEM Education 2.0 Credits

The research rotation course allows students to gain exposure to real-world experience in STEM education. In partnership with STEM departments from across Drexel's campus, opportunities will be identified for students to support STEM educational missions across campus, while gaining experience with teaching, education research, curriculum design, educational assessment/evaluation or other applied projects in STEM Education. Students may choose to do all of their internships focused on developing one area, or they may choose to do three separate internships focused on distinct areas.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 2 times for 6 credits

**Prerequisites:** GRAD 511 [Min Grade: B] or ISTM 511 [Min Grade: B]

**Corequisite:** ISTM 515

### ISTM 517 Projects in Undergraduate STEM Education 2.0 Credits

The Projects in Undergraduate STEM Education course allows students to gain exposure to real-world experience in STEM education through sustained, long-term engagement in efforts to understand and solve a complex problem in STEM Education. Students will work closely with a mentor faculty member in their discipline to support the STEM educational missions across campus through conceptualizing and understanding the problem context, designing and implementing an approach to address the problem and analyzing and disseminating results.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 2 times for 6 credits

**Prerequisites:** GRAD 511 [Min Grade: B] or ISTM 511 [Min Grade: B]

**Corequisite:** ISTM 515

# Interior Design

## Courses

### INTR 500 Visual Culture: Interiors 3.0 Credits

Visual Culture: Interiors addresses the interior environment by studying the impact history, economics, culture, materials and technological developments have on the design of interior spaces. While comparing historical context with specific knowledge, this course will enable the student to be a more articulate designer by a comprehensive examination of the interiors.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 501 Visualization Fundamentals 3.0 Credits**

An introductory course that explores the use of proprietary computer applications for communications and the preparation of visual materials in Interior Design. The course introduces and reinforces classic design principles for expert visual communication of ideas through digital techniques from an Interior Design perspective.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 511 History of Modern Architecture and Interiors 3.0 Credits**

Covers development of modern architecture and interiors in the 19th and 20th centuries. Develops a vocabulary for discussing architecture; an understanding of how various factors affect design; and a familiarity with names, movements, and buildings that are part of historical development.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 515 Sustainability: History, Theory and Criticism 3.0 Credits**

Course examines the meaning and implications of sustainable design to develop an informed interpretation and working assessment of this movement. Concepts and methodologies are explored through assigned readings, class discussion, field trips and team research.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 532 Interior Studio I 4.0 Credits**

Primary spatial course. Involves conscious recognition of the manipulability of space or spaces within a given volume and small-scale environmental orientation. Includes professionally juried presentations.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 533 Interior Studio II 4.0 Credits**

Covers diagramming program requirements, designing for complex spatial requirements with an awareness of building systems (e.g., partitions, heating/ventilating/cooling, lighting), and furniture. Includes professionally juried presentations.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 532 [Min Grade: B-]

**INTR 622 Graduate Studio A 4.0 Credits**

Focuses on a given residential environment with specific architectural identity meeting the residential space requirements of particular clients and recognition of and respect for the quality of interior architecture, volume and its ornament. Develops original approaches to furniture planning, lighting, interior elaboration, furniture, color and finish selection. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 623 Studio A Seminar 2.0 Credits**

Focused study on the impact of interior architectural and decorative detailing on the interior environment through the understanding of precedent studies and ornamentation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 624 Material Investigations 3.0 Credits**

This course provides for investigative study of materials that shape the interior environment. Exploration of materials through application, research, codes and hands-on presentation are addressed.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 625 Advanced Visual Methods 3.0 Credits**

An advanced course in visualization focusing on hybrid representation strategies. Specialized topics in digital and hand rendering and exploration of the visual language of presentation and rendering techniques for design development and visualization of interior spaces.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 632 Graduate Studio B 4.0 Credits**

Investigates the manipulation of spatial volume within the context of small-scale environments. Projects build in complexity in terms of use, tectonics and structure emphasizing concept development, iterative design process and various ways of making. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 622 [Min Grade: C]

**INTR 633 Studio B Seminar 2.0 Credits**

Focused study in digital communication and making and its role in the design of the interior environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 634 Interior Systems I 3.0 Credits**

Focused study in environmental systems and understanding of the impact and integration between systems and the built environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 641 Furniture Design 4.0 Credits**

A hands-on investigation of furniture design. Covers design of interior and exterior environmental elements, through explorations in craftsmanship; the application of materials to ideas; and development of prototypes. A lab fee is required for this course.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 12 credits

**INTR 642 Graduate Studio C 4.0 Credits**

Focuses on the design of an interior with emphasis on programmatic requirements and environmental behavior leading to a synthesized and identifiable environment. Emphasizes concept, pre-design research, programming, space planning and presentation. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 632

**INTR 643 Studio C Seminar 2.0 Credits**

Investigation in interior detailing and the impact it has on the identity of the interior environment. Focused study and understanding of the design attributes of materials, construction systems and use of detail as a design process and generator.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 645 Advanced Digital Methods 3.0 Credits**

Intensive focus on advanced modeling and rendering software. Lighting, materiality, form and spatial experience are explored through realistic three-dimensional digital models.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 625 [Min Grade: C-]

**INTR 652 Graduate Studio D 4.0 Credits**

Focused on design of a mid to large scale commercial interior with emphasis on programmatic requirements, parti, adjacency diagrams and office systems. Applies a design concept based on client identity through interior planning and appropriate selection of furniture, materials and finishes consistent with contract interiors. Requires building code analysis, and demonstrated understanding of building codes. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 642 [Min Grade: C]

**INTR 653 Studio D Seminar 2.0 Credits**

Focused study and application of building codes and construction documentation of a mid-large scale commercial interior environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 654 Interior Systems II 3.0 Credits**

Develops and deals with many dimensions of light that must be understood if natural and artificial lighting are to be incorporated in the interior design of a building. Provides a series of investigations that allow the student to predict visual effects, meet minimum sight requirements, and ensure visual comfort. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 634 [Min Grade: C-]

**INTR 662 Graduate Studio E 4.0 Credits**

Studio context will provide for investigative study on subjects of specific environmental concern reflective of current trends, through the study of a large scale interior environment. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 652 [Min Grade: C] or INTR 430 [Min Grade: C]

**INTR 663 Studio E Seminar 2.0 Credits**

Focused study and analysis of professional practice covering contemporary business methods, practices, and procedures in the operation of a design firm, including legal and ethical implications.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 674 Fabrication and Making 3.0-4.0 Credits**

Exploration into design fabrication and making methodologies. A variety of procedures, techniques and tools are utilized to design and fabricate at full scale within the built environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 694 Thesis Programming 3.0 Credits**

Focuses on the process of defining an appropriate thesis topic, writing a succinct proposal, research methodologies and the development of a research plan.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 697 Thesis - Development 3.0 Credits**

Provides faculty guidance to enable students to identify and investigate an aspect of interior design. May include establishment of philosophical base, data collection, study of comparable or similar programs and spaces, writing of a design program, building selection and measurement, and preliminary design development. Includes professionally juried presentation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 694 [Min Grade: C+]

**INTR 698 Thesis - Documentation 3.0 Credits**

Allows development and refinement of design responses to the program of INTR 897 through in-depth analysis of the design problem. Involves evaluation of work on the basis of the understanding of the design process, the execution of the concept and the extent of development, and the emergence of a design character appropriate both to the student as a designer and to the resolution of the specific problem. Includes professionally juried final presentation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INTR 697 [Min Grade: C+]

**INTR 699 Comp Exam for Interior Design 0.0 Credits**

Required of candidates for the M.S. degree.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**INTR 1599 Independent Study in Interior Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 9 times for NaN credits

**INTR 1699 Independent Study in Interior Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR 1799 Independent Study in Interior Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR 1899 Independent Study in Interior Design 1.0-4.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit



**INTR 1999 Independent Study in Interior Design 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR T580 Special Topics in Interior Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR T680 Special Topics in Interior Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR T780 Special Topics in Interior Design 1.0-4.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR T880 Special Topics in Interior Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**INTR T980 Special Topics in Interior Design 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## International Business

### Courses

**INTB 620 International Business Management 3.0 Credits**

This course is an introduction to doing business at a global scale. This course explores international business, from theories to practical day to day to issues facing the international business person. Subjects include the role of culture, differences in the business environment, strategic management, organizational design, marketing, operations, and human resources.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

**INTB 632 Economic Analysis of Multinational Corporations 3.0 Credits**

Analysis of MNCs as an economic unit. Explores the determinants of organizational structure expansion strategies, and R&D strategies of multinational corporations. Impact of MNCs on competitiveness, technology transfer, and trade policy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** BUSN 502 [Min Grade: C] or ECON 601 [Min Grade: C] or ECON 610 [Min Grade: C]

**INTB 790 International Business Seminar and Residency 3.0 Credits**

This course pairs online academic instruction with a one-week international residency. Coursework in international business and on-site cultural immersion enhance students' understanding of the global economy and the opportunities and challenges facing companies around the world. The online course component consists of an overview of the economic issues facing the Region and Country(ies) through class discussions, relevant case studies, and group work focused on companies that will be visited abroad. The international residency is a one-week business trip to Country(ies) where students gain firsthand knowledge of conducting business in the region through company presentations, site visits, and cultural experiences.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**INTB 1599 Independent Study in INTB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB 1699 Independent Study in INTB 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB 1799 Independent Study in INTB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB 1899 Independent Study in INTB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB 1999 Independent Study in INTB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB T580 Special Topics in INTB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB T680 Special Topics in INTB 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB T780 Special Topics in INTB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB T880 Special Topics in INTB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**INTB T980 Special Topics in INTB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Legal Studies

### Courses

**BLAW 510 Analyzing Legal Options in Decision-Making 2.0 Credits**

Analyzes laws governing business transactions, relationships and organizations with a focus on ethical issues, legally enforceable contracts, employee/agent rights and duties, the legality of restrictive covenants and nondisclosure agreements, and the duties, powers, and liabilities of corporate directors and officers. Related areas of the legal environment of business will also be covered.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BLAW 605 Legal Options in Decision Making 3.0 Credits**

The course covers laws governing and relating to commercial transactions, relationships, organizations and ethics with emphasis on the application of law in decision making.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is BUSN.

**BLAW 620 Legal Aspects of Employment 3.0 Credits**

Examines and analyzes legal aspects of employment as governed by law and judicial decisions, including labor standards, workers' compensation, employment law and employment practices, and employer and employee rights.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BLAW 626 Fundamentals of Business Organizations Law 3.0 Credits**

An introduction to various business organization legal topics, including those most commonly covered in the Uniform Certified Public Accountant (CPA) examination, such as agency, partnerships, and corporations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BLAW 631 Real Estate Law for Managers and Developers 3.0 Credits**

Integrates real property laws and the rights, obligations and limitations pertaining to property ownership with the legal aspects of management and acquisition of various types of commercial and residential properties.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BLAW 646 Legal Issues in New Ventures 3.0 Credits**

This course is intended to address the various legal and ethical issues that confront individuals and companies in starting up new ventures, either within an existing company or a new start-up company.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**BLAW I599 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW I699 Independent Study in Legal Studies 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW I799 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW I899 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW I999 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW T580 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW T680 Special Topics in Legal Studies 0.5-4.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW T780 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW T880 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**BLAW T980 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

# Legal Studies

## Courses

### **LSTU 550 Introduction to the Legal System 4.0 Credits**

This course will begin to help students "think like lawyers" by providing an overview of the United States legal system. It will explain the legislative and judicial processes, so that students will gain an understanding of where the power to regulate originates and the basis of federal law and regulations. The course will then focus on substantive areas of the law, such as torts, contracts, and criminal law.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 551 Compliance Skills: Auditing, Investigation & Reporting 4.0 Credits**

This is a skills course that provides students opportunities to develop internal audit skills and strategies, conduct internal investigation work plans, and draft executive level communications. The skills taught will include work plan development, investigative techniques, interviewing methods, class presentations, and drafting of projects plans and board/executive level reporting.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 552 Ethics and Professional Standards 4.0 Credits**

Students will be exposed to fundamental issues and current best practices in managing issues of ethical/legal compliance, corporate social responsibility and business ethics. Topics cover business issues, including anti-corruption, environmental crimes/compliance, child labor, employment discrimination, crisis management, whistleblowing, retaliation, fraud, privacy, sustainability and social enterprise. Special attention is given to preparing students to understand and manage the demands on corporations making complex business decisions in the face of increasing expectations for transparency and accountability.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 553 Legal Research and Analysis 4.0 Credits**

Students will learn how to research topics and distill their research in written form through a series of exercises. They will also be expected to complete numerous written communications of increasing length and complexity. Detailed feedback will be provided on all written exercises by the professor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 554 Risk Assessment and Management 4.0 Credits**

Risk assessment and management has become a crucially important field for private sector business as well as government sector agencies and organizations, particularly over the past decade following the passage of laws such as Sarbanes-Oxley and Dodd-Frank. This course will examine regulatory compliance and risk management issues that impact various corporate and governmental entities, providing students the opportunity to explore risk analysis and compliance in a variety of legal environments. This course will help familiarize students with issues that might arise in corporate risk management departments, contracts departments, risk management consulting, and the regulatory compliance departments of financial services industries, banking, insurance, credit, risk assessment, and benefits management.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 555 Compliance Communications 4.0 Credits**

This course serves as an introduction to the fundamentals of writing specific to the growing area of compliance and addresses why compliance writing is different than general business writing. Assignments are drawn from the various types of writing that are typical of compliance professionals in various industries. Topics include writing for different audiences (various corporate departments, c-suite executives, boards of directors, regulators, the public, etc.), policy and procedure writing, the complexities of communicating with a diverse global audience, investigation memos and evaluation/communication of metrics-based data.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 560 MLS Masters Capstone I 3.0 Credits**

This course will provide students with faculty and peer support and guidance in preparing a capstone research project in completion of the Master of Legal Studies. Students will prepare a major written project which may consist of a novel legal claim supported by a substantial literature review or an experientially-based study grounded in a substantial literature review.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 561 MLS Masters Capstone II 2.0 Credits**

This course will provide students with faculty and peer support and guidance in preparing a capstone research project in completion of the Master of Legal Studies. Students will prepare a major written project which may consist of a novel legal claim supported by a substantial literature review or an experientially-based study grounded in a substantial literature review.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

### **LSTU 600 Health Care Rules and Regulations 4.0 Credits**

This course is designed to provide students with an understanding of the laws and regulations encountered by compliance professionals. The course will equip students to apply statutory and regulatory principles to situations that they will encounter in their work.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 601 Health Care Quality, Patient Safety and Risk Management 4.0 Credits**

This course will examine methods and tools for managing quality in health facilities, physician practices, managed care, and public health; including developments in quality assurance and improvement, utilization review, risk management, and patient satisfaction.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 602 Patients and Privacy: HIPAA and Related Regulations 4.0 Credits**

The focus of this course will be the privacy and security provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the foundation for federal protections of health care information. Additionally, the course will examine the interplay between HIPAA and other federal and state health privacy laws and the application and enforcement of those laws in a variety of health care settings. The class will incorporate discussions about the close and evolving relationships among health care policy, evolving social norms, and health privacy laws.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 603 Legal Regulation of Pharmaceutical and Medical Device Research and Development 4.0 Credits**

This course explores the regulatory entities and schemes governing the research and development, management, financing, and reporting requirements of clinical trials in the pharmaceutical and life sciences sectors. Topics include the role of the Institutional Review Board, compliance with Good Clinical Practice standards, informed consent, pharmacovigilance and the protection of human research subjects, payments and financial transparency, conflicts of interest, ethical considerations in designing and executing clinical trials, and reporting requirements.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 604 Legal Regulation of Pharmaceutical and Medical Device Sales and Marketing Practices 4.0 Credits**

This course explores the law governing pharmaceutical and medical device sales and marketing practices, including product pricing, advertising, labeling, promotion and distribution. Topics may include identification of the entities regulating pharmaceutical and medical device manufacturers, disclosure and transparency requirements, payments to doctors and institutions, fraud and abuse, anti-bribery laws, direct-to-consumer advertising including internet advertising, off-label marketing and promotion, labeling over-the-counter (OTC) drugs, and limitations on the government's ability to regulate commercial speech.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 605 Food and Drug Law 4.0 Credits**

This course considers the federal regulation of products subject to FDA jurisdiction, including food, human prescription and nonprescription drugs, animal feed and drugs, biologics and blood products, medical devices, and cosmetics. The course examines the public policy choices underlying the substantive law, FDA enforcement power, and agency practice and procedure.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 610 NCAA Governance I: Division I 4.0 Credits**

This course will provide a comprehensive overview of the NCAA governance methodology and structure related to managing a Division I Intercollegiate athletic program. Students will explore the NCAA bylaws, focusing specifically on large public research universities with high-profile teams playing at the top National College Athletics Association level, and will examine the relationship between athletics and undergraduate education.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 611 NCAA Governance II- Division II and III 4.0 Credits**

This course will introduce students to the membership criteria and governance structure relating to managing a Division II or III Intercollegiate athletic program. Students will explore NCAA rules-making process and bylaws specific to DII and DIII schools and will continue the examination of the relationship between athletics and education in the higher education setting.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 612 NCAA Infractions and Enforcement Processes 4.0 Credits**

This course will offer a comprehensive overview of the NCAA enforcement mechanism for infractions of the NCAA rules and regulations in across Divisions. Students will examine the investigatory processes and the consequences member institutions face for violating NCAA bylaws. Students will also explore how the rules have been interpreted and enforced by the NCAA, on campus, and by judicial decisions.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 620 Legal Issues in Employee Hiring and Termination 4.0 Credits**

Legal issues in hiring and termination of employees are at the core of human resources responsibilities. This course will examine regulatory compliance and management issues that arise in the context of hiring and terminating employees with special consideration of federal law and its continued developments. This course will help familiarize students with issues that arise in human resource departments, particularly as they pertain to those points of entry and exit and where the need to document becomes a critical duty of those managing the hiring, evaluation and termination process.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 1 times for 8 credits



**LSTU 621 Human Resources Compliance: Managing the Employer/Employee Relationship 4.0 Credits**

This course is designed to introduce students to the fundamentals of human resource compliance and regulation and to provide an overview of the skills necessary to manage human resources effectively. The course will examine why human resource management matters in today's business world and will show how employee performance and legal compliance serve as intermediary processes that connect human resource practices to organizational performance and effectiveness. Students will discuss the various ways in which the employer/employee relationship can be harnessed in positive ways rather than be seen in an adversarial light. This course will highlight issues that might arise in human resource departments, compliance departments and benefits management departments.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 622 Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution 4.0 Credits**

Human resource managers deal not only with laws, rules and regulations, but also and foremost, with people. This course explores the practical reality of working in human resources and provides the necessary skills to ensure competency and success. The course focuses on negotiation with subordinates, peers and supervisors; mediation, because human resource workers often act as informal mediators between employees and supervisors; and alternative dispute resolution, as more employers require their employees to submit their complaints to some form of resolution process as an alternative to a formal lawsuit. This course will familiarize students with issues that arise in human resource departments and provide them with concrete tools to analyze, understand, and implement the best possible path to resolution.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 630 Corrections Law 4.0 Credits**

This course is designed to introduce students to the constitutional rights of prisoners and the implications of those rights for prison management. In particular, students will gain a working knowledge of the role of the First Amendment in regulating inmate mail, associational rights, religious practice, and visitation. They will learn how the Fourth Amendment relates to searches of both inmates and visitors. Students will discover how the Fifth and Fourteenth Amendment Due Process rights control inmate transfer, classification and discipline. They will also learn how the Eighth Amendment controls prison policy with respect to the conditions of confinement and provision of health care.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 631 Criminal Law 4.0 Credits**

This course examines the principles that underlie liability for criminal conduct. Topics include the definition of crimes and the principles of punishment, the required acts and mental states necessary for liability, and defenses to and justifications for conduct. Specific crimes will be discussed including conspiracy and intentional murder and manslaughter.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 632 Criminal Procedure: Investigations 4.0 Credits**

This course considers the Fourth Amendment's protection against unreasonable search and seizure, the Fifth Amendment's right to Due Process and against compulsory self-incriminations, and the Sixth Amendment's right to counsel, all with particular emphasis on the application of these constitutional provisions within the context of criminal investigation.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 640 Legal Landscape of Student Rights and Campus Safety 4.0 Credits**

This course will discuss the legal rights of students beginning at the application process and continuing through matriculation and separation from the higher education institution. Topics may include the Family Educational Rights and Privacy Act (FERPA); anti-discrimination and equal access issues; campus crime and safety, including sexual assault and required disclosures; and liability and negligence on the part of the institution.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 1 times for 8 credits

**LSTU 641 Institutional Compliance: Aid and Accreditation 4.0 Credits**

This course will provide an overview of compliance issues in American institutions of higher learning as they pertain to financial aid and accreditation. In particular, this course will focus on issues pertaining to federal and state financial aid, college access, and reporting requirements. The course will also examine accreditation and disclosure requirements under the Higher Education Act and other relevant regulations and laws.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 1 times for 8 credits

**LSTU 642 Higher Education Institutions: Financial Rules and Regulations 4.0 Credits**

This course will introduce students to the many financial rules and regulations that govern institutions of higher learning. This course will expose students to areas such as governance and accountability, charitable gifts and endowments and their attending tax implications as well and issues that arise in the areas of intellectual property and scientific research.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 1 times for 8 credits

**LSTU 649 Foundations of Financial Regulation 4.0 Credits**

This foundational course will introduce students to various types of financial services institutions in the U.S. and the bodies that regulate them. The course will explore the history of domestic financial regulation and the development and current state of regulation in different industry sectors, including commercial and consumer depository institutions, investment companies, securities firms, private investment funds, and insurance companies.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 650 Legal Regulation of Global Financial Crimes 4.0 Credits**

This course covers a broad scope of global financial crimes and their intersection with the US financial system. Students will learn about a variety of types of financial crimes; what laws and regulations come into play; which regulators enforce them; the consequences for individuals and financial institutions who enable such crimes (whether intentionally or otherwise); the latest data breach issues, laws, and regulations (including GLBA, GDPR, and others); and how current events, politics, and technological advances intersect with these criminal enterprises.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 651 Legal Regulation of Investment Advisers 4.0 Credits**

This course will thoroughly review the Investment Advisers Act of 1940 and how it laid the foundation for present day regulation. It will explore the various legal and regulatory schemes that govern investment companies and look at the key policies that drive them.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 652 Legal Regulation of Investment Companies 4.0 Credits**

This course will thoroughly review the Investment Company Act of 1940 and how it laid the foundation for present day regulation. It will explore the various legal and regulatory schemes that govern investment companies and look at the key policies that drive them.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 653 Broker/Dealer Regulation 4.0 Credits**

This course will discuss the legal and regulatory frameworks that govern broker-dealers. It will explore the multiple legal and regulatory regimes that govern broker dealers and affiliated institutions.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 654 Banking Law 4.0 Credits**

This course will explore the development of banking law and how that development shapes our current banking regulatory regime. It will also compare the US banking regulatory scheme comprised of state and federal bodies with the more uniform systems operating in many foreign jurisdictions.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 660 Information Privacy Law 4.0 Credits**

This course will introduce students to the development of information privacy law in the United States. It will focus on legal regulations limiting government access to private information as well as laws regulating the ability of third parties to access such information. It will conclude with an introduction to the privacy regulatory regime imposed by the Federal Trade Commission and European Union regulators.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 661 The Law and Strategies Surrounding Cybersecurity 4.0 Credits**

This course will introduce students to the legal and regulatory frameworks governing US cybersecurity. It will examine topics including domestic cybersecurity standards, data breach notification and response, and the creation of compliance programs to manage cybersecurity risks.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 662 European Union Data Privacy and Protection 4.0 Credits**

This course explores the law governing information privacy, data protection, and data security in the European Union. Topics may include an introduction to the EU Data Protection Directive and the new General Data Protection Regulation (2018), the Data Protection Authorities and cybersecurity in Europe. Students will also explore the so-called "Right to Be Forgotten," and how EU law affects US companies doing business in Europe or with European entities.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 998 Thesis I –Scholarly Legal Writing: Planning and Preparation 4.0 Credits**

This course will introduce you to research and writing techniques commonly used in legal scholarly writing. Specifically, this course will help you identify and develop an original thesis topic and will provide you with the foundation needed to draft, edit, and present an original scholarly work of publishable quality in Thesis II.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU 999 Thesis II – Scholarly Legal Writing: Writing, Refining, and Presentation 4.0 Credits**

Following Thesis I, this course will provide faculty-guided oversight and mentorship for the drafting, editing, and presentation of an original piece of publishable-quality legal scholarship akin to a law review article. Students will confer with a faculty advisor weekly, either live or via real-time video conference, submit interim drafts as assigned, and receive meaningful faculty feedback. Students will submit a final scholarly paper and present it to colleagues in a workshop format.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Not repeatable for credit

**LSTU I599 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 6 times for 84 credits

**LSTU I699 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 6 times for 84 credits

**LSTU I799 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 6 times for 84 credits

**LSTU I899 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 6 times for 84 credits

**LSTU I999 Independent Study in Legal Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated 6 times for 84 credits

**LSTU T580 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated multiple times for credit

**LSTU T680 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated multiple times for credit

**LSTU T780 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated multiple times for credit

**LSTU T880 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated multiple times for credit

**LSTU T980 Special Topics in Legal Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Thomas R. Kline School of Law

**Repeat Status:** Can be repeated multiple times for credit

## Linguistics

### Courses

**LING 560 Foundations of Linguistics 3.0 Credits**

Foundations of Linguistics provides a foundation in the analysis of language, including topics of phonology, morphology, syntax, and semantics. Using a problem-based approach, students examine areas of language use such as first and second language acquisition, the analysis of world languages other than English, and variation in language use (sociolinguistics).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

## Management

### Courses

**MGMT 510 Business Problem Solving 3.0 Credits**

Decision-making and problem-solving prowess is a skill that can and should be learned. Why do well-intentioned, smart, experienced professionals make poor decisions far too often? It may be because they haven't been taught a disciplined process for making quality decisions. Perhaps they've relied on intuition, brains, luck, common sense, and training within the narrow bounds of their professional expertise. Unfortunately, in today's professional environment these attributes may not be enough to sustain advantage. This course will help managers build confidence in the quality of their complex problem solving and decision making abilities, making them better leaders, and preparing them for effectively solving future challenges.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 520 Strategy Analysis 2.0 Credits**

Strategy Analysis will help you understand the fundamental question: Why do some firms perform better than others? Strategy Analysis will offer you the frameworks and tools necessary to assemble and analyze information required to arrive at the answer to the fundamental question.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MGMT 530 [Min Grade: C] and ACCT 510 [Min Grade: C] and MKTG 510 [Min Grade: C]

**MGMT 530 Managing and Leading the Total Enterprise 2.0 Credits**

In this course, you will assume the leadership of an existing business and manage it through expansion, releasing new products, raising capital, and achieving success against agile and capable competitors. A dynamic total enterprise simulation puts you in the board room with a team of professionals who together will use critical thinking to guide your company through several simulated years of operations. You will know, sense, experience, and understand the challenges that business leaders confront, analyze, and overcome on a regular basis. This experiential learning course will provide you with the ability to integrate cardinal business concepts for managing the total enterprise and unmatched practical experience in applying your knowledge, making better business decisions, and measuring your success.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 600 Introduction to Change Management: An Integration of Macro and Micro Perspectives 3.0 Credits**

Organizational change is one of the most challenging managerial tasks. This course provides an overview of organizational change by focusing on external and internal dynamics, in which firms craft their strategic actions and organizational implementations. The course has two modules. The first module takes a strategic perspective to analyze the external dynamics of large-scale organizational change. The second module focuses on the internal dynamics of organizational change. The course introduces analytical tools for students to understand the complexity of organizational change, build a mindset of organizational change and obtain a skillset for executing organizational change agendas.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 601 Managing the Total Enterprise 3.0 Credits**

Business Simulation focusing on the need to integrate strategic and operational concepts, issues and decisions in moving technological enterprise from start-up to success.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 602 Innovation Management 3.0 Credits**

This course will focus on the role of innovation in building the competitive advantage of firms. It will focus on the process of innovation, sources of innovation, and types of innovation – both process and product. Theories of diffusion of innovation, factors driving and impeding innovation, and resistance to innovation will be highlighted. Critical issues of management of innovation will be discussed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 603 Technology Strategy 3.0 Credits**

Technological change has been a persistent force in the conduct and performance of contemporary organizations. This course will focus on the markets and institutions shaping technology shifts and strategies that firms can employ to address these shifts. Key concepts covered include standards and dominant designs, network effects, technology lockout, modularity and product architecture, platform technologies, complementary products and multi-sided markets. A special topic on recent developments in technology applications will also be discussed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 604 Strategic Change Management 3.0 Credits**

Corporations are continuously adapting to changes and new opportunities in their environments to maintain a competitive advantage. However, if not planned and implemented properly, change not only runs the risk of undermining a firm's value proposition and customer base but might be difficult to manage. This course approaches the management of change from a strategic perspective. As such, we will consider how internal structures and external factors jointly facilitate (or hinder) change and innovation, covering topics such as organizational resistance to change, agility, strategic repositioning, and various sources of change.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 630 Corporate Strategy 3.0 Credits**

This course focuses on the strategic management of firms spanning multiple business lines or geographic areas. As opposed to Strategy Analysis that focuses on individual businesses, in this course we examine issues specific to multi-business corporations. For example, what are a firm's core competences that can be exploited in multiple settings? Which new markets or businesses should a firm enter? How should those businesses be entered? How should one manage the portfolio of a diversified firm? How should a firm work with other firms? How does synergy matter when it comes to diversification, mergers or acquisitions? By considering these questions critical to analyzing and managing a multi-business organization, this course has important implications for business students across disciplines and function areas.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MGMT 520 [Min Grade: C]

**MGMT 635 Advanced Strategy Business Simulation 3.0 Credits**

This experiential learning course provides the student with the ability to apply integrated business concepts for managing the total enterprise using a more complex business simulation than used in MGMT 530 after obtaining the knowledge, skills, and abilities from other MBA core and elective courses. In this course, students will assume the leadership of an existing business and manage it through expansion, releasing new products, raising capital, negotiating labor contracts, and achieving success against agile and capable competitors. A dynamic total enterprise simulation puts the student in the board room with a team of professionals who together will use critical thinking to guide the company through several simulated years of operations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MGMT 520 [Min Grade: C] and MGMT 530 [Min Grade: C]

**MGMT 640 Strategic Human Resource Management 3.0 Credits**

This course examines how line managers can determine the most effective HR practices. HR practices examined include job designs, reward systems, development and appraisal systems, and internal and external staffing approaches. Students are encouraged to think strategically about different aspects of managing the organization's human assets.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 650 Corporate Venturing 3.0 Credits**

This course will examine how organizations can create and sustain capacity for entrepreneurship and better manage the innovation process. This course will focus on the organizational and project level to explore the many ways that organizations can establish structures and processes for entrepreneurship.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 652 New Venture Planning 3.0 Credits**

Students draw on their entire business education and practical experience and bring it to bear upon a plan for launching a new venture. Working in small teams, students research a new project or service; prepare marketing, sales and operation plans; and make financial plans.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 655 Knowledge Management 3.0 Credits**

Provides a broad overview of the emerging field of knowledge management. The primary focus of the course will be on the concepts and approaches useful for managing knowledge from a corporate strategies perspective. Covers KM tools and techniques, and management approaches.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit



**MGMT 660 Leading the Digital Supply Chain 3.0 Credits**

Supply chain leaders have done a good job of optimizing results by managing suppliers, moving manufacturing to low-cost locations and increasing the efficiency of logistics. But these steps are insufficient in a global business environment that is being reshaped by Big Data, analytics, emerging technologies, innovative business models, new management challenges, and an increasingly risky operating environment. Leading the Digital Supply Chain is a course that will prepare you to lead and accelerate the transformation of supply chains by taking advantage of new management practices, a continuously expanding data reservoir, and new ways to collaborate with customers and suppliers to build innovative products and services.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 670 Business Ethics 3.0 Credits**

Presents several frameworks by which to view ethics and decision-making. Links theory and practice through the study of business ethics as it relates to a variety of management issues. Focuses on the individual, the organization, and the system. Includes case studies, field work, readings, and interaction with visiting guest lecturers.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 676 Sustainability and Value Creation 3.0 Credits**

Managing strategically must incorporate environmentalism as a key component for creating value to all stakeholders. Sustainability, the capacity of a company to do good for society and the environment, is critical to competitive advantage. This course is intended to familiarize students whose primary background is not science or engineering based with relevant frameworks and perspectives about the necessity of incorporating sustainability into competitive strategies. In particular, the courses addresses: description of key concepts and stakeholders; public policy issues, lessons learned from the success and failures of integrating sustainability into management both nationally and globally.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 680 Leading for Innovation 3.0 Credits**

This course is presented and delivered by LeBow's Centers of Excellence. The course integrates the thought leadership of our Centers. Through an experiential learning platform, the course will focus on the way leaders, both entrepreneurs and executives, need to innovate as they lead their businesses for value creation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 686 Strategy Implementation 3.0 Credits**

This course will focus on the frameworks and tools necessary and often used in strategy implementation. The course will stress the need to tailor an implementation approach to be aligned with the intended strategy, and responsive to external stakeholders, both shareholders, customers and others. In successive sessions, the course will focus on rational components of execution such as structure and reward systems, and the human components such as culture, networks and power. The distinct roles of top management and middle management will be illustrated, and examples will include both single industry and diversified firms.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MGMT 602 [Min Grade: C]

**MGMT 690 Change Management Experiential Capstone 3.0 Credits**

This change management capstone course is designed to provide actionable know-how and skills for leading and managing change management initiatives successfully. Using live change consulting projects, a simulation, and interactions with change practitioners, the course is designed to provide students with a real world experience in the art and science of change management. This course is primarily aimed at graduate level masters students, mid- to senior-level executives, and other professionals, who aim to develop systematic understanding of organizational change, as well as practical strategies for leading organizational change in their respective organizations. Students from all disciplines and concentrations are expected to benefit from the depth and breadth of change-related issues covered in this course.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 715 Business Consulting 3.0 Credits**

This course focuses on business problem solving through project-based learning, equipping students with skills to effectively frame a problem, model a solution and communicate their findings. Acting as student consultants throughout the quarter, teams conduct research and analyses to form insights and recommendations for an organization's business challenges, then present their work at the conclusion of the course.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 2 times for 9 credits

**MGMT 770 MBA Capstone 2.0 Credits**

This core course will provide a student with an exposure to integrated decision making situation from the CEO's perspective. This course will enable students to appreciate the complexities of formulating and solving complex business problems. We will also discuss how the "soft" side of things effect business performance. Finally, unlike the analytic focus of strategy analysis, the students will be forced to think through specific action plans and implementation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MGMT 520 [Min Grade: C]

**MGMT 906 Foundations of Research in Behavioral Science 3.0 Credits**

MGMT 906 is a broad-based course that is intended to familiarize students with basic material on theory building in behavioral research. It course will expose the students to different perspectives on theory building, logic of discovery and verification, major scholars in philosophy of science and business disciplines who have shaped our practice of principles of measurement, research designs and strategies.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**MGMT 907 Research Analysis in Behavioral Sciences 3.0 Credits**

The objective of this course is to introduce students to methodologies and analytical techniques that are important for carrying out behaviorally-oriented research in business disciplines. Specific topics include hypothesis development, measurement, sampling and data collection, ethical issues in research, and data analysis/reporting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** MGMT 906 [Min Grade: C] and (STAT 932 [Min Grade: C] or STAT 931 [Min Grade: C])

**MGMT 908 Advanced Research in Behavioral Science 3.0 Credits**

This is a seminar course in advanced research methods. It includes attention to philosophical questions, to political and ethical issues, and to practical matters of method and technique.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** MGMT 907 [Min Grade: C] or MGMT 903 [Min Grade: C]

**MGMT 910 Readings in Strategic Management 3.0 Credits**

This course introduces students to many of the major theoretical approaches and debates in strategic management. This course supplies a roadmap for students to roam the terrain of organization theory and gear up to generate original research ideas that extend inquiry in a student's chosen area of research.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 935 Seminar in Organization Theory 3.0 Credits**

This course aims at equipping students with knowledge about both classical and contemporary organizational theory, which is one of the central pillars of management research. We will cover core topics such as organizational learning, organizational change, contingency theory, institutional theory, and organizational ecology.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**MGMT 940 Seminar in Organizational Behavior 3.0 Credits**

This course provides a critical review of significant concepts within the field of organizational behavior. The course starts with individual behaviors concepts such as work motivation, job design, and work attitudes, turns to group processes and leadership; and concludes with a consideration of cultural issues in organizational behavior.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 950 Technology and Strategy 3.0 Credits**

The purpose of this seminar is to introduce Ph.D. students to the disciplines of Technology Management and Strategic Management. Since the two disciplines cover a broad area of various research streams, the focus is on the most essential research streams such as knowledge-based view of the firms or transaction cost approach.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MGMT 998 Dissertation Research in Management 1.0-12.0 Credit**

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT I599 Independent Study in MGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT I699 Independent Study in MGMT 0.0-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT I799 Independent Study in MGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT I899 Independent Study in MGMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT I999 Independent Study in MGMT 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT T580 Special Topics in MGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT T680 Special Topics in MGMT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT T780 Special Topics in MGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT T880 Special Topics in MGMT 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MGMT T980 Special Topics in MGMT 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

# Management of Information Systems

## Courses

### **MIS 612 Aligning Information Systems and Business Strategies 3.0 Credits**

In this course, we will examine a variety of IS issues which are important to organizations, including information systems strategy, impact of IT on organization and work processes, business process reengineering, systems architecture and project management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 615 Aligning Information Technologies and Operations 3.0 Credits**

Information Technology (IT) infrastructure must be aligned with an organization's strategy and operations to ensure optimal benefits. This class uses the principles of DevOps to examine operational alignment for IT infrastructure. Students learn how different IT infrastructures are matched to different operational profiles to maximize effectiveness. Students will also be exposed to cross-domain alignment: the ways in which top-level IT and business strategies affect operations. This includes how IT strategy affects business operations and how business strategy guides IT operations and infrastructure. Finally, students learn how new modes of system delivery meet the needs of business operations in hypercompetitive environments.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 624 Systems Analysis & Design 3.0 Credits**

Examines concepts of the information systems development lifecycle and methods for analyzing user information requirements. Focuses on structured techniques for designing a system, managing its development and testing, performing feasibility analyses, and ensuring both user satisfaction and achievement of functional requirements. Covers techniques such as rapid application development (RAD), prototyping, and joint analysis and design (JAD) in detail. Also covers techniques such as data flow diagramming, logical database design, and user interface design.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 625 Management of Information Technology Operations 3.0 Credits**

Contemporary Information Technology (IT) ecosystems include multiple infrastructure components, applications, and performance monitoring tools, which may be located within or external to an organization. In this course, students learn how a firm's IT assets are procured, deployed, integrated, and managed. This includes licensing and service level agreements (SLAs), cost center (shared services) and profit center approaches for IT infrastructure, approaches for identifying and remediating problems with IT operations, and best practices for securing IT assets. Machine learning for IT operations management is also covered.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 630 Inter-Active Decision Support Systems 3.0 Credits**

Examines the theory of DSS for use in supporting managerial decision making. Also discusses EIS, KBS, data mining, and data warehousing. Describes the benefits of online analytical processing (OLAP) to the organization and how they can be measured. Includes the development and use of DSS by student groups in a case study.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 632 Database Analysis and Design for Business 3.0 Credits**

Focuses on database analysis and design for a wide range of business functions. Stresses the fundamentals of sound logical database design using techniques such as entity/relationship modeling. Examines the relational database and the object-oriented approaches to database design and handles specific design methods, such as normalization. Also discusses physical database design and data storage methodologies such as raid and hierarchical storage management (HSM). Involves a hands-on orientation with the use of tools such as oracle, Access, and Visual Basic.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 633 Predictive Business Analytics with Relational Database Data 3.0 Credits**

This course introduces students to data mining through Base Programming, applied statistics, and data visualization methods in SAS. In this course, students learn to solve statistical problems rigorously and think critically with data analysis in SAS. Students acquire the analytical skills in SAS programming, capabilities in recognizing data patterns and visualizing the results.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 634 Advanced Business Analytics with Relational Database Data 3.0 Credits**

This course is the sequel of MIS 633. This course discusses SAS Advanced Programming as applied to business analytics in a relational database environment. The course deals extensively with SQL, SAS macros, optimization of SAS programs, and exploratory statistical methods as applied in SAS to identify and analyze patterns in the data.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **MIS 635 Introduction to Hadoop and MapReduce 3.0 Credits**

Today's business climate has created a data-driven economy, generating large amounts of data. Storage and processing of such large-scale datasets requires specialized software tools such as Apache Hadoop. The mission of this course is to introduce students to the fundamentals of Hadoop and MapReduce.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 636 Python Programming for Business Applications 3.0 Credits**

This course focuses on the fundamentals of computer programming with Python and its applications in business practices. Specific emphasis will be placed on solving optimization problems and building predictive models widely used by industry (e.g., network optimization and churn models). Using the Python interpreted programming language, students will develop coding skills and be able to efficiently solve today's relevant business problems.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 641 MIS Policy and Strategy 3.0 Credits**

Ties together concepts from all areas of management and the economic, behavioral, functional, and technical aspects of MIS. Defines overall and context-specific information needs of organizations and focuses on the role of MIS in meeting these needs. Examines alternatives for matching MIS department structures and operations to the structures, strategies, and behaviors of organizations. Also investigates, proposes, and analyzes management policy issues relating to the management of the MIS function.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 642 Emerging Information Technologies in Business 3.0 Credits**

This course explores the current and potential future impact of emerging technologies on organizations and their core business operations, namely, accounting, finance, management and operations. Students will gain insights into these technologies and examine the challenges and opportunities of integrating the technologies into the organization. Other topics covered include managing change and legal and privacy issues resulting from emerging technologies.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 643 Digital Platform Management 3.0 Credits**

Digital platforms exist in various forms, such as electronic markets where participants exchange products and services, or core IT products that bring communities of businesses and consumers together. Incumbents as well as start-ups can build digital platforms to enter new markets or launch digital innovations. This course introduces students to the various types of digital platforms and the opportunities they offer. By studying the dynamics in this arena, students learn about the various forms of coordination and competition that exist in digital ecosystems, and what strategies firms have employed to succeed there. Additionally, students gain understanding of the changes that take place in markets and industries when digital platforms emerge.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 650 Management of Health Care Info Systems 3.0 Credits**

This course explores the concepts, design, and application of the management of information systems in the modern healthcare environment.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 651 Information Systems Outsourcing Management 3.0 Credits**

The course presents a balanced presentation of the risks and benefits of outsourcing and what should be the objectives and mindset of successful outsourcers. It also discusses the appropriate skill set, how to approach this risky endeavor. Although concentrating on information systems outsourcing, its lessons apply to other types of outsourcing.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 652 Business Agility and IT 3.0 Credits**

This introductory course will cover the core principles, practices, and frameworks of agile practices and how they can be utilized to drive successful delivery inside an organization. These concepts also tie into the idea of organizational change, and how an enterprise can use these practices and principles on a large scale to shift an organization to one that reacts to change and opportunity at speed to enable success. The course will also emphasize these learnings in the context of real-world Management Information Systems (MIS) projects. Additionally, some related emerging topics such as international/distributed project management and design thinking all in the context of agile methodologies will also be introduced.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 653 Design Thinking for Digital Innovations 3.0 Credits**

Design Thinking is a human-centered, collaborative approach to designing new services and products that has become popular in the context of digital innovations. Design thinking can also be applied to strategies and roadmaps, organizational structures, and processes-related problems. This course teaches the core principles, practices, and frameworks of design thinking, and how they can be utilized to drive successful business outcomes. Topics discussed include: the philosophy, concepts of design thinking, the process (empathize, define, ideate, prototype, test, implement), customer and team collaboration, identification of customer needs, and value-driven product design.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 661 Managing with Enterprise Application Software using SAP - Logistics 3.0 Credits**

This course examines essential concepts in ERP (enterprise resource planning) and the software that supports operational processes in modern companies. We will use SAP ERP solutions, taking a hands-on approach to applications areas such as procurement, production, fulfillment, or related business processes. After completing this course, students will be equipped with practical skills and competencies for careers in business and information technology where ERP software is used.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit



**MIS 662 Managing with Enterprise Application Software using SAP-Accounting & Analytics 3.0 Credits**

This course examines real-life accounting business processes in modern companies, concepts of enterprise application software like ERP (enterprise resource planning) and methods for reporting and data analysis. We will use SAP ERP and Analytics solutions, taking a hands-on, case study approach to exploring Financial Accounting, Managerial Accounting and related business processes. After completing this course, students will be equipped with practical skills and competencies for careers in business and information technology where SAP software is universal.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 901 Research Seminar in MIS 3.0 Credits**

This course provides an introduction to research in the fields of Management Information Systems. It covers classic journal articles in the field, various research methods, and provide a perspective in a major research project during the course.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MIS 1599 Independent Study in MIS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS 1699 Independent Study in MIS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS 1799 Independent Study in MIS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS 1899 Independent Study in MIS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS 1999 Independent Study in MIS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS T580 Special Topics in MIS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS T680 Special Topics in MIS 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS T780 Special Topics in MIS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS T880 Special Topics in MIS 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MIS T980 Special Topics in MIS 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Marketing

### Courses

**MKTG 510 Marketing Strategy 2.0 Credits**

Marketing is the practice of creating and exchanging value. Marketing strategy can be thought of as a process by which companies allocate scarce resources in order to exchange value in ways that enhance corporate performance and sustainability. The course addresses how creating and delivering superior value can improve relationships with customers and other stakeholders. It also provides students with analytical skills, decision tools, and disciplined frameworks to conduct a market analysis.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 601 Marketing Strategy & Planning 3.0 Credits**

Emphasizes application of strategic planning in marketing to achieve competitive advantage. Examines the role of strategic planning in developing effective marketing programs that enhance the overall performance of the firm.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 606 Customer Analytics 3.0 Credits**

This course is designed to give students powerful, cutting-edge tools to turn customer data into actionable managerial insights. Focus is on predictive analytic techniques used by marketers to acquire, develop, and retain customers. While students will employ quantitative methods in the course, the goal is not to produce experts in statistics; rather, students will gain the competency in the use of data to make better business decisions. The course uses a combination of lectures, cases, and exercises, and will be taking a very hands-on approach with real-world databases to provide students with tools that can be used immediately on the job.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]) and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C])

**MKTG 607 Marketing Experiments 3.0 Credits**

Focused at the intersection of marketing strategy and marketing analytics students will develop skills that will allow them to design, execute, analyze and communicate A/B and multivariate tests, designed to provide definitive answers to business questions like, "Which advertisement should we use?", "How much should we be willing to spend on an advertisement?", "Which product design should we go with?" Students will gain fluency in executing statistical methods including confidence intervals, regression, optimal design, and sequential experimentation. Students will become adept at communicating data-based conclusions to business leaders and will devise strategies for developing a culture of data-based decision making in business organizations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]) and (STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C])

**MKTG 622 Buyer Behavior Theory 3.0 Credits**

Provides an interdisciplinary study of the theories and research of buyer behavior. Draws on concepts from marketing, anthropology, psychology, sociology, and economics and their application for marketing managers seeking insights into the consumer decision-making process.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 624 Channels of Distribution Management 3.0 Credits**

Applies marketing channel theory and research to the design of channel systems, selection of intermediaries, administration of interorganizational channels, and evaluation of distribution performance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 627 Digital Marketing 3.0 Credits**

This course explores how organizations and leaders can maximize the business value of social and digital media platforms. The course also provides a framework and best practices for digital media management, enhances understanding of strategic communication within the digital media context, and improves digital media communication, content management, and analytic skills. Assignments include a personal branding weekly project, an in-class digital media marketing simulation, and a final real-world group consulting project on digital media strategy and implementation. Outside experts will provide lectures on specific digital marketing topics on select weeks.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 630 Global Marketing 3.0 Credits**

Covers concepts, principles, and practices of international marketing management. Studies cross-cultural differences and distribution systems, pricing methods, promotional methods, trade barriers, and current factors influencing international marketing.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 634 Integrated Marketing Communications Management 3.0 Credits**

Takes the marketing manager's viewpoint to examine the management and coordination of all marketing communication to customers and stakeholders. Discusses concepts and strategies in such areas as advertising, sales promotion, personal selling, and public relations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 638 New Product Planning, Strategy, and Development 3.0 Credits**

Examines the process of strategic planning for marketing innovation and development of new products in a dynamic business environment. Integrates concepts and techniques from several disciplines to understand new product development.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 646 Services Marketing 3.0 Credits**

Covers marketing theory, concepts, strategy, and tactics as applied to the unique characteristics and demands of service organizations and manufacturing firms that use service as a competitive advantage. Evaluates marketing strategies of various service industries using case studies to illustrate the links between internal business processes and external customer satisfaction.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 650 Marketing Management Cases and Problems 3.0 Credits**

Applies the case method to the analysis of consumer and industrial product/service marketing situations. Requires students to use systematic techniques to make decisions in product development, communications, distribution, and pricing in an evolving marketing environment.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 652 Marketing Information Management and Research 3.0 Credits**

Examines the current tools available to modern marketing decision makers for information management and applies these tools in realistic situations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 654 Corporate Brand & Reputation Management 3.0 Credits**

An examination of how business managers can build the reputation of their organizations in order to gain competitive advantage in the market. The course will focus on how companies can enhance their financial value through increased attention to multiple stakeholders.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 790 Seminar In Marketing Management 3.0 Credits**

Examines current developments and contemporary thought in marketing. Requires an in-depth analysis of a special marketing area selected by the student, and oral and written reports of graduate quality.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MKTG 601 [Min Grade: C] or MKTG 510 [Min Grade: C]

**MKTG 920 Concept Found Buyer Bhvr 3.0 Credits**

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 922 Seminar in the Development of Marketing Thought and Theory 3.0 Credits**

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 926 Seminar in Strategic Marketing Planning 3.0 Credits**

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 932 Developing Marketing Channel Systems 3.0 Credits**

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**MKTG 940 Multivariate II 3.0 Credits**

This course is designed to help student researchers enhance their data analysis skills by developing a conceptual understanding of the most widely used multivariate techniques.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** STAT 924 [Min Grade: C]

**MKTG 942 Models of Consumer and Firms' Decisions 3.0 Credits**

The course provides a flexible, hands-on understanding of regression & multilevel modeling. Course provides doctoral students starting serious empirical research with a useful toolkit of techniques. Topics include: fitting & understanding classical linear regression & generalized linear regression models (e.g., logistic & Poisson regression), using simulation to check model fit & model properties, understanding the assumptions & challenges underlying causal inference & a few techniques to perform causal inference & understanding multilevel data structures & fitting linear & generalized linear multilevel models.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** STAT 924 [Min Grade: B]

**MKTG 998 Dissertation Research in Marketing 1.0-12.0 Credit**

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG I599 Independent Study in MKTG 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG I699 Independent Study in MKTG 0.5-3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG I799 Independent Study in MKTG 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG I899 Independent Study in MKTG 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG I999 Independent Study in MKTG 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**MKTG T580 Special Topics in MKTG 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG T680 Special Topics in MKTG 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG T780 Special Topics in MKTG 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG T880 Special Topics in MKTG 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**MKTG T980 Special Topics in MKTG 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Materials Engineering

### Courses

**MATE 500 Structure and Properties of Metals 3.0 Credits**

Covers crystallography, crystal defects, dislocation mechanisms, phase transformations, recovery and recrystallization, diffusional processes, and strengthening mechanisms.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 501 Structure and Properties of Polymers 3.0 Credits**

Covers step and free radical polymers, copolymerization, molecular weight characteristics, polymer morphology, thermodynamics, viscoelasticity, yielding and crazing, and Boltzmann and T-T superpositions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 503 Introduction to Materials Engineering 3.0 Credits**

This course provides an introductory overview of materials science and engineering at the graduate level. The fundamental linkages between processing, structure and properties will be addressed with emphasis on micro- and nano-structural impacts on properties.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 504 The Art of Being a Scientist 2.0 Credits**

This course will provide incoming graduate students with the knowledge to become proactive, empowered graduate students. Reading assignments will highlight examples of student situations and though classroom discussions and in class activities the students will gain an understanding of their ethical and societal responsibilities, the importance of communication and the tools to access and plan their academic and career goals.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 505 Phase Equilibria 3.0 Credits**

Covers thermodynamic concepts of phase equilibria, including unary, binary, and ternary systems; pressure effects; and relationships between phase diagrams and structure.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 507 Kinetics 3.0 Credits**

Covers nucleation phenomena in homogeneous and heterogeneous metallic and ceramic systems, strain energy analysis, composition fluctuation analysis, growth and solution kinetics of second phases, coarsening processes, martensitic transformations, and crystallization of glass.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 510 Thermodynamics of Solids 3.0 Credits**

Covers classical thermodynamics, introduction to statistical mechanics, solution theory, thermodynamics of interfaces and crystal defects, and phase diagrams and reaction equilibrium.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 512 Introduction to Solid State Materials 3.0 Credits**

This course is a graduate level introduction to solid-state materials. The effects of crystal structure and bonding on properties will be discussed. Quantum theory of solids will be used to elucidate the electronic transport, magnetic, dielectric and optical properties of solid state materials.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 514 Structure, Symmetry, and Properties of Materials 3.0 Credits**

Structure–property relationships form a cornerstone for performance-engineering in nearly all materials. Condensed matter systems, including inorganic or organic materials, are defined by their internal structure—the distribution of atoms, defects, and large scale domains with preferred microstructures. This class aims to familiarize materials science students with the real space and k-space structural description of both ideal (defect free) and realistic (imperfect) crystalline materials and the properties derived from the underlying point and transitional symmetry.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATE 503 [Min Grade: C]

**MATE 515 Experimental Technique in Materials 3.0 Credits**

Covers electron microscopy techniques, scanning transmission and Auger analysis, x-ray diffraction, x-ray wavelength dispersive and energy dispersive analysis, thermal analysis, statistics and error analysis, and design of experiments.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 516 Computational Techniques in Materials 3.0 Credits**

In the past few decades, computational materials modeling and simulation tools have become an essential component to modern materials design, development, and deployment. This course will teach the basics of a broad range of materials modeling and simulation approaches, with emphasis on the first-principles calculations based on density functional theory (DFT) and computational thermodynamics approach (the CALPHAD approach). Teaching contents will be organized to be practice-oriented. There will be lots of hands-on experience with using the modeling software to study the structural, mechanical, electronic, thermodynamic, and kinetic properties of materials. Please note that computer programming knowledge is NOT a prerequisite.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 525 Introduction to Composite Materials 3.0 Credits**

Covers classification and definition of composite materials; properties of fibers, matrices, and their interfaces; structural geometry of reinforcing materials; formation and testing of composites; and properties and analysis of composite materials.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 530 Solidification Processing I 3.0 Credits**

Covers principles of solidification processing, heat flow during solidification, thermodynamics and kinetics of nucleation and growth, solute redistribution, interfacial stability and morphology, transport phenomena: continuum treatments and structural effects, and rapid solidification.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**MATE 535 Numerical Engineering Methods 3.0 Credits**

Covers numerical solution of non-linear equations, linear systems, and integration of ordinary differential equations. Introduces finite differences and finite elements. Provides a user's perspective of finite elements, element selection, convergence, and error estimation. Applications to heat transfer, diffusion, stress analysis, and coupled problems. Maple and ABAQUS (a commercial non-linear finite element program) are used in this course. A term project using ABAQUS is required. Emphasis is placed on materials engineering examples.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 536 Materials Seminar Series 1.0 Credit**

MSE hosts visitors from materials and materials-related academic departments, national laboratories and industry to visit and interact with students and to present a seminar. Students will interact with visitors. Lectures on other selected topics: safety and health, ethics in science & engineering research, and writing and presentation skills.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 12 times for 12 credits

**MATE 541 Introduction to Transmission Electron Microscopy and Related Techniques 3.0 Credits**

This course covers fundamentals of electron optics, electron-specimen interaction, and transmission electron microscopy (TEM). Elastic (high resolution and in situ TEM) and inelastic scattering techniques (energy dispersive spectroscopy, electron energy loss spectroscopy) are reviewed. An introduction to scanning electron microscopy (SEM), focused ion beam (FIB), and sample preparation is provided.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 542 Nuclear Fuel Cycle & Materials 3.0 Credits**

This course encompasses the nuclear fuel cycle, including extraction, enrichment, transmutation in a nuclear reactor, reprocessing, waste processing, repository performance, materials for nuclear reactors, mechanical and thermal performance will be discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 544 Nanostructured Polymeric Materials 3.0 Credits**

This course is designed to address the role of polymer science in Nanotechnology. Topics that will be covered include block copolymer templated self assembly, polymer thin and thick films, LBL, self assembly, soft lithography and polymer nanocomposites.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATE 501 [Min Grade: C]

**MATE 560 Powder Metallurgy I 3.0 Credits**

Covers commercial and near-commercial methods of powder making, material and process variables, atomization mechanisms, powder properties and characterization, powder compaction, and properties in the green state.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 563 Ceramics 3.0 Credits**

This course deals with the structure and bonding of ceramics. The fundamental role of point defects on electric and diffusional properties is discussed. Sintering, both solid and liquid phase, is explored. What affects strength, creep, subcritical crack growth and fatigue of ceramics is elucidated. Glasses and their properties are examined.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 565 Crystal Mechanics I 3.0 Credits**

Covers crystal plasticity, texture development, continuum aspects of dislocations, interaction and intersection of dislocations, dislocation multiplication, dislocations in crystalline solids, and dislocation boundaries and configurations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 570 Materials Processing I 3.0 Credits**

Covers metal deformation processes: slab and deformation work analyses; slip line theory; and upper bound analysis applied to upsetting, drawing, extrusion, rolling, and deep drawing.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE 572 Materials for High Temperature and Energy 3.0 Credits**

This graduate level introduction to high temperature materials and materials used for energy applications, deals with metals and ceramics that are used in systems that produce or store energy, such as power generation facilities, solid oxide fuel cells, batteries, photovoltaics, thermoelectric generators and supercapacitors.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 576 Recycling of Materials 3.0 Credits**

This course will examine the selection criteria for recycling component materials. Recycling involves both reusing materials for energy applications and reprocessing materials into new products.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 582 Materials for Energy Storage 3.0 Credits**

The course will address principles of operation of electrochemical energy storage devices and describe materials used in those devices.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 583 Environmental Effects on Materials 3.0 Credits**

Environmental degradation is explored with focus on electrochemical corrosion reactions in metals and alloys due to atmospheric, aqueous, chemical or elevated temperature exposure. In addition, high temperature degradation of ceramics and degradation of polymers due to exposure to heat, light and chemicals will be addressed. The role of these environmental effects during service and the impact on performance and reliability will be explored.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 585 Nanostructured Carbon Materials 3.0 Credits**

Covers advanced carbon materials ranging from diamond to fullerenes and nanotubes. Structure, properties and applications will be discussed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 595 Synthesis of Functional Solids 3.0 Credits**

Chemical and materials sciences have traditionally focused on understanding structure-property-performance relationships with the goal of predicting where the atoms should be placed to achieve a targeted property or process. Much less effort, however, has been directed toward a predictive science for synthesis – understanding how to get the atoms where they need to go to produce the desired structure. The course will provide an overview of the chemical methods used for the synthesis of inorganic functional materials and demonstrate how material properties change depending on the synthesis route. Content will be structured by the synthesis approach and practical material function.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 602 Soft Materials 3.0 Credits**

This course is designed to introduce the field of Soft Materials to senior undergraduate and graduate students. Topics that will be covered include Polymers, Gels, Colloids, Amphiphiles and Liquid Crystals.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 603 Advanced Polymer Characterization 3.0 Credits**

This class covers advanced polymer characterization methods that are related to the structure and properties of polymeric materials. Focus will be devoted to scattering and microscopy techniques. X-ray/Neutron scattering and diffraction will be discussed to understand polymer crystalline and nanostructure. Various polymer microscopy techniques such as electron microscopy, scanning probe microscopy and polarized light microscopy will be discussed. Advanced polymer thermal analysis such as modulated differential scanning calorimetry and chip calorimetry will be covered to understand metastability of polymeric materials. The class will discuss how to use this suite of characterization tools to design experiments for targeted applications.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 1 times for 6 credits

**Prerequisites:** MATE 501 [Min Grade: C]

**MATE 604 Principles of Polymerization I 3.0 Credits**

This course focuses on the underlying principles which govern the synthesis of macromolecules and methodologies to control polymer structure. Chemical reactions, kinetics, polymerization parameters, and statistics involved in step-growth, chain-growth, and controlled/living polymerizations will be reviewed. The impact of different polymerization strategies and formulations will be discussed as they relate to polymer molecular weight, functionality, and dispersity, along with their influence on macromolecular architecture and structure.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 605 Computer Simulation of Materials and Processes I 0.0-4.0 Credits**

Simulation of equilibrium and transport properties of materials by Monte Carlo and molecular dynamics methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 610 Mechanical Behavior of Solids 3.0 Credits**

Covers stress and strain, three-dimensional nomenclature, hydrostatic and deviatoric stresses, isotropic and anisotropic elasticity and plasticity, viscoelasticity, crack growth, and fracture.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 651 Advanced Polymer Processing 3.0 Credits**

Covers continuum mechanics; heat transfer; application to extrusion, calendaring, coating, injection molding, film blowing, rotational molding, and fiber spinning; powder processing; design; and equipment selection.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 661 Biomedical Materials I 3.0 Credits**

This course covers biocompatibility; implantable devices; survey of materials properties; corrosion;; cardiovascular applications; orthopedic applications; kidney dialysis; artificial heart and lung devices.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 662 Biomedical Materials II 3.0 Credits**

This course covers phase equilibria; strengthening of materials; dental cast alloys; denture base materials; adhesives and sealants; porcelain and glasses; dental materials laboratory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MATE 702 Natural Polymers 3.0 Credits**

This course provides an introduction to natural and biomimetic polymers with an interdisciplinary view of biology, chemistry and macromolecular science. An understanding of natural building blocks and methods by which nature carries out polymer synthesis and modification reactions is coupled with insights into DNA; structural proteins; polysaccharides; and a wide variety of renewable resources.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATE 501 [Min Grade: C]

**MATE 897 Research 1.0-12.0 Credit**

Hours and credits to be arranged.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is MATE or major is MSE.

**MATE 898 [W] Master's Thesis 1.0-12.0 Credit**

Hours and credits to be arranged.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is MATE or major is MSE.

**MATE 998 Ph.D. Dissertation 1.0-12.0 Credit**

Hours and credits to be arranged.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is MATE or major is MSE.

**MATE I599 Independent Study in MATE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE I699 Independent Study in MATE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE I799 Independent Study in MATE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE I899 Independent Study in MATE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE I999 Independent Study in MATE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE T580 Special Topics in MATE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE T680 Special Topics in MATE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE T780 Special Topics in MATE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE T880 Special Topics in MATE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MATE T980 Special Topics in MATE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Mathematics

### Courses

**MATH 504 Linear Algebra & Matrix Analysis 3.0 Credits**

Course topics include the QR decomposition, Schur's triangularization theorem, the spectral decomposition for normal matrices, the Jordan canonical form, the Courant-Fisher theorem, singular value and polar decompositions, the Gersgorin disc theorem, the Perron-Frobenius theorem, and other current matrix analysis topics. Applications of the material are outlined as well.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 505 Principles of Analysis I 3.0 Credits**

Metric spaces, compactness, connectedness, completeness. Set theory and cardinality, continuity, differentiation, Riemann integral.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 506 Principles of Analysis II 3.0 Credits**

A continuation of MATH 505. Uniform convergence, Fourier series, Lebesgue integral in Euclidean spaces, differential calculus in Euclidean spaces, inverse and implicit functions theorems, change of variables in multiple integrals.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 505 [Min Grade: C]

**MATH 510 Applied Probability and Statistics I 3.0 Credits**

Covers basic concepts in applied probability; random variables, distribution functions, expectations, and moment generating functions; specific continuous and discrete distributions and their properties; joint and conditional distributions; discrete time Markov chains; distributions of functions of random variables; probability integral transform; and central limit theorem.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 511 Applied Probability and Statistics II 3.0 Credits**

Covers probability plots and graphical techniques for determining distribution of data, including sampling and sampling distributions, law of large numbers, parametric point estimation, maximum likelihood estimation, Bayes estimation, properties of estimators, sufficient statistics, minimum variance unbiased estimators, and parametric interval estimation. Introduces hypothesis testing.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 510 [Min Grade: C]

**MATH 512 Applied Probability and Statistics III 3.0 Credits**

Covers hypothesis testing, analysis of variance, multiple regression, and special topics. Introduces linear models.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 511 [Min Grade: C]

**MATH 520 Numerical Analysis I 3.0 Credits**

Covers polynomial interpolation, numerical solutions of nonlinear equations, numerical integration (Newton-Cotes, Gauss quadrature), error estimates of various numerical methods, and function approximation (polynomial, Fourier, Pade).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 521 Numerical Analysis II 3.0 Credits**

Covers numerical linear algebra and matrix computation, direct and iterative methods for solving linear systems and eigenvalue problems, least square problems, various matrix factorizations (QR, singular value decomposition, LU and Cholesky), and Krylov subspace methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 522 Numerical Analysis III 3.0 Credits**

Covers numerical solutions of ordinary and partial differential equations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 520 [Min Grade: C]

**MATH 523 Computer Simulation I 3.0 Credits**

Covers computer simulation of pseudo-random variables, including Monte Carlo methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 510 [Min Grade: C]

**MATH 530 Combinatorial Mathematics I 3.0 Credits**

Covers graphs and networks, with an emphasis on algorithms. Includes minimum spanning trees, shortest path problems, connectivity, network flows, matching theory, Eulerian and Hamiltonian tours, graph coloring, and random graphs.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 531 Combinatorial Mathematics II 3.0 Credits**

Covers mathematical tools for the analysis of algorithms, including combinatorics, recurrence relations and generating functions, elementary asymptotics, and probabilistic methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 530 [Min Grade: C]

**MATH 532 Topics in Combinatorial Math 3.0 Credits**

Covers topics in discrete mathematics, including asymptotic enumeration, number theory, probabilistic combinatorics, and combinatoric algorithms.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 531 [Min Grade: C]

**MATH 533 Abstract Algebra I 3.0 Credits**

Covers groups, transformation groups and group actions, isomorphism and homomorphism theorems, Sylow theorems, symmetric groups, rings, and fields.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 534 Abstract Algebra II 3.0 Credits**

Covers factorization domains, Euclidean domains, and polynomial rings, and modules, vector spaces, and linear transformations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 533 [Min Grade: C]

**MATH 535 Topics in Abstract Algebra 3.0 Credits**

This third course in the Abstract Algebra sequence covers a selection of topics in advanced modern algebra such as symmetries, representation theory, algebraic geometry, homological algebra, Galois Theory and coding theory.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 3 times for 9 credits

**Prerequisites:** MATH 533 [Min Grade: C] and MATH 534 [Min Grade: C]

**MATH 536 Topology I 3.0 Credits**

Covers general topological spaces, metric spaces, and function spaces; open sets, limit points, limits of sequences, convergence, separation axioms, compactness, connectedness, continuity, homeomorphisms, and product of N-spaces; and specialized applications to the real line, Euclidean N-space, and well-known function spaces.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 538 Manifolds 3.0 Credits**

Topics will be selected from the following: Differential structures, immersion theorems, tangent bundles, vector fields and distributions, integral manifolds, integration on manifolds, differential forms, general Stokes Theorem, applications to physics and engineering.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 540 Numerical Computing 3.0 Credits**

Intended to introduce students to contemporary computing environments and the associated tools. Uses contemporary software tools and specific applications from science and engineering to illustrate numerical and visualization methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 572 Financial Mathematics: Fixed Income Securities 3.0 Credits**

The course is a mathematical introduction to interest rates and interest rates related instruments including loans, bonds, mortgages and swaps. The course emphasizes the mathematical aspects of the subject and computational implementation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit



**MATH 604 Topics in Matrix Analysis 3.0 Credits**

Advanced matrix analysis, including topics such as inequalities involving eigenvalues and/or singular values, norms and their duals, operator monotone and convex functions, spectral variation and spectral perturbation, matrix inequalities, numerical range and its variations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 504 [Min Grade: C]

**MATH 610 Probability Theory I 3.0 Credits**

Covers basics of modern probability theory: properties of probability measures, independence, Borel-Cantelli lemma, zero-one law, random variables, distribution theory, and expectations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 633 [Min Grade: C]

**MATH 611 Probability Theory II 3.0 Credits**

Covers further development of modern probability theory, including modes of convergence of random variables, series of random variables, weak and strong laws of large numbers, characteristics functions, inversion formula and continuity theorem, and central limit theorem.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 610 [Min Grade: C]

**MATH 612 Topics in Probability Theory 3.0 Credits**

This third course in the probability sequence covers a selection of topics in modern probability theory. Topics may include: theory of sums of independent random variables, inequalities, martingale theory, combinatorial probability.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 6 credits

**Prerequisites:** MATH 611 [Min Grade: C]

**MATH 613 Stochastic Processes I 3.0 Credits**

Covers conditional probabilities, expectations, Markov chains, classification of states, recurrence and absorption probabilities, asymptotic behavior, random walk, birth and death processes, and ruin problems.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 510 [Min Grade: C] and MATH 611 [Min Grade: C]

**MATH 614 Stochastic Processes II 3.0 Credits**

Covers queuing theory, waiting line models, embedded Markov chain method, and optimization problems. Includes applications and simulation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 613 [Min Grade: C]

**MATH 615 Topics in Stochastic Processes 3.0 Credits**

Covers topics including branching processes, Brownian motion, renewal processes, compounding stochastic processes, martingales, and decision-making under uncertainty.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 613 [Min Grade: C]

**MATH 620 Partial Differential Equations I 3.0 Credits**

Covers derivation and classification of partial differential equations; elementary methods of solution, including Fourier series and transform techniques; linear and equilinear equations of the first order; hyperbolic, elliptic, and parabolic type equations; maximum principles; existence, uniqueness, and continuous dependence theorems; Riemann's method; method of characteristics; Green's functions; and variational and numerical methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 621 Partial Differential Equations II 3.0 Credits**

Continues MATH 620.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 622 Partial Differential Equations III 3.0 Credits**

Continues MATH 621.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 623 Ordinary Differential Equations I 3.0 Credits**

Covers existence and uniqueness theorems, properties of solutions, adjoint equations, canonical forms, asymptotic behavior, phase space, method of isocline, classification of singular points, linear two-dimensional autonomous systems, non-linear systems, stability theory, Lyapunov's methods, quadratic forms, construction of Lyapunov's function, boundedness, limit sets, applications to controls, linear equations with periodic coefficients, Floquet theory, characteristic multipliers and exponents, existence of periodic solutions to weakly non-linear systems, jump phenomena, subharmonic resonance, and stability of periodic solutions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 624 Ordinary Differential Equations II 3.0 Credits**

Continues MATH 623.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 625 Ordinary Differential Equations III 3.0 Credits**

Continues MATH 624.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 626 Dynamical Systems 3.0 Credits**

Dynamical systems, including topics on phase portraits, invariant sets, one-dimensional and higher-dimensional flows, the study of equilibrium and other dynamical phenomena such as periodic orbits, homoclinic orbits and heteroclinic orbits, linear and structural stabilities of equilibrium, Poincaré maps of dynamical systems, bifurcations of equilibrium and periodic orbits, the normal forms of bifurcations, the existence of invariant manifolds, the persistence and differentiability of invariant manifolds under perturbation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 623 [Min Grade: C]

**MATH 630 Complex Variables I 3.0 Credits**

Covers Cauchy's theorem, Morera's theorem, infinite series, Taylor and Laurent expansions, residues, conformal mapping and applications, analytic continuation, and Riemann mapping theorem.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 631 Complex Variables II 3.0 Credits**

Covers entire functions, Picard's theorem, series and product developments, Riemann Zeta function, and elliptic functions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 630 [Min Grade: C]

**MATH 633 Real Variables I 3.0 Credits**

Covers algebra of sets, topology of metric spaces, compactness, completeness, function spaces, general theory of measure, measurable functions, integration, convergence theorems, and applications to classical analysis and integration.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 634 Real Variables II 3.0 Credits**

Covers Fubini's theorem, Radon-Nikodym theorem, LP-spaces, linear functionals on LP-spaces, Riesz-representation theorem, topological integration, Riesz-Markoz theorem, Luzin's theorem, basic complex functions, analytic functions, and complex-integration.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 633 [Min Grade: C]

**MATH 635 Real Variables III 3.0 Credits**

Covers topics including differentiation theory, Fourier series and transforms, and singular integrals.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 634 [Min Grade: C]

**MATH 640 Functional Analysis 3.0 Credits**

An introduction to abstract linear spaces, including normed linear spaces, Hilbert spaces, Banach spaces, and their duals. Fundamental theorems such as the Hahn-Banach theorem, open mapping and closed graph theorems will be covered, along with possible applications to differential and integral equations and fundamentals of distribution theory.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 504 [Min Grade: C] and MATH 506 [Min Grade: C]

**MATH 641 Harmonic Analysis 3.0 Credits**

Covers modern techniques and applications of harmonic analysis, including Fourier series, Fourier transforms and related topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 640 [Min Grade: C]

**MATH 642 Operator Theory 3.0 Credits**

An introduction to basic spectral theory of linear operators, theory of compact operators, and theory of unbounded operators.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 640 [Min Grade: C]

**MATH 660 Lie Groups and Lie Algebras I 3.0 Credits**

Covers matrix groups, topological groups, locally isomorphic groups, universal covering groups, analytic manifolds, Lie groups; the Lie algebra of a Lie group, differential forms, and Lie's three theorems; analytic subgroups of a Lie group and compact Lie groups; and semisimple Lie algebras, general structure of Lie algebras, Cartan subalgebras, modules and representation, and computational techniques in representation theory.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 670 Methods of Optimization I 3.0 Credits**

Provides a rigorous treatment of theory and computational techniques in linear programming and its extensions, including formulation, duality theory, simplex and dual-simplex methods, and sensitivity analysis; network flow problems and algorithms; systems of inequalities, including exploiting special structure in the simplex method and use of matrix decompositions; and applications in game theory and integer programming.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 671 Methods of Optimization II 3.0 Credits**

Covers necessary and sufficient conditions for unconstrained and constrained optimization. Includes computational methods including quasi-Newtonian and successive quadratic programming, and penalty and interior methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 672 Methods of Optimization III 3.0 Credits**

Covers advanced topics in mathematical programming, including interior point methods in linear programming; stochastic optimization; multi-objective optimization; and global minimax, functional, and non-linear least squares optimization methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 670 [Min Grade: C] and MATH 671 [Min Grade: C]

**MATH 673 Calculus of Variations 3.0 Credits**

Introduction to calculus of variations. Covers applications to geometry, classical mechanics and control theory, Euler-Lagrange equations, problems with constraints, canonical equations, Hamiltonian mechanics, symmetries and Noether's theorem, Hamilton-Jacobi theory, introduction to optimal control, maximum principle, and Hamilton-Jacobi-Bellman equations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 701 Algebraic Combinatorics 3.0 Credits**

This course covers methods of Abstract Algebra that can be applied to various combinatorial problems and conversely, combinatorial methods to approach problems in representation theory, algebraic geometry, and homological algebra.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MATH 533 [Min Grade: C]

**MATH 723 Mathematical Neuroscience 3.0 Credits**

This is an introduction to mathematical and computational techniques for analyzing neuronal models. Topics include conductance based models, neuronal excitability, bursting, neural networks, and compartmental models, as well as phase plane analysis, slow-fast systems, elements of applied bifurcation theory, and simulating differential equation models using MATLAB.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 898 Master's Thesis 0.5-20.0 Credits**

Master's thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**MATH 997 Research 1.0-12.0 Credit**

Research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH I599 Independent Study in MATH 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH I699 Independent Study in MATH 0.5-6.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH I799 Independent Study in MATH 0.0-6.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH I899 Independent Study in MATH 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH I999 Independent Study in MATH 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH T580 Special Topics in Mathematics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH T680 Special Topics in Mathematics 0.0-9.0 Credits**

Covers special topics of interest to students and faculty.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH T780 Special Topics in Mathematics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH T880 Special Topics in Mathematics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**MATH T990 Special Topics in Mathematics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Mathematics Education

### Courses

**MTED 500 Learning and Teaching Number and Operation 3.0 Credits**

Course focus is on the key ideas of number and operation and support students in developing a coherent understanding of both our number system and the structural similarities between it and the computation, arithmetic, algebra, and problem solving that appear throughout the school mathematics curriculum.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 501 Proportional and Algebraic Reasoning 3.0 Credits**

This course is about learning and teaching algebra, focusing on patterns, functions and graphs, proportionality, and algebraic connections. Participants will collaboratively explore open-ended problems, discussing, evaluating, revising, and analyzing others' solutions. This is the first course in a sequence to prepare teachers for implementing student-centered, content-based and technology-enhanced instruction.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 502 Geometry & Spatial Reasoning 3.0 Credits**

This course is about learning and teaching geometry, focusing on characteristics of shapes, representational systems, geometric modeling, and proof. Participants will collaboratively explore open-ended geometric problems, discussing, evaluating, revising, and analyzing others solutions. This is the second of three introductory courses that prepare teachers to enact student-centered learning and teaching.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 503 Data Analysis and Probabilistic & Statistical Reasoning 3.0 Credits**

This course is about learning and teaching data analysis and probabilistic and statistical reasoning, focusing on representation of data, measures of center and spread, inferential statistics, proportionality and probability, and introductory statistical analysis. Participants will discuss, evaluate, revise and analyze solutions and methods. This is the third of a 3-course sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**MTED 511 Functions through the Curriculum 3.0 Credits**

This course will consist of an extended analysis of the conception of function, including its historical development. Participants will gain personal experience in thinking of function as a unifying idea on mathematics as well as with conceptual instructional materials.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 517 Mathematics Methods and Content (PreK-4) 3.0 Credits**

Candidates will develop an in-depth understanding of how to effectively deliver standards-aligned academic math content based on age appropriate understanding and individual and group needs, including an appreciation and respect for the individual differences and unique needs of all children in the PK-4 setting. This course has a Stage 3 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 521 [Min Grade: C]

**MTED 518 Advanced Mathematics Methods and Content (PreK-4) 3.0 Credits**

This course provides teacher candidates with an advanced perspective on the learning and teaching of mathematics to elementary school students and includes a combination of readings and analysis of current research and activities that integrate mathematical content and pedagogy. This course is designed to support teachers' understandings of PreK-4 mathematics as well as the way that this content serves as the foundation for advanced elementary and middle school mathematics.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MTED 517 [Min Grade: B]

**MTED 519 Teaching Secondary Mathematics 3.0 Credits**

The course focuses on major issues in learning and teaching mathematics in the secondary classroom. Topics will include instructional practices, learning theories, assessment and current research in math. This course also includes multimedia and field-based experiences. This course has a Stage 3 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 528 Cultural and Historical Significance of Mathematics 3.0 Credits**

The course explores how mathematics reflects and influences the ideas and movements in culture, history, biography and philosophy. An emphasis on teaching methods is integrated throughout the course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 551 Resources & Strategies for Effective Implementation of Problems-based Instruction 3.0 Credits**

This course will enhance teachers' understanding of the Common Core State Standards' Mathematical Practices and the role of problem solving in addressing them. The goal is to develop participants' ability to support approaches that maximize problem-solving discussions in the classroom and strengthen their students' ability to practice perseverance.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 563 Middle Years Mathematical Methods (4-8) 1.5 Credit**

This course focuses on critical knowledge and skills for teaching mathematics in middle years, including learning theories and psychology in mathematics education, mathematics curricula, teaching mathematics, technology, assessment, and meeting individual student needs. The major goal is to provide prospective middle school teachers the opportunity to develop concepts, skills, and pedagogical procedures for effective teaching of mathematics in middle years. Important social and cultural aspects of teaching math that impact student learning will be considered, as well as reflection occur on how teaching mathematics can be made exciting, intriguing, and understandable for students.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 601 Diagnosing Student Mathematical Thinking 3.0 Credits**

This course is about student-centered learning and teaching of mathematics. This goal is to develop participants' expertise in analyzing student work, understanding student thinking, and using that understanding to guide subsequent interactions and interventions with the student.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.



**MTED 611 Virtual Field Experience I - Online Mentoring 1.5 Credit**

This course utilizes the Math Forum's online learning environment to provide teachers with opportunities to engage with students, diagnose student understandings, and implement appropriate instructional responses. Key to this course is virtual one-on-one interactions and an opportunity to reflect on these interactions. This is the first of a 2-course sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**Prerequisites:** MTED 601 [Min Grade: C]

**MTED 612 Virtual Field Experience II - Online Mentoring 1.5 Credit**

This course utilizes the Math Forum's online learning environment to provide teachers with opportunities to engage with students, diagnose student understandings, and implement appropriate instructional responses. Key to this course is continued virtual interactions and an opportunity to reflect on these4 interactions. This is the second of a 2-course sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**Prerequisites:** MTED 611 [Min Grade: C]

**MTED 621 Collaborative Instructional Design & Analysis I 3.0 Credits**

This course focuses on teachers identifying critical areas from their colleagues' classrooms that are in need of improvement and designing and implementing a substantive, outcome-driven response. The course will involve intensive analysis of curricular goals, intended student outcomes, lesson planning and classroom-based "action research".

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**Prerequisites:** MTED 601 [Min Grade: C]

**MTED 622 Collaborative Instructional Design & Analysis II 3.0 Credits**

This course is the second of two courses designed to help teachers identify critical areas from their colleagues' classrooms that are in need of improvement and designing and implementing an appropriate response. The course will involve similar tasks and assignments as MDED 621 but will differ in curricular focus.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**Prerequisites:** MTED 621 [Min Grade: C]

**MTED 642 Mathematics Coaching and Leadership 3.0 Credits**

This course explores the attributes of effective mathematics coaching. The goal is to develop candidates' understanding and expertise of the structure, skills, core concepts, facts, methods of inquiry and application of technology required to build and sustain a successful mathematics coaching practice within their chosen specialization (preK-12, pre-K-8 or 6-12).

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MTED 621 [Min Grade: B]

**Corequisite:** MTED 643

**MTED 643 Practicum in Mathematics Coaching and Leadership 2.0 Credits**

This course offers teachers the opportunity to engage in a wide range of practical experiences in authentic educational settings and connect their coaching knowledge with practical issues in real school contexts. As the term develops, participant's required exposure to learning situations and school settings under the guidance of program faculty and trained mentors will increase significantly. There is a substantial field experience component in this course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MTED 621 [Min Grade: B]

**Corequisite:** MTED 642

**MTED 651 Problem Solving Strategies 3.0 Credits**

Course focus is on supporting the development of mathematical approaches to problems that allow students to productively engage with and reason through a wide variety of mathematical tasks. Students will develop high levels of competence and sophistication with a wide range of mathematical approaches, including guess and check, consider a simpler problem, analyze in terms of parity, case analysis, etc.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**MTED 661 Teaching Math with Dynamic Math Technology 3.0 Credits**

This course explores how the teaching and learning of math in grades 6 through calculus is enhanced by appropriate use of dynamic mathematics software such as Classpad.net, Geogebra and Desmos. Course activities will include constructing content-focused math activities from scratch and using existing ready-to-use activities from the different dynamic math software tools to cover topics in middle school, algebra, geometry, statistics, and calculus. Technology skills such as creating sliders, constructions, creating multiple representations, creating hide/show buttons, and more will be covered as they relate to the math topics being explored. The focus is on using technology appropriately to enhance the teaching and learning of mathematics.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT or major is TLC.

**MTED 662 Teaching Calculus with Dynamic Geometry Software 3.0 Credits**

This course explores teaching the fundamental ideas of calculus, including limits, derivatives, antiderivatives, and integrals through the use of dynamic geometry software. While the course will cover a variety of calculus content, it is not a calculus course. This course is designed to enrich students' understanding of calculus ideas, to corroboratively explore these ideas with colleagues, and to engage in professional conversations about the implications of these experiences and technologies on the teaching of the ideas of calculus at the middle and secondary levels.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT or major is TLC.

**MTED 690 Current Research in Mathematics Learning & Teaching 3.0 Credits**

This capstone course for the Master of Science program in Mathematics Learning and Teaching will provide students with an introduction to research in mathematics education. Participants will read, analyze, and synthesize seminal research articles in mathematics education and create a proposal for a future classroom-based research project.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is MLAT.

**MTED 775 Special Topics in Mathematics Education 3.0 Credits**

Covers various topics of particular interest to mathematics teachers and education students.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 3 times for 9 credits

**MTED I599 Independent Study in MTED 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED I699 Independent Study in MTED 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED I799 Independent Study in MTED 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED I899 Independent Study in MTED 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED I999 Independent Study in MTED 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED T580 Special topics in MTED 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED T680 Special topics in MTED 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED T780 Special topics in MTED 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED T880 Special topics in MTED 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**MTED T980 Special topics in MTED 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Mechanical Engineering & Mechanics

### Courses

**MEM 503 Gas Turbines & Jet Propulsion 3.0 Credits**

Covers fundamentals of thermodynamics and aerothermodynamics, and application to propulsion engines; thermodynamic cycles and performance analysis of gas turbines and air-breathing propulsion systems, turbojet, turboprop, ducted fan, ramjet, and ducted rocket; theory and design of ramjets, liquid and solid rockets, air-augmented rockets, and hybrid rockets; aerodynamics of flames, including the thermodynamics and kinetics of combustion reactions; supersonic combustion technology and zero-g propulsion problems; and propulsion systems comparison and evaluation for space missions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 504 HVAC Equipment 3.0 Credits**

Covers performance of air handlers, pumps, direct expansion systems, chillers, cooling towers, and similar equipment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 505 HVAC Controls 3.0 Credits**

Covers control theory and application to heating, ventilating, air conditioning, including pneumatic, fluidic, and electronic controls.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 517 Fundamentals of Nanomanufacturing 3.0 Credits**

This course introduces conventional methods that emerged from microelectronics and nonconventional or alternative approaches as applied to fabricate nanometer-scale biological and solid-state devices; Preliminary concepts for nanofabrication; Conventional lithographic methods; Nonconventional methods such as nanoimprint lithography and chemical and biological approaches; Cell culturing for application in biology; The safe development and use of advanced nanotechnological manufacturing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 417 [Min Grade: C] or PHYS 201 [Min Grade: C]

**MEM 518 Introduction to Nanoscale Metrology 3.0 Credits**

Highlights the most innovative and powerful developments in nano/microscale diagnostics; Reviews conventional and non-conventional micro- and nanofabrication, preliminary concepts for nanoscale metrology; Covers optical diagnostics for microfluidics and nanofluidics, scanning electron microscopy, transmission electron microscopy, atomic force microscopy, ionic current blockage measurement, mass spectroscopy and UV-Vis spectroscopy, and laser induced fluorescence.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 530 Aircraft Flight Dynamics & Control I 3.0 Credits**

Covers development of dynamic models, linearization, aerodynamic coefficients, control derivatives, longitudinal and lateral modes, and open-loop analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 540 Control Applications of DSP Microprocessors 3.0 Credits**

Most of the control systems today are digital and implemented using microprocessors. In this course, the students will learn how to employ the state-of-the-art DSP microprocessors to perform analog-to-digital conversion, digital-to-analog conversion, digital signal processing, decision making, and feedback control action to achieve precise regulation/ tracking, disturbance reduction, and robust stability/performance for physical systems. In addition to lectures by the instructor, the course will feature eight hands-on lab projects centered on the design and microprocessor implementation of digital controllers for MIMO (multi-input-multi-output) electro-mechanical systems. Cross-listed with undergraduate course MEM 459.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 545 Solar Energy Fundamentals 3.0 Credits**

This course focuses on basic theories of solar radiation, solar thermal energy, and photovoltaics. Students will learn basic radiation heat transfer, solar radiation, solar thermal collection and storage, passive and active solar heating/cooling, physics of photovoltaic cells, and characteristics and types of solar cells.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 345 [Min Grade: D] or PHYS 201 [Min Grade: D]

**MEM 569 Introduction to Composite Materials I 3.0 Credits**

Introduces anisotropic elasticity, lamina stiffness and compliance, plane-stress and plane-strain, stress-strain relations of a lamina, testing methods, engineering elastic constants, failure criteria, and micromechanics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 570 Introduction to Composite Materials II 3.0 Credits**

Covers laminated plate theory, stiffness and compliance of laminated plates, effect of laminate configuration on elastic performance, and review of research topics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 569 [Min Grade: C]

**MEM 571 Introduction to Robot Technology 3.0 Credits**

Covers robot configuration; components, actuators, and sensors; vision; and control, performance, and programming. Includes lectures and laboratory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 572 Mechanics of Robot Manipulators 3.0 Credits**

Covers homogeneous transformation, direct and inverse kinematic manipulators, velocities and acceleration, static forces, and manipulators' dynamics, via Lagrange and Newton-Euler formulations. Includes lectures and laboratory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 666 [Min Grade: C]

**MEM 573 Industrial Application of Robots 3.0 Credits**

Covers path planning and workspace determination, robot accuracy and repeatability measurements, robot cell design, application engineering and manufacturing, material transfer, processing operations, and assembly and inspection. Includes lectures and laboratory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 574 Introduction to CAM 0.0-3.0 Credits**

Examines the basic elements used to integrate design and manufacturing processes, including robotics, computerized-numerical controlled machines, and CAD/CAM systems. Covers manufacturability considerations when integrating unit process elements.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 591 Applied Engr Analy Methods I 3.0 Credits**

Covers effective methods to analyze engineering problems. This module focuses on analytical and computational methods for problems tractable with vectors, tensors and linear algebra. Uses symbolic/numerical computational software. Examples drawn from thermal fluid sciences, mechanics and structures, systems and control, and emerging technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 592 Applied Engr Analy Methods II 3.0 Credits**

Covers effective methods to analyze engineering problems. This module focuses on computational and analytical methods for complex variables and ordinary differential equations. Uses symbolic/numerical computational software. Examples drawn from thermal fluid sciences, mechanics and structures, systems and control, and emerging technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 591 [Min Grade: C]

**MEM 593 Applied Engr Analy Methods III 3.0 Credits**

Covers effective methods to computationally and analytically solve engineering problems. This module focuses on solution methods for partial differential equations, Fourier analysis, finite element analysis and probabilistic analysis. Uses symbolic/numerical computational software. Examples drawn from mechanical and civil engineering.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 592 [Min Grade: C]

**MEM 601 Statistical Thermodynamics I 3.0 Credits**

Covers probability theory; statistical interpretation of the laws of thermodynamics; systems of independent particles; systems of dependent particles; kinetic theory of dilute gases; quantum mechanics; energy storage and degrees of freedom; and thermochemical properties of monatomic, diatomic, and polyatomic gases.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 602 Statistical Thermodynamics II 3.0 Credits**

Covers analysis of monatomic solids, theory of liquids, chemical equilibrium, kinetic and thermochemical description of rate processes, transport phenomena, and spectroscopy.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 601 [Min Grade: C]

**MEM 603 Advanced Thermodynamics 3.0 Credits**

Covers reformulation of empirical thermodynamics in terms of basic postulates; presentation of the geometrical, mathematical interpretation of thermodynamics; Legendre transforms; requirements for chemical and phase equilibrium; first-and second-order phase transitions; Onsager reciprocal relations; and irreversible thermodynamics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 611 Conduction Heat Transfer 3.0 Credits**

Covers conduction of heat through solid, liquid, and gaseous media; advanced analytical methods of analysis, including integral transform and Green's functions, the use of sources and sinks, and numerical and experimental analogy methods; and variational techniques.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 612 Convection Heat Transfer 3.0 Credits**

Covers convective heat transfer without change of phase or constitution, fundamental equations, exact solutions, application of the principle of similarity and the boundary-layer concept to convective heat transfer, similarity between heat and momentum transfer, and heat transfer in high-velocity flows.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 613 Radiation Heat Transfer 3.0 Credits**

Covers radiation heat transfer between surfaces and within materials that absorb and emit. Formulates and applies methods of analysis to problems involving radiation alone and radiation combined with conduction and convection.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 617 Introduction to Microfabrication 3.0 Credits**

This course focuses on the fundamentals of microfabrication technologies. The materials, principles, and applications of silicon-based microfabrication technologies such as photolithography, wet/dry etching, deposition techniques, surface micromachining, and polymer micromachining will be covered. This course also includes two lab sessions through which students will have a hands-on experience in microfabrication.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 619 Microfluidics and Lab-on-a-Chip 3.0 Credits**

The course explores applications of microfluidic phenomena and lab-on-a-chip technology. The topics include fluid behavior in microchannels, electrokinetic manipulation, micro-scale separation/surface sciences, transducer effects, and microactuators. Students will also have a hands-on experience through laboratory sessions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 417 [Min Grade: C] or MEM 617 [Min Grade: C]

**MEM 621 Foundations of Fluid Mechanics 3.0 Credits**

Covers kinematics and dynamics of fluid motion; Lagrangian and Eulerian description of motion; transport theorem; continuity and momentum equations (Navier-Stokes equations); vorticity vector and equation; three-dimensional, axisymmetric, and two-dimensional complex potential flows; constitutive equations of a viscous fluid; dynamic similarity; Stokes flow; and similarity analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 622 Boundry Layers-Laminar & Turbulent 3.0 Credits**

Covers laminar boundary layers; approximate integral method; three-dimensional laminar boundary layer and boundary-layer control; transient boundary-layer flows; the integral momentum equation; origins of turbulence; transition to turbulent flow; Reynolds-averaged equations; Reynolds stress; measurement of turbulent quantities; study of turbulent wall bounded flows, including pipe flow, flow over a flat plate, and flow over a rotating disk; and boundary layer in a pressure gradient.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 621 [Min Grade: C]

**MEM 630 Linear Multivariable Systems I 3.0 Credits**

State space representation, continuous time and discrete time systems, similarity transformation, invariant subspaces, state response, stability, controllability, observability, Kalman decomposition, spectral and singular value decompositions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 631 Linear Multivariable Systems II 3.0 Credits**

Pole assignment, output feedback, linear quadratic regulator, observer design, stochastic processes, state response to white noise, Kalman filter, linear quadratic Gaussian controller, evaluation of closed loop system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**MEM 632 Linear Multivariable Systems III 3.0 Credits**

Model reduction: approximation of transfer functions, modal truncations, oblique projections, component cost analysis, internal balancing; controller reduction: observer-based controller parametrization, Riccati balancing, q-COVER theory, optimal projections.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 633 Robust Control Systems I 3.0 Credits**

Covers linear spaces and linear operators; Banach and Hilbert spaces; time-domain spaces; frequency-domain spaces; singular value decomposition; EISPACK, LINPACK, and MATLAB, including internal stability; coprime factorization over the ring of polynomial matrices; matrix fraction description; properties of polynomial matrices; irreducible mfd's; Smith-McMillan form; poles and zeros; canonical realizations; and computation of minimal realizations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 634 Robust Control Systems II 3.0 Credits**

Covers the structure of stabilizing controllers; coprime factorization over the ring of proper stable rational matrices; algebraic Riccati equation; state space computation of coprime factorization; yvb controller parametrization; linear fractional transformation; state space structure of proper stabilizing controllers; formulation of control problem, H, and H optimization problem; model matching problem; tracking problem; robust stabilization problem; inner-outer factorization; and Sarason's H interpolation theory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 633 [Min Grade: C]

**MEM 635 Robust Control Systems III 3.0 Credits**

Covers Hankel-norm approximations, balanced realizations, two-block H optimization, generalized multivariable stability margins, structured and non-structured stability margins, structured singular values, robust stabilization and performance, and recent developments in robust control.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 634 [Min Grade: C]

**MEM 636 Theory of Nonlinear Control I 3.0 Credits**

Provides a comprehensive introduction to the geometric theory of non-linear dynamical systems and feedback control. Includes stability, controllability, and observability of non-linear systems; exact linearization, decoupling, and stabilization by smooth feedback; and zero dynamics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 637 Theory of Nonlinear Control II 3.0 Credits**

Covers systems with parameters, including bifurcation and stability; static bifurcation; local regulation of parameter-dependent non-linear dynamics; tracking; limit cycles in feedback systems; perturbation methods; frequency domain analysis; and applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 636 [Min Grade: C]

**MEM 638 Theory of Nonlinear Control III 3.0 Credits**

Covers high gain and discontinuous feedback systems, including sliding modes, applications, and advanced topics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 637 [Min Grade: C]

**MEM 639 Real Time Microcomputer Control I 0.0-3.0 Credits**

Covers discrete-time systems and the Z-transform, sampling and data reconstruction, the pulse transfer function, discrete state equations, time-domain analysis, digital simulation, stability, frequency-domain analysis, Labview programming, and data acquisition and processing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 640 Real Time Microcomputer Control II 0.0-3.0 Credits**

Covers design of discrete-time controllers, sampled data transformation of analog filter, digital filters, microcomputer implementation of digital filters, Labview programming techniques, using the daq library, writing a data acquisition program, and Labview implementation of pid controllers.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 639 [Min Grade: C]

**MEM 646 Fundamentals of Plasmas I 3.0 Credits**

Introduces the fundamentals of plasma science and modern industrial plasma applications in electronics, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include quasi-equilibrium and non-equilibrium thermodynamics, statistics, fluid dynamics and kinetics of plasma and other modern high temperature and high energy systems and processes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 647 Fundamentals of Plasmas II 3.0 Credits**

Continues the development of the engineering fundamentals of plasma discharges applied in modern industrial plasma applications in electronics, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include quasi-equilibrium and non-equilibrium thermodynamics, statistics, fluid dynamics of major thermal and non-thermal plasma discharges, operating at low, moderate and atmospheric pressures.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 646 [Min Grade: C]

**MEM 648 Applications of Thermal Plasmas 3.0 Credits**

Introduces applications of modern thermal plasma processes focused on synthesis of new materials, material treatment, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include: thermodynamics and fluid dynamics of high temperature plasma processes, engineering organization of specific modern thermal plasma technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 649 Application of Non-Thermal Plasmas 3.0 Credits**

Application of modern non-thermal plasma processes focused on synthesis of new materials, material treatment, fuel conversion, environmental control, chemistry, biology, and medicine. Topics include: non-equilibrium thermodynamics and fluid dynamics of cold temperature plasma processes, engineering organization of specific modern non-thermal plasma technologies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 660 Theory of Elasticity I 3.0 Credits**

Summarizes mechanics of materials courses. Covers vector and tensor analysis, indicial notation, theory of stress, equilibrium equations, displacements and small strains, compatibility, and strain energy; formulation of the governing equations and the appropriate boundary conditions in linear elasticity, and uniqueness of the solutions; elementary three-dimensional examples and two-dimensional theory; stress functions; solutions in Cartesian and polar coordinates; and Fourier series.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 663 [Min Grade: C]

**MEM 661 Theory of Elasticity II 3.0 Credits**

Covers two-dimensional problems by the method of Muskhelishvili, torsion problem, stress function and solutions by means of complex variables and conformal mapping, three-dimensional solutions for straight beams, energy theorems, virtual work and their applications, and Rayleigh-Ritz method.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 660 [Min Grade: C]

**MEM 662 Theory of Elasticity III 3.0 Credits**

Covers use of Fourier series and Green's functions for plane problems; three-dimensional problems in terms of displacement potentials; use of the Galerkin vector and the Boussinesq-Papkovich-Neuber functions; fundamental solutions to the Kelvin, Boussinesq, Cerruti, and Mindlin problems; and elastic contact. Introduces non-linear elasticity.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 661 [Min Grade: C]

**MEM 663 Continuum Mechanics 3.0 Credits**

Covers kinematics, Eulerian, and Lagrangian formulations of deformation; theory of stress; balance principles; continuum thermodynamics; and constitutive relations in fluids and solids.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 664 Introduction to Plasticity 3.0 Credits**

Reviews stress and strain deviators, invariants and distortional energy, principal and octahedral stresses and strains, Tresca and von Mises yield criteria, yield surface and Haigh-Westergaard stress space, Lode's stress parameter, subsequent yield surface, Prandtl-Reuss relations, work hardening and strain hardening, stress-strain relations from Tresca criteria, incremental and deformation theories, the slip-line field, slip-line equations for stress, velocity equations and geometry of slip-line field, limit analysis, simple truss, bending of beams, lower and upper bound theorems, and plasticity equations in finite-element methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 660 [Min Grade: C]

**MEM 665 Time-Dependent Solid Mechanics 3.0 Credits**

Part a: Covers elastodynamics, including plane, cylindrical, and spherical waves; characteristics; the acoustic tensor; polarizations and wave speeds; transmission and reflection at plane interfaces; critical angles and surface waves; and waveguides and dispersion relationships. Part b: Covers linear viscoelasticity, including relaxation modulus and creep compliance, hereditary integrals, Laplace transform, correspondence principle, creep buckling and vibrations, viscoplasticity, creep, strain-rate effects, shear bands, and shock waves.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 660 [Min Grade: C]

**MEM 666 Advanced Dynamics I 3.0 Credits**

Covers analytical statics (principle of virtual work), Lagrange's equations, conservation laws, stability analysis by perturbation about steady state, Jacobi first integral, ignoration of coordinates, classification of constraints, solution of constrained dynamical problems by constraint embedding (elimination) or constraint adjoining (Lagrange multipliers), generalized impulse and momentum, and formulation and solution of non-holonomic systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 667 Advanced Dynamics II 3.0 Credits**

Covers vector dynamics in three dimensions, including a detailed study of rotational kinematics, motion of the mass center and about the mass center for a system of particles and a rigid body, moments of inertia, three-dimensional dynamical problems, and comparison between Lagrangian techniques and the vector methods of Euler and Newton. Includes vibrations, Euler's angles, motion of a gyroscope, and motion of an axially symmetric body under no force other than its weight.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 666 [Min Grade: C]

**MEM 668 Advanced Dynamics III 3.0 Credits**

Covers central forces, effect of the earth's rotation, Foucault's pendulum, variational methods, Hamilton's principle, state space techniques for the integration of equations of motion, and numerical integration of equations of motion on microcomputers through the CSMP program. Depending on student interest, includes either Hamiltonian dynamics (canonical equations, contact transformations, Hamilton-Jacobi theory) or rigid body kinematics of complex dynamical systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 667 [Min Grade: C]

**MEM 670 Theory of Plates and Shells 3.0 Credits**

Covers elements of the classical plate theory, including analysis of circular and rectangular plates, combined lateral and direct loads, higher-order plate theories, the effects of transverse shear deformations, and rotatory inertia; matrix formulation in the derivation of general equations for shells; and membrane and bending theories for shells of revolution.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 671 Mechanical Vibrations I 3.0 Credits**

Free and forced responses of single degree of freedom linear systems; two degree of freedom systems; multiple degree of freedom systems; the eigenvalue problem; modal analysis; continuous systems; exact solutions; elements of analytical dynamics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 672 Mechanical Vibrations II 3.0 Credits**

Continuous systems; approximate solutions; the finite element method; nonlinear systems; geometric theory, perturbation methods; random vibrations; computational techniques.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 673 Ultrasonics I 3.0 Credits**

Basic elements of ultrasonic nondestructive evaluation, wave analysis, transducers, transform techniques, A,B,C,M,F and Doppler imaging, medical imaging, multiple element arrays, real-time imaging, calibration.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 674 Ultrasonics II 3.0 Credits**

Basic elements of guided wave analysis, oblique incidence reflection factor, critical angle reflectivity, surface waves, lamb waves, plate waves, dispersion, phase and group velocity, experimental techniques for guided waves.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 675 Medical Robotics I 3.0 Credits**

Use of robots in surgery, safety considerations, understanding robot kinematics, analysis of surgeon performance using a robotic devices, inverse kinematics, velocity analysis, acceleration analysis, various types of surgeries case study.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 676 Medical Robotics II 3.0 Credits**

Force and movement for robot arms, robot dynamics, computer vision, vision based control, combining haptics, vision and robot dynamics in a cohesive framework for the development of a medical robotic system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 675 [Min Grade: C]

**MEM 677 Haptics for Medical Robotics 3.0 Credits**

Introduction to haptics, physiology of touch, actuators, sensors, non-portable force feedback, portable voice feedback, tactile feedback interfaces, haptic sensing and control.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 678 Nondestructive Evaluation Methods 3.0 Credits**

This course covers the tools necessary for the inspection and evaluation of materials and infrastructures. Most relevant methods used for Non-Destructive Evaluation (NDE) of structural components will be discussed. Physical principles of continuum mechanics, electrical engineering, acoustics and elastic wave propagation underlying the NDE methods will be covered. Sensor data acquisition and digital signal processing will be addressed.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 681 Finite Element Methods I 3.0 Credits**

Covers formulation of finite element methods for linear analysis of static and dynamic problems in solids, structures, fluid mechanics, heat transfer, and field problems; displacement-based, hybrid, and stress-based methods; variational and weighted residual approaches; effective computational procedures for solution of finite element equations in static and dynamics analyses; and pre-processing and post-processing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 682 Finite Element Methods II 3.0 Credits**

Covers formulation of advanced finite element methods for non-linear analysis of static and dynamic problems in solids, structures, fluid mechanics, heat transfer, and field problems; material non-linearity; large displacement; large rotation; large strain; effective solution procedures for non-linear finite element equations in static and dynamic analyses; and effective finite element methods for eigenvalue problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 681 [Min Grade: C]

**MEM 684 Mechanics of Biological Tissues 3.0 Credits**

Covers composition and structure of tendons, ligaments, skin, and bone; bone mechanics and its application in orthopedics; viscoelasticity of soft biological tissues; models of soft biological tissues; mechanics of skeletal muscle; and muscle models and their applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 685 Mechanics of Human Joints 3.0 Credits**

Covers the structure of human joints, including experimental and analytical techniques in the study of human joint kinematics; applications to the design of artificial joints and to clinical diagnosis and treatments; stiffness characteristics of joints and their applications to joint injuries; and prosthetic design and graft replacements.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 686 Mechanics of Human Motion 3.0 Credits**

Examines experimental and analytical techniques in human motion analysis and human locomotion; interdependency of muscle force distribution in human motion; modeling and simulation of bipedal locomotion; energetics, stability, control, and coordination of human motion; and pathological gait.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 687 Manufacturing Processes I 3.0 Credits**

Introduces basic manufacturing process technology and the mechanical properties of metals and plastics. Covers dimensional and geometry tolerancing; surface finishing; material removal processes and machine tools; processing of polymers and reinforced plastics, including general properties of plastic materials and forming, shaping, and processing of plastics; and CNC machining and programming. Combines lectures and laboratory work.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 688 Manufacturing Processes II 3.0 Credits**

Covers processing of polymers and reinforced plastics, including general properties of plastic materials and forming, shaping, and processing of plastics; CNC machining and programming; casting processes; sheet-metal forming processes; bulk deformation processes; and computer integrated manufacturing systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 687 [Min Grade: C]

**MEM 689 Computer-Aided Manufacturing 0.0-3.0 Credits**

Covers development of software and hardware for computer-aided manufacturing systems, basic elements used to integrate the manufacturing processes, and manufacturability studies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 701 Physical Gas Dynamics I 3.0 Credits**

Reviews equilibrium kinetic theory of dilute gases. Covers non-equilibrium flows of reacting mixtures of gases, flows of dissociating gases in thermodynamics equilibrium, flow with vibrational or chemical non-equilibrium, non-equilibrium kinetic theory, flow with translational non-equilibrium, and equilibrium/non-equilibrium radiation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 602 [Min Grade: C]

**MEM 705 Combustion Theory I 3.0 Credits**

Covers thermochemistry, including the relationship between heats of formation and bond energies, heat capacities and heats of reaction, chemical equilibrium and the equilibrium constant, calculation of adiabatic flame temperature and composition of burned gas, free energy and phase equilibrium, classical chemical kinetics, and chain reaction theory.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 706 Combustion Theory II 3.0 Credits**

Covers laminar flame propagation in premixed gases, detonation and deflagration, heterogeneous chemical reactions, burning of liquid and solid fuels, and diffusion flames.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 705 [Min Grade: C]

**MEM 707 Combustion Theory III 3.0 Credits**

Covers advanced topics in combustion, including combustion-generated air pollution, incineration of hazardous wastes, supersonic combustion, propellants and explosives, and fires.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 706 [Min Grade: C]

**MEM 711 Computational Fluid Mechanics and Heat Transfer I 3.0 Credits**

Covers classification of fluid flow and heat transfer phenomena, including time-dependent multidimensional heat conduction and finite-difference and finite-element formulations; convection and diffusion; upwind, exponential, and hybrid schemes; and boundary-layer-type fluid flow and heat transfer problems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 712 Computational Fluid Mechanics and Heat Transfer II 3.0 Credits**

Covers basic computational methods for incompressible Navier-Stokes equations, including vorticity-based methods and primitive variable formulation; computational methods for compressible flows; inviscid and viscous compressible flows; finite-element methods applied to incompressible flows; and turbulent flow models and calculations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 711 [Min Grade: C]

**MEM 714 Two-Phase Flow & Heat Transfer 3.0 Credits**

Covers selected topics in two-phase flow, with emphasis on two-phase heat transfer problems, basic conservation equations for two-phase flows, nucleation, bubble dynamics, pool boiling, forced convective boiling, condensation heat transfer, two-phase flow equipment design, tube vibration and flow instability in two-phase flows, and fouling in heat transfer equipment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit



**MEM 717 Heat Transfer in Manufacturing 3.0 Credits**

Covers heat conduction fundamentals, including phase change problems (casting, welding, and rapid solidification processes) and cooling controls of rolling, forging, and extrusion processes.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 611 [Min Grade: C]

**MEM 721 Non-Newtonian Fluid Mechanics and Heat Transfer 3.0 Credits**

Covers the stress-strain rate relationship, simple flow, general constitutive and conservation equations, generalized Newtonian models, molecular theories, rheological property measurements, plane Couette flow, hydrodynamic theory of lubrication, helical flow, boundary layer flows, pipe flows, natural convection, thin film analysis, drag reduction phenomenon, and biorheology.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 622 [Min Grade: C]

**MEM 722 Hydrodynamic Stability 3.0 Credits**

Introduces stability, including discrete and continuous systems. Covers linear theory; instability of shear flows, spiral flows between concentric cylinders and spheres, thermoconductive systems, and viscous flows; global stability and non-linear theories; and time periodic and non-periodic flows, attractors, and bifurcation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 622 [Min Grade: C]

**MEM 723 Vortex Interactions and Complex Turbulent Flow 3.0 Credits**

Nonlinear vortex motion and interaction; motion of point vortices; generation and interaction of vortex rings and counter-rotating vortex pairs; vortex impulse, energy, pairing, bifurcation, and bursting; study of free and separating turbulent flows: mixing layers, wakes, jets, and buoyant plumes; recirculation behind bluff bodies and backsteps; longitudinal and lateral vortex waves and shear layers; sweeps and bursts in turbulent boundary layers; characteristics of turbulence: entrainment and molecular mixing, effects of buoyancy, rotation, acceleration, and heat release; the 3-D turbulent energy cascade and the 2-D inverse cascade.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 725 Compressible Fluid Dynamics 3.0 Credits**

Reviews one-dimensional flows. Covers steady flow of a compressible fluid; two- and three-dimensional subsonic, transonic, supersonic, and hypersonic flow; normal and oblique shock waves; wave reflections; oblique shock wave interactions and generation vorticity; compressible boundary layers; and shock boundary-layer interactions.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 621 [Min Grade: C]

**MEM 727 Fluid Dynamics in Manufacturing Processes 3.0 Credits**

Covers transport of slurries, molten metals, and polymers; hydrodynamics in forming processes; resin flow model in polymer composites; shaped charge jet technology; separation and filtration; coating; lubrication; and melt-spinning process.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 730 Control of Flexible Space Structures I 3.0 Credits**

Covers modeling of FSS including PDE description and finite element modeling, model errors, model reduction, component cost analysis, modal cost analysis, stability of mechanical systems, gyroscopic and non-gyroscopic systems, and rate and position feedback.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 731 Control of Flexible Space Structures II 3.0 Credits**

Covers probability theory, stochastic processes, Kalman filter, LQG compensators, controller reduction, CCA theory, balancing reductions, and applications.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 730 [Min Grade: C]

**MEM 733 Applied Optimal Control I 3.0 Credits**

Covers necessary conditions from calculus of variations, equality and inequality constraints, fixed and free final time problems, linear-quadratic control, bang-bang control, and application to problems in flight mechanics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 734 Applied Optimal Control II 3.0 Credits**

Covers neighboring extremals and the second variation, perturbation feedback control, sufficient conditions, numerical solution methods, and application to problems in flight mechanics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 733 [Min Grade: C]

**MEM 735 Advanced Topics in Optimal Control 3.0 Credits**

Covers singular arc control, model following control, variable structure control, singular perturbation methods, differential games, and applications.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** MEM 734 [Min Grade: C]

**MEM 760 Mechanics of Composite Materials I 3.0 Credits**

Covers anisotropic elastic moduli, stress-strain relations of a lamina, failure criteria of a lamina, introduction to micromechanics, laminated plate theory, residual stresses, and strength of laminates.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 660 [Min Grade: C]

**MEM 761 Mechanics of Composite Materials II 3.0 Credits**

Covers anisotropic plates and shells, boundary value problem in anisotropic heterogeneous elasticity, vibrations and buckling of laminated plates, and testing methods.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 760 [Min Grade: C]

**MEM 762 Mechanical Composite Materials III 3.0 Credits**

Covers classical failure criteria for orthotropic materials, fracture in laminates, three-dimensional stress analysis, simulation of delamination and transverse cracks, fatigue damage, and cumulative damage models.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MEM 761 [Min Grade: C]

**MEM 770 Theory of Elastic Stability 3.0 Credits**

General stability criteria; beam column; the elastica; energy methods; torsional stability; combined torsion and flexure; lateral buckling of beams in pure bending; buckling of rings; curved bars and arches.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 777 Fracture Mechanics I 3.0 Credits**

Covers fundamental mechanics of fracture, including linear elastic crack mechanics, energetics, small-scale yielding, fully plastic crack mechanics, creep crack mechanics, fracture criteria, mixed mode fracture, stable quasi-static crack growth (fatigue crack growth and environmentally induced crack growth), toughness and toughening, and computational fracture mechanics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 782 Impact and Wave Propagation I 3.0 Credits**

Governing equations for elastic waves; longitudinal waves in a bar; transverse in a flexible string; flexural waves in a Bernoulli-Euler beam; flexural waves in a Timoshenko beam; Rayleigh surface waves; Pochhammer-Chree waves in circular cylinders; reflection of plane waves at a plane boundary.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 783 Impact and Wave Propagation II 3.0 Credits**

Spherical and cylindrical waves in unbounded medium; method of Laplace transform; method of characteristics; flexural waves in a Timoshenko plate; viscoelastic and viscoplastic waves; dispersion and phase velocity; natural frequency in free vibration.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 784 Impact & Wave Propagation III 3.0 Credits**

Governing equations for unsteady, nonisentropic fluid flows; shock waves; method of characteristics for nonlinear system; numerical integration along characteristics; impact and vibration of shell topics in wave propagation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 891 Topics in Advanced Engineering I 2.0 Credits**

Linear systems; control theory; vibrations and eigenvalue problems; systems dynamics; Fourier transformation; flight dynamics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 892 Topics in Advanced Engineering II 2.0 Credits**

Separation of variables; thermodynamics; heat transfer; fluid mechanics; boundary layer theory; elasticity; finite element methods. Solid mechanics; aeroelasticity.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 893 Topics in Advanced Engineering III 2.0 Credits**

Basic probability and statistics; communication theory; sampled data system; digital and optical processing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 894 Engineering Mathematics 3.0 Credits**

Application of matrices, linear algebra, and complex analysis to engineering problems. Ordinary and partial differential equations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM 897 Research 1.0-12.0 Credit**

Supervised research in Mechanical Engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM 898 Master's Thesis 1.0-20.0 Credit**

Master's thesis.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM I599 Independent Study in MEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM I699 Independent Study in MEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM I799 Independent Study in MEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM I999 Independent Study in MEM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**MEM T580 Special Topics in MEM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM T680 Special Topics in MEM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM T780 Special Topics in MEM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM T880 Special Topics in MEM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**MEM T980 Special Topics in MEM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Medical Family Therapy

### Courses

## Museum Education

### Courses

## Museum Leadership

### Courses

**MUSL 500 Museum History and Philosophy 3.0 Credits**

Through the examination of readings, case studies, and visits to local institutions, students will develop an understanding of the history and theory of the museum from the 18th century to the present, with special attention paid to major issues surrounding contemporary museum practice.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 510 Museum Leadership 3.0 Credits**

This course will explore the philosophy and history of leadership in cultural institutions as well as in business, government, and non-profit organizations. Students will examine and understand the value of strategic planning and the core functions of a modern museum including collections management, education, marketing, communications, technology and fundraising.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 530 Museum Management 3.0 Credits**

This course will cover a variety of roles required to run the contemporary museum including curators, conservators, registrars, educators, programmers, audience development, fundraising and volunteers.

This course will include an examination of how various museum roles collaborate with and interact with each other.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 620 Sustainable Cultural Practices 3.0 Credits**

This course will examine sustainable practices at the leadership level in museums, arts, and cultural organizations. Through readings and case examples, students investigate green and sustainable practices in museums, arts, and cultural organizations. Students will design a program to initiate green practice within a museum, presenting it during the final class for feedback from peers in a supportive and co-creative manner.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 630 Exhibitions and Programming 3.0 Credits**

This course focuses on exhibition and program planning—from topic conception, to development and design, to educational programming and marketing.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 650 Governance for Museums and Non-Profit Organizations 3.0 Credits**

Most museums in the United States hold their collections in the public trust—meaning that they are accountable to the public as a result of their tax-exempt status. Similarly the non-profit sector exists to serve a social purpose or need that the public sector or government cannot or does not serve. To manage the public trust and represent the interests of the public at large, museums and non-profit organizations have boards of “trustees.” Trustees are community leaders who, in the non-profit sector, serve as volunteers and contribute wealth, wisdom and work to the organization on whose boards they serve. This class will examine the ethical, legal and strategic implications of governance and examine the interactions between boards and museum staff.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MUSL 530 [Min Grade: C]

**MUSL 670 Museum Communications and Marketing 3.0 Credits**

Provides an in-depth study of the theory and best practices in all areas of strategic communications and marketing in contemporary museums and related organizations.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 690 Culturally Responsive Museums 3.0 Credits**

This course will examine community-responsive and culturally-specific museums in the United States. Through readings and case examples, students investigate these unique museums and the communities they serve. Students will perform site visits to three culturally-specific museums, observe the practices of three museums, and maintain a reflective journal of their experiences.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 710 Bricks and Mortar 3.0 Credits**

This course will provide an intensive study of all aspects of the planning, designing, and construction of museums. The connection of capital projects to other museum functions such as master planning, strategic planning, and fundraising will be examined.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 720 Overview of Curatorial Practices 3.0 Credits**

This course examines the role of the curator in the contemporary museum field. Collections management, interpretation and exhibition will be addressed, along with current issues facing curators in a contemporary museum setting.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL 750 Museum Leadership Practicum 3.0 Credits**

This course is a 2-term required practicum sequence for all Arts Administration & Museum Leadership students in the Museum Leadership Concentration. This will be a project-based applied research inquiry developed in collaboration with a number of area host institutions. Each project will have specific, measurable, deliverable outcomes that will advance the host institution's mission and identified goals. 3 credit hours – Applied.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** MUSL 500 [Min Grade: C] and MUSL 530 [Min Grade: C]

**MUSL 755 Museum Leadership Practicum II 3.0 Credits**

This is the second term of a two-term required practicum for all museum leadership students. Students will work in teams at a local museum to complete a practical project that will expose them to contemporary museum practices.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** MUSL 530 [Min Grade: C] and MUSL 750 [Min Grade: C]

**MUSL I599 Independent Study in Museum Leadership 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL I699 Independent Study in Museum Leadership 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL I799 Independent Study in Museum Leadership 1.0-4.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL I899 Independent Study in Museum Leadership 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL I999 Independent Study in Museum Leadership 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**MUSL T580 Special Topics in Museum Leadership 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL T680 Special Topics in Museum Leadership 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL T780 Special Topics in Museum Leadership 1.0-4.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL T880 Special Topics in Museum Leadership 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**MUSL T980 Special Topics in Museum Leadership 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## National Security Management

### Courses



# Neuroscience

## Courses

### NEUR 534 Neuroscience 3.0 Credits

This course describes: structure and functions of the human central nervous system; neurons; basic topography of the spinal cord and brain; major sensory and motor pathways; higher cortical functions. Neurological deficits resulting from stroke, brain trauma and other neuropathological processes; as well as implications for rehabilitation and psychotherapy are presented.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CATX.

# Nonprofit Management

## Courses

### NPM 501 Foundations in Fundraising and Ethics 3.0 Credits

This is another graduate-level introductory course providing a broad understanding of the different elements of nonprofit organizations from the fundraising perspective and it will provide the basis from which students will then learn, in greater detail, about stewardship, donor cultivation, capital campaigns. It also provides students with a base knowledge to prepare them for their subsequent experiential learning.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

### NPM 520 Writing for Nonprofits 3.0 Credits

Writing is crucial to the success of all nonprofit organizations. In this introductory graduate-level course students will create their own nonprofit organization and will craft a number of written materials based on the organization they envision. Students will build upon these materials in subsequent courses.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

### NPM 550 Stewardship & Donor Cultivation 3.0 Credits

Stewardship is the process of developing a relationship, followed by the continued cultivation of that relationship. In this class, students will focus on the subtleties and strategies of stewarding prospects, transitioning them to donors, and the continued cultivation of donors. Students will also explore the four R's of donor cultivation: research, romance, request, and recognition.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

### NPM 600 Nonprofit Workshop I 3.0 Credits

In this workshop-based course, students will work directly with a nonprofit organization to study, solve, or create an action plan for a particular generalized need as identified by the nonprofit. Students will build upon early foundational knowledge while developing hands-on experience in a safe setting guided by the faculty member. Through reflective work, students will learn to assess their own work and ultimately identify their own strengths and weaknesses to target areas for continued growth.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NPM 550 [Min Grade: B] (Can be taken Concurrently) and NPM 501 [Min Grade: B] and NPM 520 [Min Grade: B]

### NPM 602 Nonprofit Workshop II 3.0 Credits

In this second workshop-based course, students will work directly with a nonprofit organization to study, solve, or create an action plan for a particular in-depth need as identified by the nonprofit. Students will continue to build upon foundational knowledge while developing hands-on experience in a safe setting guided by the faculty member. Through reflective work, students will learn to assess their own work and ultimately identify their own strengths and weaknesses to identify area for continued growth.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NPM 600 [Min Grade: B]

### NPM 603 Regional Volunteer Experience 3.0 Credits

Most nonprofit organizations heavily rely on volunteers. To effectively manage a nonprofit organization, whether small or large, it is essential to understand the goals and intent of the volunteers. In this course, students will volunteer on a weekly basis at a nonprofit (located near their place of residence). Students will complete weekly self-assessment reports to reflect on their experience as a volunteer, while also looking at the function of the nonprofit organization.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

### NPM 610 Fostering Diversity and Inclusion in the Workplace 3.0 Credits

Diversity in the workplace has moved beyond calculating a broad range of employee demographics. Employers, especially nonprofits, are focusing on including and elevating diverse voices and diverse perspectives and building teams that represent the populations they serve and for-profits to create and deliver more innovative services and products and gain a competitive edge. Evidence demonstrates diverse teams are more creative and productive. But, inclusion cannot happen in a vacuum. Leadership must foster and support diversity and inclusion and create an environment where all employees are empowered to be productive and innovative.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

### NPM 615 Program Evaluation 3.0 Credits

The course is designed to have students apply qualitative and quantitative methods to frame and implement an evaluation capable of being implemented in a broad range of nonprofit (and for-profit) organizational settings, including those found in education, health care, government and private sector organizations. Students will study the purposes and models of program evaluation, roles of the evaluator and stakeholders, and address ethical issues associated with an evaluation. To gain practical experience with "continuous program improvement," students will conduct an evaluation of an existing program.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**NPM 645 Strategic Planning for Nonprofits 3.0 Credits**

Strategic planning is essential for the effective leadership, management, and sustainability of the nonprofit organization. In this course, students will explore how nonprofit organizations identify strategies to achieve and develop their mission. Students will examine the key elements of the strategic planning process, especially those unique to nonprofit organizations: goal setting, engagement with board initiatives, mission development and/or realignment, funding limitations, and the roles of key stakeholders, such as board members, executive leadership, staff, and volunteers. Students will develop a practical model they can then apply to any nonprofit organization to conduct successful strategic planning.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**NPM 670 Managing Effective Capital Campaigns 3.0 Credits**

Capital Campaigns are the structure around which the largest donations are typically received. They differ drastically from annual funds, and thus it is imperative that students develop the necessary skills and knowledge needed to manage a capital campaign from conception through completion.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**NPM 680 Leading Nonprofit Organizations 3.0 Credits**

Students will explore the different roles within the senior leadership team of nonprofit organizations to determine how those roles intersect to achieve the mission. Students will delve into leadership skills such as communication, motivating others, managing conflict, building partnerships and financial acumen to understand the necessity of those skills in developing a strategic vision, managing an effective team, and growing the organization to meet the needs of the community. The notion of servant leadership, ethics, and mission will be threaded throughout the course. Students will consider their own leadership skills to determine what skills they need to develop/enhance to be an effective nonprofit leader. This course is ideal for students already working in a nonprofit seeking a more senior role.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NPM 501 [Min Grade: B]

**NPM 700 Capstone I 1.5 Credit**

Students can pursue one of two paths for their capstone experience: first, they can choose to work with the nonprofit they partnered with during the Nonprofit Workshop II course and implement the plan, etc. as identified in that class; or second, students can choose and study a specific topic, trend, or issue confronting the nonprofit sector. During the Capstone I course, students will do the following: Option 1: Further develop the implementation plan, establish how s/he will be evaluated for the implementation, develop a reading list to assist in the implementation, and begin the implementation. Option 2: Choose a topic, conduct research, develop a bibliography, and create an outline for a final paper (to be completed in the Capstone II course).

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NPM 501 [Min Grade: B] and NPM 520 [Min Grade: B] and NPM 550 [Min Grade: B] and NPM 645 [Min Grade: B] and NPM 600 [Min Grade: B] and NPM 602 [Min Grade: B] and NPM 603 [Min Grade: B]

**NPM 701 Capstone II 4.5 Credits**

This is the second in of a two-part capstone experience in which students demonstrate, in one of two ways, what they have learned in the program. They can choose to apply their skills in an experiential setting or conduct research and report on a specific relevant topic within the nonprofit sector. Both demonstrate the breadth of the student's knowledge.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NPM 700 [Min Grade: B]

## Nursing

### Courses

**NURS 500 [WI] Confronting Issues in Contemporary Health Care Environments 3.0 Credits**

Confronting Issues in Contemporary Health Care Environments examines Health care policy and politics in terms of contemporary issues relative to nurses in advanced roles, health care access, quality, and cost. The focus of this course is the critical analysis of health policy and global health utilizing advanced nursing roles in relation to the broader health landscape.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 502 Advanced Ethical Decision Making in Health Care 3.0 Credits**

The focus of this course is to develop the student's ability to identify ethical dilemmas, apply moral reasoning, and then take the action necessary to resolve the dilemma. Questions of clinical and applied ethics, including basic principles and theories that support and challenge the decision making process will be examined from various perspectives to address the moral difficulties the advance practice health care provider is likely to encounter.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 503 Basic Principles of Nurse Anesthesia 3.0 Credits**

This course examines the operational principles of anesthesia equipment, airway anatomy, basic airway management and proper patient positioning. Nurse anesthesia practice issues, cultural competency and the hazards of substance use disorders in the profession are also explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 504 Overview of Nurse Anesthesia 3.0 Credits**

This course provides an overview of nurse anesthesia practice and principles. The lecture content is reinforced with simulation in which small student groups practice basic airway management skills and regional anesthesia insertion techniques. Students are also introduced to the process of induction, maintenance, and emergence.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 505 Chemistry and Physics 2.0 Credits**

This course examines equipment, measurements, waveforms and gas laws relevant to anesthesia practice. Basic organic chemistry, the chemistry of agents utilized in nurse anesthesia practice is discussed. A focus on anesthesia safety includes electrical safety, prevention of surgical fires, and the hazards of intraoperative hypothermia.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 507 Nurse Anesthesia Pharmacology I 3.0 Credits**

This course examines general pharmacokinetic, pharmacodynamics, and pharmacogenetic principles. The pharmacology of anesthetic agents including inhalational agents, intravenous induction drugs, sedatives, opioid and non-opioid analgesic agonists-antagonists is emphasized. Perioperative fluid management and blood component therapy is also studied.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 508 Nurse Anesthesia Clinical Practicum I 1.0 Credit**

This is the first in a series of six nurse anesthesia clinical practicum courses. Clinical practicum I introduces the student to the anesthesia management of patients undergoing surgical and/or diagnostic procedures. As didactic knowledge and clinical competency increase, students may administer regional anesthesia, insert invasive monitoring lines or participate in the anesthesia management of patients undergoing more complex procedures. This course is complemented by clinical case presentations and simulation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 510 Advanced Principles of Nurse Anesthesia I 3.0 Credits**

This is the first in a series of four principles of nurse anesthesia practice courses. In this course, basic and advanced knowledge of the respiratory system including anatomy, physiology, pathophysiology and pharmacology is examined. Monitoring of neuromuscular blockade and the anesthetic management for the patient with postoperative nausea and vomiting is also incorporated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 511 Nurse Anesthesia Pharmacology II 3.0 Credits**

This course examines the pharmacology of drugs used in anesthesia practice including pertinent cardiovascular agents, neuromuscular blocking agents, anticholinergics, anticholinesterases, cycloheximides, cholinergic agonists, and local anesthetics.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 512 Nurse Anesthesia Clinical Practicum II 1.0 Credit**

This is the second in a series of six nurse anesthesia clinical practicum courses. In clinical practicum II, the student continues to participate in the anesthesia management of patients undergoing surgical and/or diagnostic procedures. As didactic knowledge and clinical competency increases, students may administer regional anesthesia, insert invasive monitoring lines or participate in the anesthesia management of patients with significant co-morbidity undergoing more complex procedures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 515 Advanced Principles of Nurse Anesthesia II 3.0 Credits**

This is the second in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology, and anesthetic management for the geriatric, obese, obstetrical, and neonatal/pediatric patient population is examined. Regional anesthesia and the unique anesthesia considerations for diagnostic or surgical procedures out of the operating room are also presented. The didactic content is enhanced with a cadaver lab, ultrasound guided peripheral nerve block workshop, and pediatric simulation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 516 Nurse Anesthesia Clinical Practicum III 2.0 Credits**

This is the third in a series of six nurse anesthesia clinical practicum courses. In Clinical Practicum III, students have the opportunity to administer anesthesia to patients scheduled for more complex surgical procedures or to care for patients with significant co-morbidities. Students may also administer regional anesthesia and insert invasive monitoring lines. Subspecialty anesthesia rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the pediatric patient.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 517 Nurse Anesthesia Clinical Practicum IV 3.0 Credits**

This is the fourth in a series of six nurse anesthesia clinical practicum courses. In Clinical Practicum IV, students have the opportunity to administer anesthesia to patients scheduled for more complex surgical procedures or to care for patients with significant co-morbidities. Students may also administer regional anesthesia and insert invasive monitoring lines. Subspecialty anesthesia rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the obstetrical and pediatric patient.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 518 Advanced Principles of Nurse Anesthesia III 3.0 Credits**

This is the third in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology and anesthetic management for the cardiac, thoracic, renal and genitourinary patient population is presented. The didactic content is enhanced with a cadaver lab and ultrasound guided central line insertion workshop.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 519 Forensic Science Foundations 3.0 Credits**

This course examines the defining characteristics of offender behavior including the importance of obtaining complete victim histories, investigation of a motive and suspects as it relates to healthcare and practice. Investigative and therapeutic factors and approaches including examination of environment, place, time and crime scene indicators will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 520 Advanced Physiology 3.0 Credits**

This course presents the essentials of organ system function in humans, with an emphasis on the integration of neural and hormonal mechanisms in the control of organ system function. This course is limited to students in the Nursing Anesthesia Program of the College of Nursing and Health Professions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 521 Advanced Pathophysiology I 3.0 Credits**

A detailed discussion of the disturbances of normal function and basic mechanisms involved in the diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes general pathological processes that are specific to the cardiovascular system.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 520 [Min Grade: C]

**NURS 522 Advanced Pathophysiology II 3.0 Credits**

A detailed discussion of the disturbances of normal function and basic mechanisms involved in diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes respiratory, renal, digestive, hepatobiliary and pancreatic pathophysiology.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 521 [Min Grade: C]

**NURS 523 Advanced Pathophysiology III 3.0 Credits**

A detailed discussion of the disturbances of normal function and basic mechanisms involved in diseases of the major organ systems and the general aspects of the common human pathophysiological conditions and syndromes. This course includes the endocrine, reproductive, sensory/motor pathways, pain pathways, neuromuscular, neurological, and skeletal pathophysiology.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 522 [Min Grade: C]

**NURS 528 Victimology – Contemporary Trend 3.0 Credits**

This course examines the wide range of victimization experiences from the perspective of the crime victim, the offender, families, and the healthcare community. Basic tenets of assessment and intervention with victims and survivors are explored. Emphasis will focus on understanding the etiologic and motivation issues as well as response patterns to victimization and perpetration dynamics from a healthcare provider perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 529 Foundations of Complementary and Integrative Therapies 3.0 Credits**

This course provides an overview of the history of medicine and reviews the theoretical foundations of selected Complementary and Integrative Therapies, including botanical medicine, clinical aromatherapy, homeopathy, mind-body therapy, energy therapy, and humor. It introduces a holistic approach to health, and offers strategies for integration of the best of conventional and complementary practices for optimal health and wellness across the spectrum of care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 530 Anesthesia Seminar 1.0 Credit**

This course fosters dissemination of evidence based practice findings with peers and other scholars. Students work independently with a faculty advisor to create a poster for visual and oral presentation based on the evidence based practice paper developed in the RSCH 504 course. Students will submit an abstract of the poster for Drexel University's College of Nursing and Health Professions Evidence Based Practice (EBP) Graduate Student Colloquium.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 531 Epidemiology in Action: Tracking Health & Disease 3.0 Credits**

Assists students to examine and actualize the processes for development and measurement of outcomes in health care in the context of evidence-based practice. Explores epidemiologic theories and models to promote understanding of risks and disease pathogenesis. Examines the dynamic balance between health and illness. Understanding of health assessment, risk identification and outcomes measurement is emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B]



**NURS 532 Evaluation of Health Outcomes 3.0 Credits**

This course examines data sets through epidemiological models and evidenced based models to examine clinical outcomes in different populations. Differences in clinical activities and outcomes of specific populations of clients, health care providers, and payers are explored and analyzed utilizing selected methodological and evaluative approaches.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HI or major is NURS.

**NURS 533 Forensic Mental Health 3.0 Credits**

This course examines the various foundations of offender behavior including theory, research and motivational models. Basic tenets of assessment and intervention with offenders will be examined from a healthcare perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 534 FNP I: Primary Care of the Emerging Family 5.0 Credits**

This is the first course in a series of five clinical courses for the graduate student studying to become a family nurse practitioner. This course introduces the FNP student to the health care needs and dynamics of the emerging family throughout the lifecycle. Clinical practicum of 160 hours occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 535 FNP II: Primary and Episodic Care of Infants, Children and Adolescents 5.0 Credits**

This is the second course in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. This course is designed to introduce the FNP student to primary and episodic care of infants, children, adolescents, and their families. Clinical practicum of 160 hours occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 536 FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I 5.0 Credits**

This is the third in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. The course is designed to introduce the FNP student to primary care of the adult-older adult population across the age spectrum. Clinical practicum of 160 hours occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B]

**NURS 537 FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II 5.0 Credits**

This is the fourth in a series of five clinical courses for the graduate student who is studying to become a family nurse practitioner. The course is designed to build on topics from FNP III, Primary Care of the Adult-Older Adult I, with a focus on care of the adult-older adult with multisystem and chronic illness that impacts quality of life. Clinical practicum of 160 hours occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B] and NURS 536 [Min Grade: B]

**NURS 538 FNP V: Integrative Practicum in Family Practice Across the Lifespan 4.0 Credits**

This is the final clinical courses for the graduate student studying to become a family nurse practitioner. This course is designed to assist the student to apply knowledge from all previous clinical courses to guide them in the transition from student to practitioner. Clinical practicum of 80 hours occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 556 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 534 [Min Grade: B] and NURS 535 [Min Grade: B] and NURS 536 [Min Grade: B] and NURS 537 [Min Grade: B]

**NURS 539 Holistic Living for the Caregiver 3.0 Credits**

This course is designed to take the student on an experiential journey toward a holistic way of living that emphasizes a mind-body-spirit approach. Emphasizes development of healthy, nutritious eating, effective exercise, and guidelines for incorporating basic supplementation. Students stress reduction and management techniques including breathing, walking and music. Integrates spiritual concepts.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 544 Quality and Safety in Healthcare 3.0 Credits**

This course provides a broad introduction to the essential competencies required by nurses to improve practice and health care delivery. Based upon the Quality and Safety Education for Nurses (QSEN) project, class activities will be designed to prepare nurses who will have the knowledge, skills and attitudes necessary to serve in leadership roles to drive quality improvement and safety within healthcare systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 547 Communication and Self-Awareness for Leading and Managing in Healthcare 3.0 Credits**

This course focuses on the central role that self plays in leadership and communication skills. By performing self-observations and analyses, students will analyze the role of self in leadership and gain appreciation of the complexities of interpersonal communication. Enhanced communication skills will also be explored in teams and organizational settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 557 [Min Grade: B]

**NURS 548 Advanced Pathophysiology 3.0 Credits**

Building on a foundation of normal physiology, students are exposed to the major disturbances of normal function and the basic mechanisms involved in disease of the major organ systems. The course includes discussion of the general aspects of the common human pathophysiological conditions and syndromes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 549 Advanced Pharmacology 3.0 Credits**

This course is designed to build on prior pharmacologic study of actions and effects of drugs on the human system across the life span. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, considerations related to age and physiologic state, adverse reactions, contraindications, and drug interactions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 550 Advanced Health Assessment & Diagnostic Reasoning 4.0 Credits**

This course is designed to introduce the experienced clinical nurse to advanced health assessment techniques and diagnostic reasoning. The content of this course focuses on advanced clinical history taking, and physical and psychosocial assessment of individuals/families across the lifespan. Differentiation of normal variations and pathophysiologic changes are emphasized integrating advanced clinical reasoning within the scope of advanced practice nursing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 551 Foundations of Phytotherapy: Clinical Applications of Herbal Therapy 3.0 Credits**

This course serves as a foundation for the safe, effective and rational approach to using some of the most commonly known herbs in clinical practice. Includes a review of the primary uses, active constituents, pharmacological actions, known contraindications, drug interactions and potential side effects, as well as a review of the clinical research and historical significance of each herb.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 552 Integrative Advanced Relaxation Techniques 3.0 Credits**

Integrative Advanced Relaxation Techniques is a whole person approach to stress management and healthy living that integrates evidence based modalities to promote relaxation and well-being. We will explore the science of the stress response and its impact on the physical, emotional, cognitive, and spiritual domains of health. Students will conduct assessments, evaluate modalities, and develop individualized relaxation strategies to reduce stress, increase positive outlook and improve health.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 553 Data Analysis for Decision-Making in HC Management 3.0 Credits**

Healthcare management is increasingly a data-dependent and data-driven process. The focus of this course is on skill development in use of data analysis to understand organizational issues, address key human resource challenges, and achieve organizational objectives. Students will utilize a healthcare organization simulation and spreadsheet application to organize and analyze data and draw conclusions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 557 [Min Grade: B] and NURS 547 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 562 [Min Grade: B] and NURS 558 [Min Grade: B]

**NURS 554 Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners 3.0 Credits**

This course is designed to prepare the Adult-Gerontology Acute Care Nurse Practitioner student for the safe prescribing and monitoring of therapeutic agents across the spectrum of adult-older adult patient population in acute and critical illness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 555 Psychopharmacology Across the Lifespan 3.0 Credits**

This course provides scientific knowledge of psychopharmacology and its application to treatment of clients with psychiatric disorders across the lifespan. The course focuses on advanced concepts in neuroscience, pharmacokinetics and pharmacodynamics of psychotropic drugs in the management of targeted symptoms of psychiatric disorders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 556 Pharmacology for Family Nurse Practitioners 3.0 Credits**

This course is designed to prepare the FNP students for the safe managing and prescribing of therapeutics. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, considerations related to physiologic state, adverse reactions, contraindications and drug interactions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 557 Leadership and Stewardship in the Health Professions 3.0 Credits**

Changes in the health care system are demanding practitioners with well-honed leadership skills and with a sense of stewardship. This course explores the concepts of leadership and stewardship from a historical and contemporary perspective with particular application to the health professions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HI or major is NURS.

**NURS 558 Economics of Healthcare Management & Policy 3.0 Credits**

This course will address the fundamentals of economics as they relate to healthcare services, quality improvement, management measures, and cost containment strategies. The student will explore the issues of market supply and demand, the economics of nursing, the impact of managed care and the role of information technology in the delivery of healthcare services.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**NURS 559 Operations Management in Contemporary Healthcare Organizations 3.0 Credits**

The rapidly changing healthcare environment and ongoing demands for increased productivity, quality, and service excellence have resulted in a renewed emphasis on operational efficiency in the delivery of health care services and nursing care. This course will examine critical issues related to structuring patient care delivery models and clinical practice for quality and efficiency. Pertinent legal and ethical considerations will be threaded through the content.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 557 [Min Grade: B]

**NURS 561 Spirituality, Health and Healing 3.0 Credits**

Spirituality is an essential aspect of one's identity. For some, spirituality is expressed in terms of religious concepts while for others it is less formalized yet no less significant in contributing meaning and purpose to their lives. Health, illness, and healing are three major life experiences impacted upon by one's spirituality.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 562 Workforce Management in Healthcare Organizations 3.0 Credits**

This course provides a comprehensive study of topics related to workforce management issues and strategic human resources management for nurses in a leadership role. Students examine recruitment, selection and retention, employee appraisal and development, as well as compensation and labor relations. Implications of generational and cultural dimensions, legal and global environments as well as current issues such as diversity training, sexual harassment policies are explored and balanced with organizational pressures related to cost-benefit priorities supporting financial goals and operational efficiency.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 557 [Min Grade: B]

**NURS 564 The Business of Healthcare 3.0 Credits**

This course provides a forum for the exploration and evaluation of financial management and the financial environment of the healthcare industry. The student will develop an understanding of the budgeting and accounting process and how a fiscally responsible budget works in a climate of decreased government funding, shared cost mechanisms and decreased personnel resources in addition to basic financial management principles and tools.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HI or major is NURS.

**NURS 566 Yoga for the Enlightened Practitioner 3.0 Credits**

This course provides a framework for understanding and experiencing the holistic practice of yoga. It addresses yoga's ancient philosophy of universal wisdom and this philosophy's increasing relevance to humankind today. The eight limbs of yoga are incorporated for study throughout the course content modules to promote self awareness and conscious action in daily life experience. Holistic yoga application as a medical modality is reviewed based on evidence based practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 567 Strategic Management: Power, Politics and Influence in Healthcare Systems 3.0 Credits**

Nursing leaders are increasingly recognized as vital to the success of health care initiatives and organizations. Strategic management provides clarity and direction in an environment of rapid change and uncertainty.

This course will utilize a systematic approach to analyze the "fit" and "position" of nursing within organizations. Power, politics and influence, management systems and processes, and organizational dynamics will be examined within the context of structure and function of current and emergent healthcare delivery systems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 558 [Min Grade: B] and NURS 557 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 562 [Min Grade: B] and NURS 564 [Min Grade: B]

**NURS 568 Practicum and Symposium in Healthcare Operations Management 3.0 Credits**

This practicum provides the student an opportunity to operationalize the leadership role in appropriate agencies and facilities in conjunction with an expert nursing leader. A course project involving a project of value to both the student and the organization will be completed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 562 [Min Grade: B]

**NURS 569 Practicum and Symposium in Technology and Management of Information in Healthcare Organizations 3.0 Credits**

The focus of the practicum will be on exposure to the management of information to support decision-making, communication, and strategic planning. These include systems for managing human resources, improving quality of care and tracking organizational metrics. A course project involving a project of value to both the student and the organization will be completed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 562 [Min Grade: B]

**NURS 570 Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine 5.0 Credits**

This is the first course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to introduce the student to the role of the Adult-Gerontology Acute Care Nurse Practitioner in adult acute/critical and chronic healthcare settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 571 Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/ Care of Patients in Acute/Crit Care Med Set 5.0 Credits**

This is the second course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster development of clinical competency and role transition in the setting of acute medicine.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 572 Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/ Care of Patients in Acute Surgical Setting 5.0 Credits**

This is the third course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster ongoing development of clinical competency and role transition in the setting of acute surgical patients.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]



**NURS 573 Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings 5.0 Credits**

This is the fourth course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster ongoing development of clinical competency and role transition in the setting of critically ill patients.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and NURS 572 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 574 Advanced Integrative Clinical Concepts 4.5 Credits**

This course is designed to build off prior undergraduate clinical knowledge. Using a case-study approach, students are able to explore advanced concepts of pathophysiology, pharmacology, and physical assessment across the lifespan.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**NURS 580 Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings 5.0 Credits**

This is the fifth course in a series of five clinical courses for the graduate student studying to become an Adult-Gerontology Acute Care Nurse Practitioner. This course is designed to foster independent and interprofessional practice in the role of the Adult-Gerontology Acute Care Nurse Practitioner.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 554 [Min Grade: B] and NURS 570 [Min Grade: B] and NURS 571 [Min Grade: B] and NURS 572 [Min Grade: B] and NURS 573 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 582 Foundation of Good Clinical Practice in Clinical Trials Mngmt 3.0 Credits**

This foundation course in clinical research provides a comprehensive review of the fundamentals of human clinical research. It includes the principles of Good Clinical Practice (GCP's), regulatory requirements and guidelines, and ethical requirements for human drug and device development in the United States.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 589 Witches, Wise Women and Women Healers 3.0 Credits**

This course provides an intriguing chronicle of women healers throughout history from ancient to modern times, those who have served as priestesses, witches, wise women, and ultimately the healers who have helped to shape and form healthcare, as we know it today. It examines the influence of religion, misogyny, science, politics, economics, and sexuality on the creation of the female archetype and the lasting impression that has influenced her role in healing practices. Finally, students will look at the role of modern healers and the evolving model of integrative healthcare in healing practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 591 Foundations of Healthcare Education 3.0 Credits**

This course prepares the prospective healthcare educator with the foundational principles necessary for teaching in various settings: classroom, clinical and college laboratories, and health care agencies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**NURS 592 PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I 5.0 Credits**

This course introduces conceptual models and theories of advanced psychiatric mental health nursing practice. The course integrates assessment, diagnosis and treatment of the adult and older adult clients with major mental health disorders, incorporating eclectic content and evidenced based practices from the sciences. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 593 PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II 5.0 Credits**

This course expands upon conceptual models and theories of advanced psychiatric mental health nursing practice. Students apply knowledge of foundational concepts and clinical skills to special populations. Integrative medical care of the psychiatric patient is emphasized in this course with consideration to common comorbidities and differential diagnoses. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 594 PMHNP III: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology III 5.0 Credits**

This course discusses conceptual models and theories of advanced psychiatric mental health nursing practice with application to the child and adolescent population and their families. The course integrates assessment, diagnosis and treatment of psychiatric disorders of children and adolescents. Students integrate and apply theory and practice of PMHNP both in the classroom and in a supervised clinical practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and NURS 593 [Min Grade: B]

**NURS 595 PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan 5.0 Credits**

This course focuses on the conceptual theories and applied modalities of individual, family, and group psychotherapy within advanced psychiatric mental health nursing practice. Students apply knowledge of psychotherapeutic concepts and strategies in the care of psychiatric patients both in the classroom and in the supervised clinical practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 555 [Min Grade: B] and NURS 592 [Min Grade: B] and NURS 593 [Min Grade: B] and NURS 594 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 602 Foundations for Clinical Nurse Leader 4.0 Credits**

First of 3 CNL clinical courses in the track. Students experience point of care management of cohorts of clients with an interdisciplinary team model and from a Microsystems perspective. Integrates core and support course content into assessment, diagnosis and of health and illness conditions of adult clients. Concepts, theories, & research related to health promotion, illness management, risk identification and reduction to improve client safety are addressed. Emphasizes collaboration and interdisciplinary approach.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 531 [Min Grade: B] and NURS 532 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 544 [Min Grade: B]

**NURS 603 Clinical Nurse Leader Capstone Immersion I 5.0 Credits**

Second of 3 CNL clinical courses in the track. Students apply concepts, theories and evidence to the care of cohorts of clients with chronic illness. Emphasis is placed on utilization of technology at the point of care. Students will collaborate with other health care providers to develop and interdisciplinary approach to epidemiologically significant problems and to design, coordinate and evaluate plans of care using evidence and outcome data. Capstone project design begins in this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 602 [Min Grade: B] or NUPR 602 [Min Grade: B]

**NURS 604 Clinical Nurse Leader Capstone Immersion II 5.0 Credits**

Third course of 3 CNL clinical courses in the track. Students complete and present the capstone project to health care administrators and other stakeholders. Emphasis is on utilization of technology at the point of care. Students will collaborate, negotiate and articulate evidence based approaches to develop an interdisciplinary plan for significant epidemiologically significant problems and potential problems in diverse populations. Students develop in-depth understanding and skills in care of chronically ill client cohorts.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 603 [Min Grade: B]

**NURS 606 Curriculum Design for Higher Level Cognition 3.0 Credits**

The purpose of this course is to offer the student applications in nursing curriculum design, including the development of a teaching/learning philosophy, mission statement, programmatic goals, learning objectives, teaching plans, and individual courses.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 591 [Min Grade: B]

**NURS 610 Foundations in Clinical Aromatherapy 3.0 Credits**

This course provides a strong foundation for the safe and effective use of 20 therapeutic essential oils. Includes the clinical application of each essential oil, basic essential oil organic chemistry, safety, dosages and known contraindications. Reviews essential oil biosynthesis, specific plant morphological structures, extraction methodologies, primary avenues of absorption, and an overview of the history of aromatherapy, and quality of essential oils. This course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 613 The Role and Responsibility of the Nurse Educator 3.0 Credits**

This course provides an overview of the roles and responsibilities of the nurse educator in academic or health care agency settings. Key policies, protocols, and legal aspects of education will be explored. Situational events occurring in educational settings will be highlighted for research and discussion to develop effective management strategies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B]

**NURS 615 Assessment, Measurement and Evaluation 3.0 Credits**

This course explores the theories, principles and practices that underpin the measurement and evaluation of educational settings. This course includes content on approaches to giving feedback, test construction and psychometrics evaluation, development and grading of written assignments, evaluation of clinical performance and self-evaluation for personal teaching effectiveness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B]

**NURS 616 Teaching Methods in Nursing Education 3.0 Credits**

This course provides an overview of teaching methods utilized within nursing education to support student learning in clinical, didactic and online learning environments. Students will examine various teaching/learning technologies, including simulation, and integrate these technologies with select teaching methods in the design of coursework to support learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B]

**NURS 618 Principles of Holistic Nursing 3.0 Credits**

This course provides a foundation of holistic nursing knowledge, understanding and insight, including holistic nursing theories, ethics, and beliefs. The course will focus on the American Holistic Nurses Association's Scope and Standards of practice, as well as the Holistic Nursing Core Values. Students will explore the concept of healing, evaluate current local and national trends and environmental conditions that affect health, and identify ways to incorporate the concepts of holistic nursing into professional practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 619 Principles of Bioenergy Therapies 3.0 Credits**

Principles of Bioenergy Therapies examines the concept of human bioenergy fields and the healing modalities known as energy therapies that rebalance the bioenergy field to promote healing. The history and research into energy therapies is covered as students explore the paradigm shift in treatment of individuals in Western medicine.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 621 Principles of Hospice and Palliative Care 3.0 Credits**

This course presents clinical practice guidelines and evidence base knowledge in addressing the physical, psychological, social, and spiritual needs of patients living with serious illness. Tools necessary to provide compassionate whole person care that acknowledges and supports individual goals, values, wishes, are presented with techniques for essential collaboration of the patient, family, and an interdisciplinary health care team. This course will examine the ancient texts of death and dying, the unique energy of the ancient hospices in Europe, and the modern hospice and palliative care movement in the United States to model care delivery that enhances quality of life in the presence of serious illness.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 622 Holistic Therapies in Hospice and Palliative Care 3.0 Credits**

This course introduces health care professionals to the use of complementary and integrative therapies (CIT) used during the end of life. Methods for assessment, the influence of the environment in healing, and therapeutic interventions for various stages of patient concerns will be explored. The current use of proven modalities in end of life care will be discussed, as well as the potential for expanding current practice. Care of the dying will be viewed from many disciplines, clinical and domestic.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 623 Cultural Perspectives in Hospice and Palliative Care 3.0 Credits**

Culture plays an important role in an individual's view of death and in a health care provider's provision of care at the end of life. This course will explore culture--the learned behaviors, beliefs, and values that define an individual's experience--and how it affects views of health, illness, dying, and life after death. The health care provider will develop skills necessary to recognize, assess, and address psychological, social/religious perspectives, and cultural taboos, realizing that different cultures may require significantly different approaches in order to provide a meaningful context for dying.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 624 Foundations of Integrative Addiction Therapies 3.0 Credits**

This course introduces the principles of integrative addictions treatment, and explores evidence based complementary and integrative therapies to enhance sustainable recovery from substance abuse disorders. Students will explore the impact of neurobiological changes, adverse events, and poor nutrition, as well as other factors that contribute to continued use. Recovery will be viewed from many disciplines, promoting a whole person approach that addresses the physical, emotional, cognitive and spiritual aspects of healing.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 625 Spirituality, Empowerment, and Transformation 3.0 Credits**

This course is appropriate for clinicians within the helping professions seeking to support others on their unique paths towards wellness. Staring with the self, the student experiences integrative approaches on their own wellness journey. These techniques form an integrative approach to assist others. Theories and techniques of behavior change include positive psychology, cognitive behavioral processes, and spiritual intelligence. Complimentary and integrative approaches explored include guided visualization and imagery, journaling, meditation, mindfulness, music, and prayer.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 629 Independent Study in Nursing 1.0-3.0 Credit**

The Master's nursing student works under the guidance of a faculty member to study in depth a topic related to their Program of Study. Independent study courses can be undertaken when there is no specific formal coursework available to support the student's program of study. Specific objectives and requirements are negotiated individually and students will sign an Independent Study Contract. This course may be repeated three times for credit as topics vary from term to term.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 9 credits

**NURS 630 Principles of Nurse Anesthesia Practice VI 3.0 Credits**

This course focuses on gastrointestinal and hepatic dysfunction related to anesthesia planning and intervention in the advanced practice role as a CRNA. Specific attention is given to mechanisms and management of coagulopathies and administration of blood and blood products. Blood borne diseases associated with blood product administration is addressed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 631 Introduction to Nutritional Neuroscience 3.0 Credits**

This course explores the emerging interdisciplinary field of nutritional neuroscience that relates directly to many healthcare and quality-of-life issues at the forefront of modern society, including mood, cognition, addictions, and brain disorders (i.e. Brain Injury, Autism Spectrum Disorder, and Alzheimer's Disease). Students will review physiological foundational neuroscience and the neuronutritional models to address conditions. This course examines specific neuronutritional agents that can be used as part of an integrative approach to promote optimal neurochemistry and brain function and to slow or reverse the progression of conditions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 632 Nursing Education Practicum 6.0 Credits**

The practicum course, which spans over two quarters, allows students the opportunity to apply knowledge and demonstrate competence in the areas of nursing education and their clinical specialty, under the supervision of a preceptor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** NURS 591 [Min Grade: B] and NURS 606 [Min Grade: B] and NURS 613 [Min Grade: B] and NURS 615 [Min Grade: B] and NURS 616 [Min Grade: B]

**NURS 635 Spirituality in Hospice and Palliative Care 3.0 Credits**

This course offers health care professionals the guidelines and tools necessary to provide compassionate spiritual care to patients and their families at the end of life, by examining spiritual beliefs, rituals and opportunities through the combined effort of patient, family and a multidisciplinary health care team. Techniques will be explored that acknowledge and support individual goals, values, wishes, through discovery, reverence, and tending of the spirit. This course will examine the ancient texts of death and dying, the use of scripture, and the unique energy of the ancient hospices in Europe.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 640 Women's Integrative Health 3.0 Credits**

This course presents an Integrative Mind-Body approach for supporting various states of health imbalance specific to women's health. Applied integrative strategies highlight the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities. Takes into account the eastern philosophy of anatomy energetics, the integration of the physical and the spiritual, psyche and soma, into a harmonious whole for addressing specific women's health conditions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CIT 501 [Min Grade: C] or CIT 502 [Min Grade: C] or CIT 503 [Min Grade: C]

**NURS 641 Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners 3.0 Credits**

This course is designed to prepare the Adult-Gerontology Primary Care Nurse Practitioner (AGNP) student for the safe managing and appropriate use of drug therapy in the management of various disease states. Students will study pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, the considerations related to physiologic state, adverse reactions, contraindications, and drug interactions. Students will analyze the scope of legal and professional responsibilities related to prescribing and the AGNP role.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Prerequisites:** NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 642 PNP I: Primary Care of Infants, Children and Adolescents 5.0 Credits**

This course provides the pediatric primary care nurse practitioner student with an introduction to the conceptual basis for meeting the health needs of diverse pediatric populations. Course content and clinical experiences prepare the student to assume the role of primary care provider for children from birth through adolescence.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 643 PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care 5.0 Credits**

This course focuses on the diagnosis and management of common pediatric episodic and emergency issues. Course content and clinical experiences prepare the student to assume the role of primary care provider for children from birth through adolescence.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]



**NURS 646 Pharmacology for the Pediatric Nurse Practitioner 3.0 Credits**

This course focuses on the appropriate medication regimens utilized in pediatric health care. The action, therapeutic effect and rationale for selection of each drug class will be examined. Toxicity and complications of each drug class will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 544 [Min Grade: B]

**NURS 647 PNP III: Management and Care of Adolescents in the Primary Care Setting 5.0 Credits**

This course focuses on the assessment, diagnosis and management of common health issues of adolescence. Reproductive health management and anticipatory guidance unique to the adolescent population will be discussed. Course content and clinical experiences prepare the student to assume the role of primary care provider to adolescents.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 664 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 648 PNP IV: Primary Care of Children with Special Health Care Needs 5.0 Credits**

This course focuses on the management of children with special health care needs in the primary care setting. Course content and clinical experiences emphasize the complex issues of chronicity, behavioral and developmental disabilities and common health problems seen in primary care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 647 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 649 Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management 5.0 Credits**

This clinical course will provide the novice acute- chronic PNP student with higher appreciation of the pathophysiological basis and management of acute-chronic health disorders with children and their families.

Emphasis is placed on critical assessment stratagems, pharmacological treatments, current research, and treatment of children with complex acute-chronic health conditions with a multicultural perspective.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 650 Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management 5.0 Credits**

The course builds upon preceding acute- chronic course content and prepares students to perform critical assessment, diagnosis and management of emerging crisis and organ system dysfunction in children with acute- chronic health conditions. The course emphasizes stabilizing patients, reducing complications, restoring optimal health, providing psychosocial support to pediatric patients and their families.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 649 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 651 PNP Management of the Medically Fragile and Technology Dependent Child in the Community 5.0 Credits**

This course will provide students with higher appreciation of the role of the Acute-Chronic Pediatric Nurse Practitioner managing children with chronic health disorders and specialized needs transitioning into different sites of care. Students will focus on the strategies within the community, home based interventions, coordination of services, and, collaboration of care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 646 [Min Grade: B] and NURS 642 [Min Grade: B] and NURS 643 [Min Grade: B] and NURS 649 [Min Grade: B] and NURS 650 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 656 Traditional Healing Systems 3.0 Credits**

This course provides a survey of ancient and contemporary Traditional Healing Systems that form the foundation of health care around the world. Without exception, these systems feature a holistic approach to diagnosis and healing, the mind-body-spirit connection, and the importance of community and environment for health and well-being. We explore Traditional Chinese Medicine, Ayurveda, and African Medicine, as well as Unani, Native North American healing and Latin American Curanderismo, to better understand the roots of medical practices in the U. S. and around the globe, and to expand our respect for culture and diversity in modern health care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is CIT.

**Prerequisites:** CIT 502 [Min Grade: B] or NURS 539 [Min Grade: B]

**NURS 657 Functional Approach to Clinical Nutrition 3.0 Credits**

This course introduces an evidence-based, functional medicine model of clinical nutrition, a science-based field of healthcare that examines core clinical imbalances that underpin specific conditions and associated symptoms. A functional approach to nutrition analyzes the multiple roles of various nutrients and focuses on how these key life-sustaining substances support health throughout the different systems of the body, as well as providing a broader perspective on deficiency symptoms and how to ameliorate them.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 658 Advanced Women's Integrative Health 3.0 Credits**

This course continues in the presentation of women's integrative health strategies that incorporate a holistic Mind-Body-Spirit approach for addressing specific women's health conditions. Applied integrative health protocols will focus on the use of dietary and lifestyle changes, nutritional supplementation, botanical medicines and other specific healing modalities for supporting various states of health imbalance.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 659 Advanced Principles of Nurse Anesthesia IV 3.0 Credits**

This is the fourth in a series of four principles of nurse anesthesia practice courses. In this course, the physiology, pathophysiology, pharmacology and anesthesia management for the neurosurgical, robotic, hematologic, trauma and burn patient is examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 660 Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult 5.0 Credits**

This is the first course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course will introduce the student to the role while focusing on the young-adult to young-old adult across the wellness-illness continuum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 10 credits

**Prerequisites:** NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 550 [Min Grade: B]

**NURS 661 Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care 5.0 Credits**

This is the second course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course is designed to foster development of clinical competency and role transition in the setting of primary medicine for the young-old and older-adult patient population.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 10 credits

**Prerequisites:** NURS 500 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 660 [Min Grade: B]

**NURS 662 Adult-Gerontology Primary Care III: Management of the Older-Adult Patient in Primary Care 5.0 Credits**

This is the third course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course is designed to further develop clinical competency to provide a multidisciplinary, comprehensive approach to the older-adult in the primary and long-term care setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 661 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 660 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 663 Adult-Gerontology Primary Care IV: Gerontology Management and Care 5.0 Credits**

This is the fourth course in a series of four clinical courses for the graduate student studying to become an Adult-Gerontology Primary Care (AGPC) Nurse Practitioner. This course will build upon the knowledge and skills acquired in previous AGPC courses to guide them in the transition from student to safe and effective practitioner.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 10 credits

**Prerequisites:** NURS 662 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 641 [Min Grade: B] and NURS 660 [Min Grade: B] and NURS 661 [Min Grade: B]

**NURS 664 Professional Issues for Nurse Practitioners 1.0 Credit**

This required course is the application and integration of the role and competencies of the nurse practitioner. The roles of the nurse practitioner as clinician, educator, researcher, expert, and leader are presented and explored. Interpretation and application of professional issues, practice issues, legislative issues, certification issues, insurance issues, legal issues and ethical conflict resolution in advanced nursing practice are explored and integrated into a model of interdisciplinary collaborative practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B]

**NURS 665 Advanced Nursing Practice in Population Health 5.0 Credits**

This course provides an opportunity for the student to delve deeper into the role of the public health nurse and apply content that has been learned in previous coursework to operationalize the role of the public health nurse in a variety of settings. In this course, the student will complete and present the capstone project to organization administration, community leaders and other stakeholders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PBHL 511 [Min Grade: B] and EPI 570 [Min Grade: B] and HMP 505 [Min Grade: B] and IPS 511 [Min Grade: B] and NURS 532 [Min Grade: B]

**NURS 666 Leadership in Health Systems Management Practicum 6.0 Credits**

This practicum, individually tailored to meet each student's career goals. The course provides an opportunity for the Student to operationalize the leadership role in appropriate agencies and facilities in conjunction with an expert nursing leader as well as develop an understanding of information systems and technology used in contemporary health care organizations. The setting will vary dependent on the student's interests, goals and objectives as discussed with faculty.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 553 [Min Grade: B] and NURS 557 [Min Grade: B] and NURS 558 [Min Grade: B] and NURS 559 [Min Grade: B] and NURS 567 [Min Grade: B] and NURS 564 [Min Grade: B] and NURS 562 [Min Grade: B]

**NURS 670 Interdisciplinary Perspectives of Health Law 3.0 Credits**

This course introduces students to areas of law and legal theory that serve as the basis for the U.S. health care system. Students will examine statutes, regulations, and case law that regulate health care practice. Students will observe a courtroom proceeding, integrate professional knowledge with health law principles, and analyze testimony of a clinical expert witness. Some of the areas to be studied include: torts, administrative law, provider liability, defenses, health policy access to care, federal regulations and the Patient Safety Movement, distinction between criminal and civil action with an emphasis on domestic violence (DV) law and interpersonal violence (IPV) case studies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 673 Emergency/Trauma Care Across the Lifespan I 5.0 Credits**

This is the first course in a series of three specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). This course introduces the ENP student to the specialized care of the patient in the emergency care setting (ECS) including clinical decision making skills necessary to manage common illness and injury across the lifespan. Students are taught the skills of assessment, interpretation of diagnostic studies, interventions, and treatments unique to the ECS.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 674 Emergency/Trauma Care Across the Lifespan II 5.0 Credits**

This is the second course in a series of three specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). This course continues to prepare the ENP student to the specialized care of the patient in the emergency care setting (ECS). Student are taught the skills of assessment, interpretation of diagnostic studies, interventions, and treatments unique to the ECS at an advanced level, thereby enhancing clinical decision making for common illness and injury across the lifespan.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 673 [Min Grade: B]

**NURS 675 Emergency/Trauma Caring for Trauma and Critically Ill Patient 5.0 Credits**

This is the final specialized clinical courses for the post-graduate FNP or AGPCNP studying to be an emergency nurse practitioner (ENP). Building upon prior clinical ENP experiences, this course teaches the student how to care for patients of the highest acuity levels. Topics of pre-hospital care, initiation of care to the trauma and critically ill patient, and transport of patients to a higher level of care. The culmination of the ENP education and transition into the ENP role is also be covered.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 673 [Min Grade: B] and NURS 674 [Min Grade: B]

**NURS 680 Primary Care for Women's Health 3.0 Credits**

This course focuses on primary health care needs of women throughout the lifecycle concentrating on prevention, screening, risk factor assessment, health maintenance as well as signs and symptoms, assessment, management.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 682 Pharmacology for the Women's Health Nurse Practitioner 3.0 Credits**

This course is designed to prepare the Women's Health Nurse Practitioner student for the safe managing and prescribing of therapeutic agents used in Obstetrics/Gynecology and primary care settings for women's health care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 664 [Min Grade: B]

**NURS 683 Nurse Anesthesia Clinical Practicum V 3.0 Credits**

This is the fifth in a series of six nurse anesthesia clinical practicum courses. Clinical practicum V affords the opportunity to administer anesthesia for patients undergoing complex surgical procedures or those with significant co-morbidities who may require invasive monitoring. Subspecialty rotations foster the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient. This course also engages the student in critical incident simulations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 684 Nurse Anesthesia Clinical Practicum VI 3.0 Credits**

This is the last in a series of six nurse anesthesia clinical practicum courses. In clinical practicum VI, students administer anesthesia for patients undergoing complex surgical procedures or to those with significant co-morbidities. Subspecialty rotations foster the application of theory to clinical practice and the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient. This course is complemented by didactic lectures and critical incident simulation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 687 Clinical Residency I 6.0 Credits**

The Clinical Practicums and Residencies provide opportunities for students to continue their development of critical thinking skills and anesthesia techniques when providing care for all types of surgical patients. Under the guidance of CRNAs and Staff Anesthesiologists, students work more autonomously and collaborate with others when providing comprehensive anesthesia care. Didactic content will address management of the patient with orthopedic or neoplastic comorbidities.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 688 Clinical Correlative Seminars 3.0 Credits**

Under the guidance of a faculty member, students discuss an anesthesia topic to clarify concepts and review prior content. Review questions are discussed, with students completing weekly quizzes to assess understanding.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 689 Clinical Residency II 6.0 Credits**

Clinical Residency II afford students increased autonomy to administer anesthesia for patients undergoing complex surgical procedures or those with significant co-morbidities who may require invasive monitoring. Subspecialty rotations foster the development of competencies to safely anesthetize the cardiac, neurosurgical, obstetrical and pediatric patient. This course is complemented by critical incident simulation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NUAN.

**NURS 690 WHNP I: Mngmnt & Care of the Common Gyn and Gender Related Issues throughout the Lifespan 5.0 Credits**

This is the first course in a series of four clinical courses for the graduate student who is studying to become a (WHNP). This course is designed to introduce the WHNP student to the gynecological needs of women and their partners from puberty throughout the post reproductive years. Clinical practicum of 160 hours in Women's Health occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B]



**NURS 691 WHNP II: Mngmnt & Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan 5.0 Credits**

This is the second women's health course in a series of four clinical courses for the graduate student who is studying to become a WHNP. This course is designed to build upon the didactic and clinical content presented in N690 by addressing more complex gender related issues throughout the lifespan. Clinical practicum of 160 hours in Women's Health occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B]

**NURS 692 WHNP III: Management & Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families 5.0 Credits**

This is the third course in a series of four clinical courses for the graduate student who is studying to become a WHNP. This course is designed to introduce the WHNP student to low risk obstetrics. Clinical practicum of 160 hours in Women's Health Low Risk Obstetrical Care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B] and NURS 691 [Min Grade: B]

**NURS 693 WHNP IV: Mngmnt & Care of the High Risk Obstetrical and Post Partum Needs of Women and Families 5.0 Credits**

This is the fourth course in a series of four clinical courses for the graduate student w studying to become a WHNP. The course is designed to introduce the WHNP student to the assessment of high-risk obstetrical care of the pregnant woman, the fetus, and the family unit. Clinical practicum of 160 hours in high risk obstetrics occurs concurrently.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NURS.

**Prerequisites:** RSCH 503 [Min Grade: B] and RSCH 504 [Min Grade: B] and NURS 500 [Min Grade: B] and NURS 502 [Min Grade: B] and NURS 544 [Min Grade: B] and NURS 548 [Min Grade: B] and NURS 549 [Min Grade: B] and NURS 550 [Min Grade: B] and NURS 664 [Min Grade: B] and NURS 680 [Min Grade: B] and NURS 682 [Min Grade: B] and NURS 690 [Min Grade: B] and NURS 691 [Min Grade: B] and NURS 692 [Min Grade: B]

**NURS 703 Health Policy and Economics 3.0 Credits**

This course bridges the chasm between politics, economics, public policy making, and the U.S. health care system, by examining and critiquing the components of each. Students analyze foreign and domestic health care policies that provide the framework that drives regulation and delivery of health care. Critical analysis of global factors, national allocation of healthcare resources and current healthcare policy debates prepares the doctor of nursing practice student to organize, advocate, and implement health policy initiatives at multiple levels.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 706 Applied Epidemiology 3.0 Credits**

This is an applied course on methods of population-based epidemiologic research that includes a discourse on statistical analysis and causal inference. This course follows a prerequisite introductory biostatistics/epidemiology course, and is designed for nursing and health sciences doctoral students who are expected to integrate statistical reasoning into the decisions they make in the health care setting. A combination of Excel-based, SPSS, and hand calculated assignments will be used to supplement the content.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B]

**NURS 714 Introduction to Qualitative Methods in Nursing Inquiry 3.0 Credits**

This introductory course focuses on developing skills fundamental to qualitative inquiry. This includes reflexivity as a qualitative strategy, which addresses subjectivity in qualitative methods and explores the positioning of self as influential in all stages of the process. The process of bracketing presuppositions will be examined including its phenomenological origins and tensions, such as: who brackets, methods of bracketing, and timing in the process of qualitative inquiry. Practical approaches to qualitative data collection and analysis will be examined including: interviewing techniques, focus groups, and thematic analysis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 716 Scientific Foundation of Nursing Knowledge Development 3.0 Credits**

This course is designed to help students explore the development of nursing knowledge that is generated from clinical practice. A critical analysis of historical and contemporary views of nursing science knowledge development and the evolution of nursing inquiry will be addressed. Concept analysis will be an integral part of this course. Students will examine relationships between the components of theory and the role that theory plays in research and clinical nursing practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 718 Quantitative Methods for Practice-based Nursing Inquiry  
3.0 Credits**

This quantitative methods course focuses on understanding and evaluating the scientific rigor of published quantitative research. Practical approaches to applying quantitative methods to address practice-based nursing problems will be examined including: project design, sampling, measurement, data collection, data analysis, and human subject protection. Emphasis is placed on scientific principles and techniques used to minimize bias and maximize internal and external validity in quantitative inquiry.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B]

**NURS 720 Health Information Technology and Information Systems  
3.0 Credits**

This course prepares a doctoral student to be proficient in the use of health information technology and information systems to assume a leadership role to improve practice and health care delivery. This course will provide students with skills in the selection, use and evaluation of technologies for care; development and implementation of a plan for data extraction from databases containing practice information. The use of appropriate software to generate statistics and accurately interpreting statistical results will be addressed. The student is expected to use these technologies in translation of evidence to clinical practice to improve health care, health care systems and patient outcomes. Additionally, the concept of interprofessional collaboration to improve patient outcomes will be addressed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B]

**NURS 722 Organizations and Systems Leadership: Innovative  
Strategies 3.0 Credits**

This course is designed to broaden and enhance the leadership skills and expertise of the Doctor of Nursing Practice student. Current topics affecting the health care delivery system will be explored, i.e. decreased revenue sources; unionization; health care reform; staffing models; magnet organization status; informatics; the aging population and its effect on the health care delivery system; strategic management, succession planning, and facilitation of clinical interdisciplinary relationships to improve clinical outcomes and research opportunities. DNP graduates must be prepared in leadership roles secondary to complex health care delivery systems, the focus on patient outcomes and decreased revenue streams.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 703 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 830 [Min Grade: B] and NURS 835 [Min Grade: B]

**NURS 802 Epistemology, Ontology, and the Philosophy of Nursing  
Science 3.0 Credits**

This course examines nurses' ways of knowing and the philosophical underpinnings of the nursing profession. Students examine the process of scientific inquiry and appraise scholarly products that have relevance to nursing knowledge development and health.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 803 Doctoral Seminar: Scientific Integrity 1.0 Credit**

The course focuses on developing scientific integrity in the responsible conduct of research. Ethical issues, including the protection of subjects, national and clinical trials, scientific fraud, and ethical treatment of data, related to the responsible conduct of research will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 804 Doctoral Seminar: Creating Intellectual Community 1.0  
Credit**

This seminar on the formation of scientists focuses on developing skill in preparing manuscripts for publication, crafting scientific abstracts and developing podium and poster presentations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 805 Doctoral Seminar: Grantsmanship 1.0 Credit**

This course on the formation of scientists focuses on the organization, development and preparation of a grant application. Students are expected to prepare components of their grant application under the direction of their mentor using the guidelines for an appropriate funding organization.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 806 Scientific Appraisal and Knowledge Development 3.0  
Credits**

This course examines approaches for knowledge development in nursing and scientific appraisal of phenomenon of interest to nursing. The conceptual foundations of nursing science and the contextual factors (e.g. age, gender) that impact nursing science are explored. Concept analysis and integrative reviews provide opportunities for students to further develop a phenomenon of interest for study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 810 DNP Project: Analysis & Evaluation 1.0 Credit**

This DNP seminar course is offered as an independent study under the direction of the doctoral student's assigned DNP Project Chairperson. This course focuses on DNP Project completion, including the DNP Project paper, with particular attention to the analysis, evaluation and dissemination of the project. The course end-product is a completed paper that satisfies DNP Project expectations and meets IDEA repository requirements. Demonstrable DNP Project progression is a course requirement.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 3 credits

**Prerequisites:** NURS 842 [Min Grade: B] and NURS 843 [Min Grade: B]

**NURS 819 Qualitative Research Methods in Nursing Inquiry 3.0 Credits**

Clinical nursing and phenomena using qualitative research methods will be examined to elucidate health and human behavior within context. The history, language and epistemology of qualitative research traditions are explored and studied as interpreted by qualitative nurses researchers in advancing the science of nursing. Qualitative strategies will be explored, compared, contrasted and analyzed. These can include but are not limited to: ethnographic, phenomenological, grounded theory, narrative, mixed methods and participatory action research approaches. The course culminates in the development of a qualitative research proposal within qualitative nursing research frameworks.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 820 The Science of Therapeutics 3.0 Credits**

This course focuses on advanced strategies to evaluate the short- and long-term outcomes of clinical therapeutics with special emphasis on feasibility, pilot studies, and randomized control trials. The course includes analysis of completed studies as well as the design of a randomized control trial used in non-pharmacologic or clinical therapeutic.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 830 Doctoral Nursing Practice Clinical Practicum 3.0 Credits**

This course is designed to enhance the clinical knowledge development of the clinical nursing scholar. Doctoral students, under the direction of their DNP advisor and course faculty, will select an area of clinical nursing practice that will be driven by their capstone project. Models of the reflective practitioner, interdisciplinary novice-to-expert theories, use of evidence-based data bases to drive interventions, and cost effectiveness evaluation of clinical interventions derived from students' Clinical Practica will be addressed. The Clinical Practicum will consist of 125 hours of practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 703 [Min Grade: B]

**NURS 835 Doctoral Nursing Practice Role Practicum 3.0 Credits**

This course is designed to broaden and enhance the role development knowledge and skills of the clinical nursing scholar. Students, under the direction of faculty advisor, will select an area of role development as a practitioner, or nurse executive. This course will address content relevant to various role careers of the clinical nursing scholar such as role negotiation theory, lifelong mentorship; leadership abilities and professional development trajectory; and stress management and role strain. The Role Practicum will consist of 125 practice hours.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 830 [Min Grade: B]

**NURS 836 Clinical and Applied Nursing Ethics 3.0 Credits**

The course is designed to enhance ethical reasoning and decision-making among nursing scholars in their role as clinicians, and/or executives.

The course will focus on the practical application of ethical theories and principles to practice. Students will discuss the relevance and application of various theoretical perspectives such as deontology, teleology (utilitarianism), virtue ethics, and relational ethics. The application of principles to practice will take a life-span approach, and include issues of resource allocation and cross-cultural influences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 703 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 830 [Min Grade: B] and RSCH 519 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 720 [Min Grade: B]

**NURS 837 Translating Evidence into Clinical Practice 3.0 Credits**

This course explores the process on how to translate research evidence into practice that includes assessing the need for change in practice, linking the clinical problem with nursing interventions and patient outcomes, synthesizing the best evidence, designing practice change, and integrating and maintaining the change in practice. Various critical analyses for assessing the quality of research evidence will be investigated. The PICOT format for translating research evidence into practice will be utilized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 718 [Min Grade: B]

**NURS 838 Global Leadership Perspectives 3.0 Credits**

This course is designed to broaden and enhance leadership skills for the Doctor of Nursing Practice (DNP) student through a global experience in another country aligned with the DNP Essentials. Cultivating an understanding of global health offers a unique opportunity to enrich and prepare future doctoral nursing leaders for responding to current and future global health care needs in diverse settings. Fostering intercultural relationships, while comparing and contrasting society and health care systems in another country, will deepen an intercultural perspective. Delivery of the course will occur at a host university in the global country visited and is integrated in the Clinical Practicum requirement for the course. Clinical Practicum requirements for this course consist of 50-hours of practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 703 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 720 [Min Grade: B] and NURS 830 [Min Grade: B] and NURS 835 [Min Grade: B] and NURS 836 [Min Grade: B] and NURS 837 [Min Grade: B] and NURS 714 [Min Grade: B]

**NURS 842 DNP Project Seminar I 3.0 Credits**

This seminar course is focused on planning and designing a proposed DNP project in response to a data-driven or factually supported practice problem. The proposed project uses evidence-based practice methodologies to improve processes and/or outcomes or to broaden understanding of a nursing practice phenomenon. This proposed project may be devised in various forms using diverse approaches, including but not limited to: program evaluation, quality improvement, evidence-based practice improvement, systematic review, or other project modalities consistent with the recommendations of the American Association of Colleges of Nursing. Clinical Practicum requirements for this course consist of 75-hours of practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and NURS 706 [Min Grade: B] and NURS 716 [Min Grade: B] and NURS 837 [Min Grade: B]

**NURS 843 DNP Project Seminar II 3.0 Credits**

This seminar course is focused on implementing, evaluating, and disseminating an approved DNP project. The required course end-product is negotiated between the doctoral student and faculty to ultimately lead to a completed, fully written paper that satisfies DNP Project expectations. Students may elect one of two DNP project completion tracks; full product by course-end or partial product completion by course-end. Students will explore and engage in opportunities for dissemination of professional work. Clinical Practicum requirements for this course consist of 125-hours of practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NURS 714 [Min Grade: B] and NURS 718 [Min Grade: B] and NURS 835 [Min Grade: B] and NURS 842 [Min Grade: B] and NURS 830 [Min Grade: B]

**NURS 850 Research Apprenticeship 1.0-3.0 Credit**

This course is designed to engage students in an intensive research apprenticeship in the conduct of research. Students will work directly with faculty researchers and their research teams to acquire experiential learning and be closely supervised by an experienced researcher, thereby gaining knowledge and skills in the real conduct of research. This experience will allow the student to gain entry into the research project and identify their feasible contributions that will span the three quarters.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**NURS 860 Integration of Genetics/Genomics in a Research Agenda 3.0 Credits**

This course provides the students with opportunities to explore how genetics and genomics can be integrated with their research interests and long term scholarship. Course content includes discussion of the evolving role of genetics and genomics in clinical and theoretical research, approaches to studying genetic and genomic issues, accessing and using multiple genetics databases, approaches to identifying collaborators, and evaluation of opportunities for funding and publication. Students will examine the ways genetics/genomics has been included in nursing scholarship through critical analysis of scientific publications. Learners will develop expertise in navigating publically available databases with genetics-related content.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 861 Interdisciplinary Approaches in Aging Research 3.0 Credits**

This course uses an interdisciplinary lens to examine special topics in aging research. The state-of-the science, research methodology, and measurement issues related to each topic are explored. Phenomena of interest to aging researchers measured in large data sets on aging (e.g. Cardiovascular Health Study, Baltimore Longitudinal Study on Aging, National Retirement Survey, etc.) are examined.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 862 Reproductive Epidemiology 3.0 Credits**

Through this course, students will learn key principles and methods for the study of reproductive epidemiology. Approaches to study critical health challenges women face nationally and worldwide will be addressed. Reproductive mortality and morbidity burdens will be examined in the context of health disparities by race and ethnicity among various populations of women.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 863 Mixed-Methods Research 3.0 Credits**

This course uses an interdisciplinary lens in examining mixed methods research. Multiple perspectives and multiple methods, including both qualitative and quantitative designs, are often needed to explore complex clinical problems and health behaviors. This course focuses on mixed methods design selection, data collection, analyses, discussion of findings and research dissemination.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NURS 891 Doctoral Nursing Special Topics for the Nurse Executive 3.0 Credits**

This course is designed to broaden and enhance leadership skills for the Doctor of Nursing Practice Student enrolled in the Clinical Nurse Executive Track. Current topics affecting the health care delivery system will be explored, i.e. decreased revenue sources; unionization; health care reform; staffing models; magnet organization status; informatics; the aging population and its effect on the health care delivery system; strategic management and succession planning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: C]

**NURS 988 Dissertation Proposal Development 3.0 Credits**

The purpose of this course is to provide opportunity for the student, with faculty advisement, to develop the proposed dissertation and prepare for its oral and written defense (candidacy examination). Students will work with their faculty advisor to establish the dissertation committee and to plan the format of the proposed dissertation.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits



**NURS 989 Dissertation 1.0-9.0 Credit**

Through this course the student will conduct original research with the goal of producing a contribution to the knowledge of the discipline. The quality of the original research must conform to that needed for submission of a manuscript to a peer-reviewed scientific journal in the student's area of research. This course includes writing and defending the proposal, conducting pilot study, getting IRB approval, implementation of the study, data analysis, interpretation of results, writing the dissertation report, defense, and dissemination of results through publications and presentations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**NURS 992 Dissertation in Nursing Science 1.0-9.0 Credit**

Through this course the student will conduct original research with the goal of producing a contribution to the knowledge of the discipline. The quality of the original research must conform to that needed for submission of a manuscript to a peer-reviewed scientific journal (traditional dissertation) or granting agency in the student's area of research. This course builds from the successfully defended dissertation proposal including, conducting a pilot study, securing IRB approval, study implementation, data analysis, interpretation of results, writing the dissertation report, defense, and dissemination of results through publications and presentations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**NURS I899 Independent Study in Nursing 1.0-3.0 Credit**

The doctoral student works under the guidance of a faculty member to study in depth a topic related to their program of study. Independent study courses can be undertaken when there is no specific formal coursework available to support either the student's dissertation topic, or area of interest. Specific objectives and requirements are negotiated individually and the student will sign an Independent Study Contract. The course may be repeated more than once provided different faculty members supervise the learning experience.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 9999 credits

**NURS T580 Special Topics in Nursing 0.0-3.0 Credits**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 12 credits

**NURS T680 Special Topics in Nursing 0.0-3.0 Credits**

This course covers special topics of relevance and significance to the discipline of nursing at the graduate level. May be repeated three times for credit with varying topics.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 12 credits

**NURS T780 Special Topics in Nursing 0.0-3.0 Credits**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 12 credits

**NURS T880 Special Topics in Nursing 0.0-3.0 Credits**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**NURS T980 Special Topics in Nursing 0.0-3.0 Credits**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor. May be repeated up to 3 times for credit if topics vary.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

## Nursing and Health Professions Courses

**NHP 680 Informatics in the Health Professions 3.0 Credits**

This course introduces the concepts of informatics in the health professions and how data, information and knowledge, through technology, can be applied to healthcare administration, education, practice and research. The goal of the course is to understand the role of health professional informatics in improving patient care outcomes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 760 Academia for Health Professionals 2.0 Credits**

Students will be introduced to the organizational structures and functions commonly found in universities and colleges. Enduring and contemporary internal and external environmental issues of higher education and professional development will be examined. Emphasis is placed on quality assurance issues in the management of academic programs. Familiarity with the context of academic environments will enable to students to understand their roles and responsibilities as faculty members, within the context of the department, college, and university levels.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 762 Health Professional Education 3.0 Credits**

This course is an introduction to teaching methods used in educating health professional students. Foundational aspects of teaching methodology, including theories of teaching, learning and student assessment, will be reviewed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 766 Health Promotion, Fitness and Wellness 3.0 Credits**

This online course is required in the DHSc program. It provides students with an introduction to concepts and education and behavioral intervention strategies to promote health, fitness and wellness in individuals with and without disabilities across the lifespan. Course content includes strategies and tactics to promote healthy behaviors (physical activity and nutrition) and address facilitators and barriers to healthy lifestyles.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 767 Leadership & Professional Issues 3.0 Credits**

This course is an exploration of two areas of leadership development and practice: 1) the art and science of leadership in the health professions including theory, skills and applications; and 2) critical issues facing the health professions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 769 Population Health: An Interprofessional Approach 3.0 Credits**

The course integrates several components of both health care and public health systems such as access, health promotion, disease prevention, screening, and chronic care management by analyzing data to identify the nature and extent of health problems and determine effective and efficient systems of care. Emphasis is placed on the social determinants of health and innovate systems and policies that advance beyond care to overall wellness. Additionally, the nature and extent of health disparities—deficits or health enhancing—are reviewed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP 810 Biostatistical Applications 2.0 Credits**

As a follow-up to univariate analyses presented in introductory courses, concepts of multivariate analysis are presented to facilitate understanding of these analyses in current literature and to introduce their use and interpretation. Course includes laboratory application of selected statistical analyses relevant to individual research needs using the SPSS software tool.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 519 [Min Grade: B] and RSCH 700 [Min Grade: B]

**NHP 818 Scholarship Question Development 2.0 Credits**

This course takes students through a systematic and discovery process of identifying a focused research question or set of questions related to their eventual scholarship project. Students learn about the importance of reviewing relevant literature, establishing a rationale for research, developing specific aims, exploring an appropriate method, and developing a realistic timeline for completion of a scholarship project.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 10 credits

**NHP 822 Teaching Practicum 1.0-3.0 Credit**

This course consists of activities culminating in meeting minimal competencies for teaching in higher education institutions. Individually identified competencies include tasks such as responsibility for planning, preparing, presenting and evaluating a course with supervision. Student, instructor and advisor develop a contract reflecting current abilities and development needs in teaching.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 15 credits

**NHP 827 Scholarship I 1.0-2.0 Credit**

Through scholarship a student produces an original contribution of knowledge. Scholarship I consists of developing the proposal, completing any pilot projects that may be required and defending the proposal.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 10 credits

**Prerequisites:** NHP 810 [Min Grade: B] and NHP 818 [Min Grade: B] and RSCH 519 [Min Grade: B] and RSCH 700 [Min Grade: B] and RSCH 813 [Min Grade: B]

**NHP 828 Scholarship II 1.0-2.0 Credit**

Through scholarship a student produces an original contribution of knowledge. Scholarship II consists of obtaining IRB approval, as needed, and implementing the proposed project. This may include data collection and analysis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 10 credits

**Prerequisites:** NHP 827 [Min Grade: CR]

**NHP 829 Scholarship III 1.0-2.0 Credit**

Through scholarship a student produces an original contribution of knowledge. Scholarship III consists of developing the dissemination product, defending the scholarship and disseminating the project.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 10 credits

**Prerequisites:** NHP 828 [Min Grade: CR]

**NHP 832 Leadership Practicum 1.0-4.0 Credit**

This course is designed for students interested in an administration and leadership mentored practicum to assist them in meeting their future career goals. Students are expected to develop a learning contract with specific objectives, and work with their faculty advisor to identify the resources needed to successfully complete this practicum.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 20 credits

**NHP I899 Independent Study in Nursing and Health Professions 1.0-4.0 Credit**

Independent study is offered to graduate students to afford them the opportunity to develop various components of their research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NHP T880 Special Topics in Nursing and Health Professions 1.0-4.0 Credit**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 16 credits

## Nutrition & Food Science

### Courses

**NFS 510 Profession of Dietetics 3.0 Credits**

This course will introduce the learner to the profession of dietetics.

Topics covered will include: educational preparation and credentialing of registered dietitians and the organizational units responsible for these functions; professional roles and practice areas of dietitians; professional responsibilities of the credentialed dietitian; the Academy of Nutrition and Dietetics and other professional organizations; and, trends affecting the dietetics profession.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 520 Pediatric Nutrition 3.0 Credits**

This course provides the learner with skills to perform pediatric nutrition assessment and medical nutrition therapy for the prevention and treatment of common medical conditions of newborns through adolescents.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 530 [Min Grade: B]

**NFS 525 Nutritional Assessment Through the Life Cycle 3.0 Credits**

This course is designed to introduce students to and provide hands-on experience with the four primary methods of nutritional assessment: dietary, anthropometric, laboratory, and clinical assessment. Assessment methodology appropriate to each stage of the life cycle, including infants, children, adolescents, adults and elderly, will be used.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 526 Lifecycle Nutrition 3.0 Credits**

This course will provide advanced study related to nutritional needs and concerns throughout the human lifecycle. We will discuss the biological basis of energy and nutrient needs, identify energy and nutrient needs, discuss selected methods of nutritional assessment, and examine the consequences of failing to meet certain needs throughout the life-course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**NFS 530 Macronutrient Metabolism 3.0 Credits**

Covers absorption, utilization, digestion, storage, and excretion of carbohydrates, lipids, and proteins.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 531 Micronutrient Metabolism 3.0 Credits**

Covers absorption, utilization, digestion, storage, and excretion of vitamins, macrominerals, and microminerals.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 543 Medical Nutrition Therapy I 3.0 Credits**

In-depth coverage of nutrition assessment and the Nutrition Care Process. Pathophysiology of selected acute & chronic disease states and their associated medical problems, with focus on using the Nutrition Care Process to meet the medical nutrition needs of patients.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 525 [Min Grade: C]

**NFS 544 Medical Nutrition Therapy II 3.0 Credits**

Pathophysiology of selected acute & chronic disease states and their associated medical problems, with focus on using the Nutrition Care Process to meet the medical nutrition needs of patients.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 543 [Min Grade: C]

**NFS 545 Nutrition in Critical Care 3.0 Credits**

Pathophysiology of selected critical care conditions and their associated medical problems, and the use of the Nutrition Care Process to meet the medical nutrition needs of patients. Also covers nutrition support including use of enteral and parenteral nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 544 [Min Grade: C]

**NFS 546 World Nutrition 3.0 Credits**

Discusses the nutritional status of peoples in various parts of the world, the incidence and treatment of deficiency diseases, problems of the food supply and efforts to improve it, and other timely aspects of this comprehensive problem.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 550 Foodservice Systems Management 3.0 Credits**

In-depth treatment of food purchasing, financial management of foodservices, cost controls, marketing in foodservice, equipment layout and design, and management/leadership theories and applications.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HNUT.

**NFS 601 Research Methods 3.0 Credits**

Covers current techniques and evaluation methods for human nutrition research. Focuses on human subject aspects and critique of the literature.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 602 Methods of Nutrition Research 3.0 Credits**

Laboratory methods current in nutrition research techniques. The emphasis will be on methods of instrumental analysis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 609 Individualized Supervised Practice Pathway 1.0-3.0 Credit**

The Individualized Supervised Practice Pathway is designed to prepare competent, entry-level dietitians for positions in medical nutrition therapy, outpatient nutrition counseling, food service management and community nutrition. The program will provide a curriculum for the student to experience and practice the many roles of the dietitian under the supervision of the preceptor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 12 times for 39 credits

**NFS 625 Nutrition and Exercise Physiology 3.0 Credits**

The principles of exercise science and their interaction with nutrition are explored in-depth. The physiological and biochemical effects of training are examined in relation to sports performance and prevention of chronic diseases prevalent in developed countries.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 629 Readings in Nutrition Science 3.0 Credits**

Covers advanced nutritional aspects of selected subjects in metabolism via an in-depth survey of current research literature in the field.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 630 Nutrition Counseling 3.0 Credits**

Emphasizes nutrition counseling techniques for use with individuals and small groups, including development of nutrition education materials as well as verbal and non verbal communication skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 530 [Min Grade: B] and NFS 531 [Min Grade: B]

**NFS 636 Maternal and Child Health Nutrition 3.0 Credits**

This course will provide the learner with an understanding of the nutrient needs of women and children, with a focus on the periods of the first 1,000 days, pregnancy, breastfeeding, infancy, toddler and preschool - age, and children with special health care needs. Issues of adequacy of the diet and access to food will be investigated, as well as resulting health outcomes. Public health resources addressing these issues in the US and globally will be explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 640 Nutrition of the Schoolchild 3.0 Credits**

Covers normal growth patterns and nutrition requirements for children of school age (K to 12). Stresses nutritional problems of schoolchildren, attitudes toward food, the role of the school lunch in nutrition, and evaluation of school lunches in relation to total nutritive needs.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 660 Capstone Project in Nutrition and Dietetics 3.0 Credits**

Completion of a scholarly project in the form of a program evaluation, quality improvement project, comprehensive literature review, or research project. Requires review of the literature, project design, conduct of the project and presentation of the results.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is NFDS.

**Prerequisites:** NFS 601 [Min Grade: B]

**NFS 690 Community Nutrition 3.0 Credits**

Surveys nutrition services of city, state, and national organizations.

Develops suggestions for the development of a community program with appropriate educational methods and illustrative materials.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS 801 Techniques in Nutrition Sciences Research 3.0 Credits**

This course will examine the techniques used in the various Department of Nutrition Sciences laboratories, spanning the subspecialties of metabolism and physiology, behavioral nutrition, medical nutrition, food safety and community nutrition. The purpose of this rotation course in laboratory techniques is to provide the student with a basic understanding and terminology needed to interact with faculty in the conduct of research in the Department of Nutrition Sciences. It will also serve to prepare the student to develop his/her own dissertation proposal and interact with nutrition researchers in the larger scientific community.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HNUT and classification is PhD.

**NFS 810 Topics in Metabolic Nutrition 3.0 Credits**

This course will examine current issues in nutrition health promotion and disease prevention from the perspective of metabolism, physiology, and behavioral nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**NFS 811 Topics in Community Nutrition 3.0 Credits**

This course will examine current issues in health promotion and disease prevention from the perspective of community based nutrition and food security.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is HNUT and classification is PhD.

**NFS 812 Integrative Nutrition Practicum 3.0 Credits**

This course will provide the nutrition science PhD student with the theory and experience of nutrition science as practiced outside of the academic research setting. The course will cover elements of practice in three settings: Nutrition/Food Industry, Public Policy, and Clinical Consultation. Students will choose one setting in which to focus for the term. This course can be repeated once as an elective by choosing a different practice setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** NFS 801 [Min Grade: B] and NFS 810 [Min Grade: B] and NFS 811 [Min Grade: B]

**NFS 849 Readings in Therapeutic Nutrition 3.0 Credits**

Covers current literature pertaining to nutrition in various conditions such as malabsorption, inborn errors of metabolism, diabetes mellitus, diseases of the gastrointestinal tract, diseases of the liver, and surgical conditions. Discusses nutrition assessment and parenteral and enteral nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** NFS 510 [Min Grade: C]



**NFS 997 Research 1.0-12.0 Credit**

Requires students, in consultation with an appropriate faculty adviser, to identify a specific food and/or nutrition problem area of mutual interest, carefully document its background, and present research reports for study. All thesis students use this number. May be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**NFS 999 Dissertation Research 1.0-9.0 Credit**

Through this course the student will conduct original research with the goal of producing an original contribution of knowledge and defend that research in an oral dissertation defense. The quality of the original research must conform to that needed for submission of a manuscript to a peer-reviewed scientific journal in the student's area of research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**NFS I599 Independent Study in NFS 0.5-9.0 Credits**

Provides an independent study in human nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS I699 Independent Study in NFS 0.5-9.0 Credits**

Provides an independent study in human nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS I799 Independent Study in NFS 0.5-9.0 Credits**

Provides an independent study in human nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS I899 Independent Study in NFS 0.5-9.0 Credits**

Provides an independent study in human nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS I999 Independent Study in NFS 0.5-9.0 Credits**

Provides an independent study in human nutrition.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS T580 Special Topics in NFS 0.5-9.0 Credits**

Covers selected topics of study in the field of nutrition and food.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS T680 Special Topics in NFS 0.5-9.0 Credits**

Covers selected topics of study in the field of nutrition and food.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**NFS T780 Special Topics in NFS 0.5-9.0 Credits**

Covers selected topics of study in the field of nutrition and food.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS T880 Special Topics in NFS 0.5-9.0 Credits**

Covers selected topics of study in the field of nutrition and food.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**NFS T980 Special Topics in NFS 0.5-9.0 Credits**

Covers selected topics of study in the field of nutrition and food.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

## Operations Management

### Courses

**OPM 998 Dissertation Research in Operations Management 1.0-12.0 Credit**

Dissertation Research.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 12 times for 24 credits

## Operations Research

### Courses

**OPR 601 Managerial Decision Models and Simulation 3.0 Credits**

Introduces students to the basic modeling tools and techniques for making managerial decisions in a complex and dynamic business environment.

Topics include linear, discrete, and nonlinear optimization, multicriteria decision making, decision analysis under uncertainty, and simulation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 620 Operations Research I 3.0 Credits**

Covers theory and applications of linear programming, including the simplex method, sensitivity analysis and duality, formulation and solution of transportation and network optimization problems. Extensions include game theory, quadratic programming, financial optimization, and emerging solution techniques such as interior-point methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 622 Operations Research II 3.0 Credits**

This course covers modeling and solving optimization problems under uncertainty. Topics will include stochastic processes, queueing systems and dynamic programming.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 624 Advanced Mathematical Program 3.0 Credits**

This course covers algorithms and software development for nonlinear programming, integer programming, and global optimization.

Special emphasis is placed on solution methods for constrained and unconstrained nonlinear optimization, a survey of methods for integer linear and nonlinear optimization, and search techniques for global optimization.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 626 System Simulation 3.0 Credits**

This course focuses on the application of simulation in analyzing complex systems. The corresponding theory is also covered.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

**OPR 640 Decision Models for the Public Sector 3.0 Credits**

This course will cover the basics of analytical modeling, optimization, and simulation as tools for decision-making in the public sector. The students will analyze cases illustrating the powerful impact of using these tools in cities across the country. Of particular focus will be the implementability of these tools and their recommendations in the real-world. Moreover, a city, especially one as big as Philadelphia, is a complex and dynamic environment, so we will investigate how to address some of the resulting challenges in our analyses. Specifically, we will address scenarios involving the improvement of existing operations, optimal resource allocation and distribution, and measuring and improving the quality and efficiency of service delivery.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** OPR 601 [Min Grade: C-]

**OPR 660 OR Models in Finance 3.0 Credits**

This course focuses on quantitative methods for financial planning such as optimal investment strategy, currency conversion, portfolio optimization, etc. Topics include fundamental concepts in (quantitative) finance, convexity theory, general theory of linear programming (duality, Farkas' Theorem on linear inequalities, von Neumann's Theorem on two-person zero-sum game), basics of probability and stochastic optimization models in finance. Furthermore, some recent advances in the theory of risk measurement, such as VaR (Value-at-Risk), CVaR (Conditional Value-at-Risk), and their multivariate counterpart; MVaR and MCVaR, etc., are also covered.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 922 Operations Research Methods I 3.0 Credits**

Covers theory and applications of linear programming, including the simplex method, sensitivity analysis and duality, formulation and solution of transportation, and network optimization problems. Extensions include integer programming, quadratic programming, and emerging solution techniques such as interior-point methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 924 Operations Research Methods II 3.0 Credits**

This course covers modeling and solving optimization problems under uncertainty. Topics will include stochastic optimization, queueing systems, and dynamic programming.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 926 Operations Research Models in Finance I 3.0 Credits**

This course will present a survey of modeling and optimization techniques arising in quantitative finance.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 2 times for 6 credits

**Prerequisites:** STAT 920 [Min Grade: C] and OPR 922 [Min Grade: C]

**OPR 991 Simulation Theory and Applications 3.0 Credits**

This course focuses on the application of simulation in analyzing complex systems. The corresponding theory is also covered.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C]

**OPR 992 Applied Math Programming 3.0 Credits**

This course covers algorithms and software development for nonlinear programming, integer programming, and global optimization. Special emphasis is placed on solution methods for constrained and unconstrained nonlinear optimization, a survey of methods for integer linear and nonlinear optimization, and search techniques for global optimization.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**OPR 998 Dissertation Research in Operations Research 1.0-12.0 Credit**

Dissertation Research.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR I599 Independent Study in OPR 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR I699 Independent Study in OPR 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR I799 Independent Study in OPR 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR I899 Independent Study in OPR 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR I999 Independent Study in OPR 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**OPR T580 Special Topics in OPR 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR T680 Special Topics in OPR 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR T780 Special Topics in OPR 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR T880 Special Topics in OPR 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**OPR T980 Special Topics in OPR 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Organizational Behavior

### Courses

**ORGB 510 Leading in Dynamic Environments 2.0 Credits**

To effectively influence others, individuals must understand themselves and how their actions, personality traits, and values affect those around them. As leaders, individuals must also interact well with others and have a foundation of knowledge to draw upon to determine appropriate actions.

This course helps students enhance their self-awareness, strengthen their social awareness, and boost their capacity to analyze critical events, make informed decisions, and take appropriate actions as leaders.

This course takes a strategic perspective of leadership, examining how leaders at all organizational levels can help promote a sustainable competitive advantage. Topics such as individual differences, building social networks, motivating employees, responding in crisis situations, and ethics are discussed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 511 Leading in Dynamic Environments: A Personal, Relational, and Strategic Approach 3.0 Credits**

To effectively influence oneself and others, individuals must understand themselves and how their actions, personality traits, and values affect their careers and those around them. As leaders, individuals must also interact well with others and have a foundation of knowledge to draw upon to determine appropriate actions in dynamically changing environments.

This course helps students enhance their self-awareness and professional development, strengthen their social awareness, and boost their capacity to analyze critical events, make informed decisions, and take appropriate actions as leaders in a variety of contexts and situations. This course takes a strategic perspective of leadership, examining how leaders at all organizational levels can help promote a sustainable competitive advantage.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 520 Leading High-Performance Teams 1.0 Credit**

Teams are a fundamental structure and building block in organizations.

Given the trend towards flatter and matrix types of business structures, teamwork and interpersonal relationships are becoming increasingly important. As a result, in order to be successful in a team based environment, individuals must be able to understand core drivers of team effectiveness as well as how to influence in these types of settings. This course examines these skillsets in terms of team structure, leadership, interpersonal relationships, knowledge exchange, processes, and outcomes. The learning method is experiential whereby individuals will participate in team based activities and then debrief them in order to learn how to effectively engage in and facilitate positive team dynamics in organizations.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ORGB 510 [Min Grade: C] or ORGB 511 [Min Grade: C]

**ORGB 530 Career and Professional Development 1.0 Credit**

To be an effective leader and to develop professionally, individuals must understand themselves, exercise self-leadership, and manage their careers and lives effectively. This course helps students develop knowledge and skills in these areas to enhance their professional development and to become effective managers of their careers. Using readings, cases, self-assessments, and discussions, the objective of the course is to provide students with opportunities to understand trends in contemporary organizations and careers, enhance their self-awareness, develop career self-management skills, and apply these skills and perspectives to further their professional development.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ORGB 510 [Min Grade: C] and ORGB 520 [Min Grade: C]

**ORGB 602 Leading and Executing Change 3.0 Credits**

Developing a winning organizational strategy that unlocks growth is essential for business survival. Developing a strategy, however, is only one part of the equation as some studies show that as much as 70% of strategy and change initiatives fail in execution. What explains the change leadership shortfall in most organizations? This course explores why change efforts fail and how to proactively overcome common change leadership challenges.

The course will introduce effective change leadership approaches, as well as develop specific skills such as planning, communication, change management, and performance measurement. Participants will develop solutions to developing strategic alignment, translating vision into action plans, making change happen and stick, and applying lessons to real world initiatives.

This course explores why change efforts fail and how to proactively overcome common change leadership challenges. The course will introduce effective change leadership approaches, as well as develop specific skills such as planning, communication, change management, and performance measurement. Participants will develop solutions to developing strategic alignment, translating vision into action plans, making change happen and stick, and applying lessons to real world initiatives.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 620 Leading Virtual Teams 3.0 Credits**

The increased globalization of our workforce makes the use of virtual platforms to manage teams an organizational imperative. Virtual coordination offers a number of benefits for leaders including greater access to talent and temporal flexibility however, it also presents a number of challenges. This type of working arrangement heightens the importance of interpersonal relationships and teamwork in modern organizations and requires thoughtful strategies to succeed. This course examines the team structures, member characteristics, interpersonal processes, and technology features that influence the effectiveness of teams, and the dynamics of interpersonal relationships in virtual environments.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 625 Leadership and Professional Development 3.0 Credits**

This course helps students develop knowledge and skills to enhance their professional development and to become effective leaders. Students will understand trends in contemporary organizations, enhance their self-awareness, and refine their interpersonal skills, and apply these skills to improve their work effectiveness.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 631 Leading Effective Organizations 3.0 Credits**

This course prepares students to make informed decisions as leaders in common institutional and environmental contexts. The focus of the contingency-based perspective of this course is to help leaders understand how best to motivate and coordinate employees and to control outcomes in a manner that ensures they fulfill strategic objectives.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB 640 Negotiations for Leaders 3.0 Credits**

This course is designed specifically for leaders to enhance their leadership negotiation style. The material is geared toward developing leaders as they deal with the art and science of securing agreements and resolving disputes. The course combines a theoretical understanding of the central concepts of negotiations with learned analytical skills to discover optimal solutions to problems (the science) and good negotiation skills to get these solutions accepted and implemented (the art).

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**ORGB I599 Independent Study in ORGB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB I699 Independent Study in ORGB 0.5-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB I799 Independent Study in ORGB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB I899 Independent Study in ORGB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB I999 Independent Study in ORGB 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**ORGB T580 Special Topics in ORGB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB T680 Special Topics in ORGB 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB T780 Special Topics in ORGB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB T880 Special Topics in ORGB 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**ORGB T980 Special Topics in ORGB 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit



# Peace Engineering

## Courses

### **PENG 501 Peace Engineering Seminar - Fall 0-1 Credits**

The Peace Engineering Seminar will introduce students to peacebuilding cases and will help students understand how engineering approaches can be applied to peacebuilding. In each term, two peacebuilding cases will be presented by peacebuilders from federal agencies, multinational organizations, and NGOs. In-class sessions subsequent to the case's presentation, students: 1) will investigate the case through the literature and discuss the case with members of the peacebuilding community; 2) will explore how techniques learned in the core Peace Engineering classes can be applied to the case; 3) will advocate for engineering and technical approaches that could be applied in similar situations; and 4) will use the case as a springboard for reflective writing about the development of skills and personal growth.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 502 Peace Engineering Seminar - Winter 0-1 Credits**

The Peace Engineering Seminar will introduce students to peacebuilding cases and will help students understand how engineering approaches can be applied to peacebuilding. In each term, two peacebuilding cases will be presented by peacebuilders from federal agencies, multinational organizations, and NGOs. In-class sessions subsequent to the case's presentation, students: 1) will investigate the case through the literature and discuss the case with members of the peacebuilding community; 2) will explore how techniques learned in the core Peace Engineering classes can be applied to the case; 3) will advocate for engineering and technical approaches that could be applied in similar situations; and 4) will use the case as a springboard for reflective writing about the development of skills and personal growth.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 503 Peace Engineering Seminar - Spring 0-1 Credits**

The Peace Engineering Seminar will introduce students to peacebuilding cases and will help students understand how engineering approaches can be applied to peacebuilding. In each term, two peacebuilding cases will be presented by peacebuilders from federal agencies, multinational organizations, and NGOs. In-class sessions subsequent to the case's presentation, students: 1) will investigate the case through the literature and discuss the case with members of the peacebuilding community; 2) will explore how techniques learned in the core Peace Engineering classes can be applied to the case; 3) will advocate for engineering and technical approaches that could be applied in similar situations; and 4) will use the case as a springboard for reflective writing about the development of skills and personal growth.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 540 Systems Engineering for Peacebuilding 3.0 Credits**

Peace Engineering is a relatively new topic. This course will apply systems thinking and systems tools in the context of peacebuilding. The course is intended to give an introduction to systems engineering and system dynamics and utilize them for this new application. Topics include system architecting, systems mapping, causal loop diagrams, stock and flow diagrams, data sourcing, decision making and game theory. Specific examples of conflict will be presented and various theories of change will be tested with the system models. This course will utilize some recent literature on systems engineering use in peacebuilding. This is a 3-credit graduate course delivered over a full academic term via Drexel's online learning management system Blackboard Learn.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 545 Introduction to Peacebuilding for Engineers 3.0 Credits**

Developed in partnership with professional peacebuilders from the PeaceTech Lab and USIP's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills practiced in the field of international peacebuilding and conflict transformation. This course provides students with first-hand accounts of peacebuilders describing the challenges and opportunities in their work, short presentations outlining key theories and concepts that guide that work, and opportunities to think about how this knowledge, skills, and attitudes can be applied to real-life peacebuilding dilemmas.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 550 Conflict Management for Engineers 3.0 Credits**

As the pace of science and technology innovation increases, so too does the role of engineers in solving some of the world's toughest challenges. The prevention of violent conflict and the pursuit of a sustainable peace is just such a challenge. Developed in partnership with professional peacebuilders from the PeaceTech Lab and the US Institute of Peace's Academy for International Conflict Management and Peacebuilding in Washington DC, this course introduces engineering students to the concepts and skills they will need in order to use technology expertise in service of conflict-affected communities. This course provides students with an introduction to the theory and practice of conflict analysis, strategic peacebuilding, and negotiation.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### **PENG 560 Peacebuilding Skills 3.0 Credits**

Peacebuilding Skills focuses on intercultural communication and facilitation in the context of peacebuilding. Cases drawn from historical peacebuilding and stabilization activities will be used to provide a framework from which to understand how communication and facilitation affect the development of a conflict and the ability to resolve conflict without violence. Weekly online classes will include a discussion of a subject's theory and a presentation of the impact of the theory in practice. The course relies on ongoing reflective analyses to help students link the theories and practices of effective peacebuilding to explorations of personal beliefs. The course will be facilitated by instructors from Drexel and from the peacebuilding community.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**PENG 600 Peace Engineering Experiential Learning 0.0-6.0 Credits**

Peace Engineering Experiential learning will give students direct experience working and conducting field-based research in peacebuilding. Students will work with faculty advisors during the spring term to arrange opportunities with external partners involved in peacebuilding and community engagement. Students will then work and conduct research with these partners throughout the summer term. Students may elect to work locally, nationally, or internationally as long as the location is approved by Drexel's International Studies office and the organization approved by Peace Engineering faculty advisors. Opportunities exist with program partners, USIP and Peace Tech Lab, and can be sought with other federal agencies, NGOs, and community service organizations.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 1 times for 12 credits

## Physical Therapy Rehab Science

### Courses

**PTRS 501 Introduction to Research 4.0 Credits**

The course is designed to provide professional graduate students with the skills necessary to evaluate the relationship between practice and published research using an interdisciplinary approach. The content includes an overview of research concepts, research ethics, literature reviews, quantitative and qualitative research methods, including sampling, data collection, and analysis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 507 Neuroscience I 3.0 Credits**

This is the first of two courses that provide a foundation in the structure and function of the nervous system. Clinical correlations relate the material to effective clinical practice and provide a neurophysiological basis for pathological entities described in the student's clinical neurology courses and commonly encountered in the clinic.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 508 Neuroscience II 2.0 Credits**

The course is designed to provide the student with a strong foundation in the structure and function of the nervous system. Clinical correlations are provided throughout the course to: 1). underscore the necessity for understanding the material for effective clinical practice and 2). provide a neurophysiological basis for various pathological entities described in their clinical neurology courses and commonly encountered in the clinic.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 530 Kinesiology I 4.0 Credits**

This course is part one of a two-part series designed to provide students with basic knowledge of biomechanics and functional aspects of the musculoskeletal system. It involves the study of the anatomical, biomechanical, and physiological fundamentals of human motion as it pertains to the upper extremity.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 531 Kinesiology II 3.0 Credits**

This course is part two of a two-part series designed to provide students with basic knowledge of biomechanics and functional aspects of the musculoskeletal system. It involves the study of the anatomical, biomechanical, and physiological fundamentals of human motion as it pertains to the spine and lower extremity.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 532 Human Gross Anatomy I 4.0 Credits**

This course is part one of a two-part series designed to introduce students to the structure and function of the back, neck, face, and upper extremity with particular emphasis on the nervous and musculoskeletal systems. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 533 Human Gross Anatomy II 4.0 Credits**

This course is part two of a two-part series designed to introduce students to the structure and function of the cranium, thorax, abdomen, and lower extremity with particular emphasis on the nervous and musculoskeletal systems. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 534 Physical Therapy Exam & Intervention I 3.0 Credits**

This course prepares a student to perform a basic musculoskeletal examination of the cervical spine and upper extremity. The entire patient management process from history taking to prescription of interventions is introduced and applied. Basic skills needed in the examination are described and practiced.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 535 Physical Therapy Exam & Intervention II 3.0 Credits**

This course prepares a student to perform a basic musculoskeletal examination of the lumbar spine and lower extremities. The entire patient management process from history taking to prescription of interventions is applied. Basic skills needed in the examination are described and practiced.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 539 Topics in Pathophysiology I 2.0 Credits**

Topics in Pathophysiology I is the first of two lecture-format courses that introduce physiology of organ systems, disease states and conditions. Differential diagnosis, medical screening, the impact of pathology and medical management in physical therapy practice will be investigated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 6 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 540 Topics in Pathophysiology II 4.0 Credits**

Topics in Pathophysiology II is the second of two lecture-formal courses that introduce physiology of organ systems, disease states and conditions. Differential diagnosis, medical screening, the impact of pathology and medical management in physical therapy practice will be investigated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 590 Advanced Musculoskeletal Anatomy 3.0 Credits**

Exposes clinicians to the structure and function of the body with particular emphasis on the nervous and musculoskeletal systems. The format consists of onsite seminars that will include cadaveric dissections. Special emphasis is placed on clinical relevance and functional interrelationships of the anatomic structures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 600 Clinical Reasoning 4.0 Credits**

Utilizing a case-based format, this course assists students with clinical reasoning strategies as outlined in the Guide to Physical Therapist Practice. Additionally, students will have opportunities to enhance self-awareness and begin to develop the professional skills inherent in physical therapy practice. Students apply concepts of patient-client management including examination, evaluation, diagnosis, prognosis, and intervention. Through small group discussion, students develop their group skills and are introduced to the team approach.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 12 credits

**PTRS 610 Issues in Pharmacotherapy 3.0 Credits**

Issues in Pharmacotherapy is a lecture-format course that focuses on providing foundational information about pharmacotherapy, pharmacokinetics, and pharmacodynamics that is applicable in physical therapy. Drug classifications are described. Examples are provided of various drug categories.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 612 Pharmacotherapeutics 3.0 Credits**

Pharmacotherapeutics is a lecture-format course that focuses on providing foundational information about pharmacotherapeutics, pharmacology, pharmacokinetics, and pharmacodynamics that is applicable in physical therapy. Drug classifications are described. Examples are provided of various drug categories.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 613 Integrated Clinical Experience I 0.5 Credits**

Integrated Clinical Experience I is the first in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 614 Integrated Clinical Experience II 0.5 Credits**

Integrated Clinical Experience II is the second in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 615 Integrated Clinical Experience III 0.5 Credits**

Integrated Clinical Experience III is the third in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 616 Integrated Clinical Experience IV 0.5 Credits**

Integrated Clinical Experience IV is the third in a series of four clinical practice courses. It is an opportunity for students to practice physical therapy skills learned in the curriculum to date. Students will have the opportunity to practice and refine their skills under the direct supervision of a licensed physical therapist.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 620 Orthopedic Physical Therapy: Upper Extremity 4.0 Credits**

This is the first in a series of three courses on orthopedic physical therapy. This course emphasizes differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative and post-operative management of patients demonstrating musculoskeletal dysfunction of the upper extremity.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 621 Orthopedic Physical Therapy: Lower Extremity 4.0 Credits**

This is the second in a series of three courses on Orthopedic Physical Therapy. This course emphasizes differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative and post-operative management of patients demonstrating musculoskeletal dysfunction of the lower extremity.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 622 Orthopedic Physical Therapy: Spine 4.0 Credits**

This course is one of three courses in orthopedic physical therapy. Emphasis is on examination, differential diagnosis, clinical decision making, and development and implementation of a plan of care for conservative management (including joint manipulation) and post operative interventions for patients with musculoskeletal dysfunction.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 623 Physical Agents 3.0 Credits**

Physical Agents discusses the equipment used and the general application of thermal agents, electrotherapy, compression devices and massage. The clinical decision making when using all of these modalities in the management of clinical conditions including pain, edema, inflammation, decreased range of motion, and muscle weakness will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 624 Functional Mobility 3.0 Credits**

This course addresses the functional management of patients with limited mobility and their equipment needs, emphasizing functional training and clinical decision making for therapeutic intervention as well as prescription of durable medical equipment. Patient/caregiver/healthcare provider safety for injury prevention is stressed, as well as effective instructional approaches for all audiences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 627 Cardiopulmonary Physical Therapy I 4.0 Credits**

This is the first of two courses designed to provide exposure to the normal and abnormal anatomy, physiology and function of the cardiac, vascular and pulmonary systems. Physiology and pathophysiology are explored in relation to functional performance, compensation for disease process and implications for management. Clinical decision making is emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 630 Cardiopulmonary Physical Therapy II 3.0 Credits**

Cardiopulmonary Physical Therapy II is the second of two courses designed to provide students with exposure to the normal and abnormal anatomy, physiology and function of the cardiac, vascular and pulmonary systems. Primary and secondary cardiopulmonary diseases/dysfunction are discussed as they relate to functional ability.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**PTRS 639 Motor Learning 2.0 Credits**

This course, a required course taken by entry-level DPT students, provides foundational knowledge for motor learning and control, and application to clinical practice. Emphasis is placed on basic concepts of motor learning and control in typically developing populations throughout the lifespan. The course provides the opportunity for an initial review of the movement science literature and sets the foundation for PTRS 656 Motor Control and Rehab. Emphasis on postural control, critical review of current theories of motor learning and control, and practice and feedback for task acquisition is emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 641 Neurological Exam and Intervention I 4.0 Credits**

This course introduces the student to examination, evaluation, diagnosis and comprehensive interventions for the adult with neurological dysfunction. It focuses on examination skills and common interventions used with this patient population. Clinical decision making will be utilized to develop appropriate intervention strategies, application techniques, and neuromuscular strengthening and conditioning principles.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 642 Neurological Exam and Intervention II 5.0 Credits**

This course focuses on adults with central nervous system dysfunction where vestibular, sensory, perceptual, cognitive, and communication deficits result in more complex movement dysfunction and limited capacity for learning. Students will learn to integrate neuromuscular, sensory-perceptual, cognitive, behavioral and functional mobility strategies into a comprehensive plan of care.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 643 Applied Biomechanics 3.0 Credits**

This course provides content essential for understanding and evaluating research literature related to the effects of aging, pathology, immobilization, and therapeutic procedures on biological tissues and human movement. Methods for quantifying and evaluating tissue properties and human neuromuscular control are included. Application to practice will come from discussion of current literature.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 644 Integumentary Physical Therapy 1.5 Credit**

The focus of this course is on wound assessment and management techniques used in the clinical setting as outlined in the Guide to Physical Therapy Practice. The use of evidence-based practice to guide clinical decision making will be emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 648 Prosthetics and Orthotics 3.0 Credits**

This lecture/laboratory course provides students with knowledge of the components and biomechanical principles used in upper and lower extremity prostheses and lower limb and spinal orthoses. The basic principles and processes of prosthetic and orthotic prescription, checkout and functional training are presented. Pre-prosthetic medical and physical therapy management of persons with amputation is also discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 649 Culture, Ethics and Interprofessionalism in Healthcare 2.5 Credits**

This course explores the impact culture, health literacy, and determinants of health have on an individual's healthcare experience. Using patient vignettes, students will examine the role of a physical therapist within an interprofessional healthcare team.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits



**PTRS 650 Motor Control and Learning Rehabilitation 3.0 Credits**

Students examine topics in movement science in motor control and motor learning throughout the lifespan and the application of these principles to varied patient populations. This course also allows students to review the movement science literature as it applies to select patient populations.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 651 Applied Tissue Biomechanics 3.0 Credits**

This course is designed to provide the information necessary for the understanding and evaluation of the effects of immobilization, increased stress and strain, injury, disease, healing and aging on biological tissues. Emphasis is placed upon the integration of tissue biomechanics into the rationale and basis for therapeutic interventions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 654 Topics in Health Policy & Services 3.0 Credits**

This course provides information on health policy and health services specific to physical therapy. Students are exposed to health legislation, social determinants of health, issues in health disparities and development of advocacy skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 655 Health Administration 2.5 Credits**

This is the last in a series of four professional development courses. The focus of the course is on the organizational, fiscal and administrative workings of the health care environment and the responsibilities of individual physical therapists in these areas.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 656 Motor Control and Rehabilitation 2.0 Credits**

This course examines contemporary insights for the application of motor control and learning in physical therapy for children and adults with movement dysfunctions. Emphasis is placed on critical review of current evidence applied to patient populations. Practice paradigms for patient scenarios for evaluations and intervention will be critically discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 660 The Human Experience in Healthcare 3.0 Credits**

This course explores the human experience of healthcare. Students will engage in an in-depth assessment of how the interaction between human relationships and other complex challenges influence health outcomes. Some of these challenges include social and psychological determinants of health, values, beliefs, and institutional culture. Students will gain insight and appreciation of the lived experience of patient and provider.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 663 Pediatric Physical Therapy I 3.5 Credits**

This is the first of two required courses that emphasize the physical therapy management of infants, children and adolescents with disabilities and health conditions across various body systems, and different delivery settings. Didactic material for various system pathologies will be presented. Clinical reasoning applied and best evidence will guide students to choose appropriate examination tools, write meaningful goals and develop a physical therapy plan of care. Child development with an emphasis on functional movement, from the pre-natal period through adolescence will be discussed in the context of physical therapy management of infants, children, and adolescents.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 664 Pediatric Physical Therapy 4.5 Credits**

This course takes a systems approach to understanding the basis for pediatric disabilities. Examination and intervention planning are discussed both broadly and in terms of specific disabilities in the context of current evidence for client management models. Lab component provides opportunity to work with a child with a disability in a community setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 13 credits

**PTRS 665 Pediatric Physical Therapy II 3.5 Credits**

This is the second of two required courses that emphasize the physical therapy management of infants, children and adolescents with disabilities and health conditions across various body systems, and different delivery settings. Didactic material for various system pathologies will be presented. Clinical reasoning applied and best evidence will guide students to choose appropriate examination tools, write meaningful goals and develop a physical therapy plan of care. Child development with an emphasis on functional movement, from the pre-natal period through adolescence will be discussed in the context of physical therapy management of infants, children, and adolescents.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 675 Life Span Development I: Birth to Adolescence 4.0 Credits**

Life Span Development I addresses the physical, cognitive, emotional, and social-cultural characteristics of development. Changes throughout prenatal, infancy, childhood and adolescence are highlighted and red flags are identified. Pediatric examination will be discussed. This course will provide foundational knowledge for Pediatric Physical Therapy evaluation, examination and intervention.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 676 Life Span Development II: Young Adulthood to Older Adulthood 3.0 Credits**

Life Span Development II is a required course for all entry-level Doctor of Physical Therapy students. This course addresses the physical, cognitive, emotional, and social-cultural aspects of aging, and the changes that occur throughout adulthood. Course content will provide foundational knowledge for concurrent and subsequent courses for physical therapy examination and intervention.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**PTRS 680 Geriatric Physical Therapy 3.0 Credits**

This is a required course for all entry-level Doctor of Physical Therapy students. This course addresses the physical, cognitive, emotional, and social-cultural aspects of aging, and the changes that occur throughout adulthood. Course content will provide foundational knowledge for concurrent and subsequent courses for physical therapy examination and intervention.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**PTRS 708 Advanced Manual Therapy Techniques 3.0 Credits**

This course expands the manual therapy content, including mobilization and manipulation techniques taught in the curriculum. Emphasis is on current evidence, implications, technique refinement, and clinical decision-making associated with manual therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT.

**PTRS 710 Advanced and Emerging Technologies in Physical Rehabilitation 3.0 Credits**

Science, technology, and devices are ever-evolving and that is especially true in rehabilitation. This course will expose students to advanced and emerging technologies in physical rehabilitation and enable them to critically evaluate these technologies so that they may most appropriately apply and advocate for their use to improve patient care. Areas that will be covered will span the physical rehabilitation spectrum from neurorehabilitation to precision rehabilitation to outpatient technology. Specific topics will include but are not limited to rehabilitation robotics, exoskeletons, advanced prosthetics, brain-machine interfaces, neuro-stimulation & modulation, regenerative medicine, genetics, epigenetics, augmented & virtual reality, mobile & wearable technology, motion capture & analysis, and telerehab.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 712 Advanced Regional Anatomy 3.0 Credits**

This course is intended to give 3rd year DPT students exposure to structural and functional aspects of a specific region of the human body. The course is self-paced and focused on skilled dissection of the regional anatomy to develop dissections to be used for future instruction. The area to be dissected is driven by students' interests. Students will spend lab time focused on detailed dissection and research of their selected region related to answering a clinical question.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is PT.

**Prerequisites:** PTRS 532 [Min Grade: B] and PTRS 533 [Min Grade: B]

**PTRS 714 Analysis of Running Biomechanics and Interventions for Running Injury 3.0 Credits**

Analysis of Running Biomechanics and Interventions for Running Injury is a lecture and lab format course that focuses on providing foundational information about running injury and analysis of running gait biomechanics that will be used to create interventions for runners with musculoskeletal injury. Students will spend time in the lab assisting and performing examination, data collection, and gait analysis of patients with injuries and formulating evidence-based treatment plans for interventions. This is an elective course that may be taken by entry-level DPT students during the second year of the program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT.

**PTRS 716 Pelvic Health Physical Therapy: A Woman's Health Perspective 3.0 Credits**

This course covers the anatomy and physiology of the pelvic floor with an emphasis on the impact that pathophysiological conditions have on pelvic floor health for cis females across the lifespan. Application of advanced knowledge to pelvic floor health for PT examination, evaluation and intervention strategies are emphasized. Musculoskeletal components of urinary incontinence and urogynecological pain conditions will be discussed and expanded upon as they relate to pelvic floor dysfunction and pelvic health. Physical examination of the pelvic floor will highlight information gained from lectures and provide opportunities to practice. PT evaluation, examination, interventions, and identification of red and yellow flags for pelvic floor dysfunction including trauma history and chronic pain will be discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT.

**PTRS 718 Interprofessional Pain Care 3.0 Credits**

This elective is for health professions students interested in improving their interprofessional skills within the context of chronic pain care. The purpose of this elective is to engage the learner in reflective and critical reasoning about contemporary evidence for interprofessional chronic pain care. The course is taught in a journal club format with guiding questions and team building activities to structure discussion and apply evidence to clinical practice scenarios. Learners will collaborate as an interprofessional team to discuss, reflect, and practice application of knowledge and communication skills. They will explore how to best implement evidence in clinical practice, working within various systemic, reimbursement, and organizational barriers.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**PTRS 720 Rehabilitation Management 3.0 Credits**

This course focuses the student on the organization and administrative aspects of health care delivery. Students knowledge of managerial and service-related business concepts are enhanced in order to increase the efficiency and effectiveness of their and others' practice in today's health care environment.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 721 Teaching Concepts in Rehabilitation 3.0 Credits**

The course provides information on the means of teaching/learning theory, teaching and learning styles, planning of learning experiences, clinical teaching tools and strategies, teaching objectives, effective feedback, and performance evaluation, all within the context of adult education and with the acknowledgment of the clinical experience of the participants.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 733 Advanced Clinical Reasoning 2.0 Credits**

This course emphasizes decision-making strategies for patients with multiple co-morbidities. Meta-cognitive strategies are used during clinical decision making to assist with student transitions from novice to entry-level clinicians.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 740 Issues in Pediatric Health & Rehabilitation 4.0 Credits**

The course addresses issues within health, prevention and rehabilitation, services and outcomes for children, youth and families. Key themes are participation, self-determination and advocacy. Materials addressing intervention, service delivery models and care across the lifespan, leadership, innovation and knowledge translation will be integrated.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 750 Differential Diagnosis 1.0 Credit**

This course uses published evidence to explore the process of differential diagnosis and explain how it is an essential piece of all physical therapy examinations. The recognition of significant medical conditions that fall out of the scope of physical therapy practice is emphasized.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 751 Evidence-Based Practice 3.0 Credits**

The objective of this course is development of skills for finding, analyzing, communicating and applying knowledge and research to physical therapy practice. Students will develop competencies in evidence-based clinical decision making.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 752 Research and Measurement in Physical Therapy 2.0 Credits**

This course introduces stages of research processes including research theory, formulating the research question, literature review, sampling, and experimental controls. Areas of psychometric measurement theory including reliability and validity issues will be examined. This information is applied to common clinical and research tests and measurements related to physical therapy.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 755 Evaluation of Research in Physical Therapy 3.0 Credits**

This course builds upon courses in evidence-based practice and measurement. Emphasis is on understanding the research designs and statistical analyses most often used in biomedical and rehabilitation research; interpretation of statistics; methods of clinical inquiry including case reports, single subject research, and program evaluation; and dissemination of research and scholarship.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 9 credits

**PTRS 758 Evidence-Based Rehabilitation 4.0 Credits**

The focus of this web-based course is on analysis of the evidence for physical (occupational) therapy practice including models and guidelines for practice. Participants development competencies in transfer of knowledge and research into practice, clinical reasoning, and evidence based decision making.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 760 Pediatric Decision Making 4.0 Credits**

The course focuses on evidence-based examination and intervention of children with disabilities within the context of child, family, and environmental factors. The course highlights the role of therapists in promoting the status of the neuromuscular and musculoskeletal systems. The importance of family-centered care, parent-child interactions, and play are explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 761 Pediatric Clinical Application 4.0 Credits**

Pediatric Clinical Application is a primary course in the post-professional pediatric concentration area. Through a problem-based case study format, the course facilitates transfer of knowledge into the specialty practice area of pediatrics and promotes independent learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 762 Women's Health in Physical Therapy 4.0 Credits**

Provides a review of female anatomy and physiology. Emphasis on aspects of examination, evaluation and intervention for selected topics related to women's health across the lifespan, especially during reproductive and menopausal years. Students are encouraged to explore the unique niche physical therapists have in providing health care services for women.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 763 Decision Making in Rehabilitation 4.0 Credits**

This course is designed to provide students with the opportunity to integrate basic and clinical science research in the design of intervention paradigms for patients being served in rehabilitation settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 764 Geriatric Rehabilitation 4.0 Credits**

This course examines the implications of an aging population, effects of age on physiological, kinesiological, social, and psychological function, using evidence as a framework for examination, intervention and clinical decision making, advocacy for patients and caregivers, health promotion and wellness, the impact of Medicare, and pharmacological issues in the elderly.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 765 Spinal Rehabilitation 4.0 Credits**

This course applies an evidence-based approach to answering clinical questions about examination, diagnosis, prevention, and management of spinal and pelvic disorders. Goals are to foster independent, critical thinking based on interpretation of scientific literature and its integration into PT theory and practice and to enhance clinical examination and intervention skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 766 Extremity Rehabilitation 4.0 Credits**

This elective, on-line course explores advanced examination and intervention strategies for the upper and lower extremities. Clinical examination procedures (including clinical imaging), outcome measures, prevention and treatment interventions will be critically analyzed using an evidence-based approach.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 767 Foundations in Hand Therapy 4.0 Credits**

This course introduces the student to the specialized field of hand therapy. The principles of hand therapy included are musculoskeletal tissues and pathology, clinical reasoning, hand examination, splinting principles, physical agents, and therapeutic exercise. Common elbow, wrist, and hand disorders are discussed to integrate the foundation topics into clinical practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 768 Upper Quarter Joint Pathology 4.0 Credits**

This course reviews the common pathologies that effect the articulations and surrounding soft tissues, especially tendons and ligaments. Anatomy, biomechanics, and examination principles for each region, shoulder, elbow, wrist, and hand are discussed. Conservative and post-operative therapeutic management for fractures, dislocations, tendon repairs, ligament injuries, and degenerative disorders are presented.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PTRS 767 [Min Grade: C]

**PTRS 769 Nerve Injuries of the Upper Quarter 4.0 Credits**

This course emphasizes the anatomy and basic science principles for the cervical spine and major peripheral nerves of the upper quarter. Age-related changes and pathophysiology of nerve lacerations and entrapment neuropathies are discussed. Advanced examination skills and interventions, conservative and post-operative, for the peripheral nervous system are presented.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PTRS 767 [Min Grade: C]

**PTRS 770 Diseases That Affect the Hand 4.0 Credits**

Course content emphasizes the impact of disease on hand function, especially with activities of daily living, vocational activities, and recreational activities. The overview includes pathology, clinical presentation, examination techniques and clinical interventions specific to the hand. Additionally, multisystem involvement associated with mutilated hand injuries and pain syndromes is discussed.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PTRS 767 [Min Grade: C]

**PTRS 772 Selected Topics in Pediatrics 1.0-4.0 Credit**

This course is designed to provide the opportunity for advanced content and discussion regarding issues facing the pediatric practitioner. This course is designed to address current issues related to practice in various pediatric settings. Topics are introduced and content delivered, but the emphasis will be on student/instructor interaction and discussion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 4 times for 16 credits

**PTRS 779 Independent Project 1.0-3.0 Credit**

Independent Project provides the student an exposure to physical therapy scholarship and research through participation in a faculty research project or self-directed study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 780 Foundations of School-based Practice 2.0 Credits**

This web-based course is designed to enhance knowledge and competencies of physical therapists in school-based practice. Emphasis on the roles and responsibilities of the physical therapist in educational settings. Participants will develop competencies to support students, families and educational teams.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 781 Advanced Competencies in School-based Practice 2.0 Credits**

This web-based course builds on Foundations of School-base Practice. The focus is on advanced competencies for physical therapists in school-based practice. Emphasis is on innovation in practice, solutions to challenges, and leadership roles as a member of the education team.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**PTRS 786 MHS Final Project I 1.0-2.0 Credit**

Students develop a final project to demonstrate the ability to use current best evidence to evaluate methods of service delivery or interventions at individual or program levels. Completion of an in-depth literature review associated with the project approved by the student's advisory committee is the focus of this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 6 credits

**Restrictions:** Can enroll if major is PT or major is RHAB and program is MHS.

**Prerequisites:** PTRS 501 [Min Grade: C] and RHAB 759 [Min Grade: C] and PTRS 758 [Min Grade: C] and PTRS 721 [Min Grade: C] and PTRS 650 [Min Grade: C] and PTRS 651 [Min Grade: C]



**PTRS 787 MHS Final Project II 1.0-2.0 Credit**

Students conduct a well designed and executed study that addresses service delivery at the individual or program level. The results of the study are presented in manuscript format suitable for dissemination at a professional meeting, in a relevant peer-reviewed journal, or other educational resources used by rehabilitation specialists.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 6 credits

**Restrictions:** Can enroll if major is PT or major is RHAB and program is MHS.

**Prerequisites:** PTRS 786 [Min Grade: C]

**PTRS 791 Clinical Experience I 4.5 Credits**

This course is the first of three required full-time supervised clinical education experiences. This course is the student's opportunity to begin to apply classroom knowledge and laboratory skills with patients and clients. The student also begins to develop as a professional through role modeling by the clinical instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 792 Terminal Clinical Experience II 4.5 Credits**

This course is the second of three required full-time supervised clinical education experiences. The student continues to apply classroom knowledge and laboratory skills and will be involved in all aspects of patient-client management (examination, evaluation, diagnosis, prognosis, intervention, discharge, and outcomes management).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 793 Terminal Clinical Experience III 4.5 Credits**

This course is a final, full-time, supervised clinical education experience. The student attains mastery of knowledge, skills, and attitudes to effectively and safely practice in today's healthcare environment. The student will experience the multiple roles of the physical therapist, such as those related to administration and health promotion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 794 Clinical Experience I 1.5 Credit**

This course is the first of three required full-time supervised clinical education experiences. This course is the student's opportunity to begin to apply classroom knowledge and laboratory skills with patients and clients. The student also begins to develop as a professional through role modeling by the clinical instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 795 Terminal Clinical Experience II 2.0 Credits**

This course is the second of three required full-time supervised clinical education experiences. The student continues to apply classroom knowledge and laboratory skills and will be involved in all aspects of patient-client management (examination, evaluation, diagnosis, prognosis, intervention, discharge, and outcomes management).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 6 credits

**PTRS 796 Terminal Clinical Experience III 4.5 Credits**

This course is a final, full-time, supervised clinical education experience.

The student attains mastery of knowledge, skills, and attitudes to effectively and safely practice in today's healthcare environment. The student will experience the multiple roles of the physical therapist, such as those related to administration and health promotion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 797 Clinical Internship I 2.0 Credits**

This course is the first portion of an extended full time clinical internship.

Clinical Internship I includes the first 12 weeks of full-time supervised clinical education. Clinical Internship II will continue this sequence for an additional 11 weeks and is required for completion of the clinical education sequence. The student will apply classroom knowledge and laboratory skills and will be involved in all aspects of patient-client management (examination, evaluation, diagnosis, prognosis, intervention, discharge, and outcomes management).

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 6 credits

**PTRS 798 Clinical Internship II 4.5 Credits**

This course is the continuation of Clinical Internship I. In this course, the student is expected to demonstrate competence in the comprehensive management of the simple patient and occasional guidance in managing the complex patient.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 15 credits

**PTRS 799 Essentials of Physical Therapy 0.5-3.0 Credits**

Designed to remediate students who require intensive instruction to achieve acceptable performance in the Doctor of Physical Therapy Program. Addresses students' individual performance deficiencies. Credits assigned based on extent of remediation required. Specific requirements are outlined in a learning contract.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 9 credits

**PTRS I699 Independent Study in Physical Therapy Rehab Science 1.0-6.0 Credit**

Independent study is offered to DPT graduate students to afford them the opportunity to develop various components of research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 6 times for 42 credits

**PTRS I799 Independent Study in Physical Therapy Rehab Science 1.0-6.0 Credit**

Independent study is offered to DPT graduate students to afford them the opportunity to develop various components of research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 6 times for 42 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS 1899 Independent Study in Physical Therapy Rehab Science 1.0-6.0 Credit**

Independent study is offered to DPT graduate students to afford them the opportunity to develop various components of research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 6 times for 42 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**PTRS T580 Special Topics in Physical Therapy Rehabilitation Science 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**PTRS T680 Special Topics in Physical Therapy Rehabilitation Science 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

**PTRS T780 Special Topics in Physical Therapy Rehabilitation Science 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated multiple times for credit

# Physician Assistant

## Courses

**PA 540 Clinical Anatomy 5.0 Credits**

This five (5) credit lecture and laboratory course is tailored to the specific needs of physician assistant students. It reviews the fundamentals of gross anatomy, and discusses the relationships between structure and function in a regional anatomy approach and major clinical applications of anatomic relationships. Material is coordinated with the PA 544 Clinical Assessment course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 542 [Min Grade: B] (Can be taken Concurrently)

**Corequisite:** PA 544

**PA 542 Patient Communication 2.0 Credits**

This lecture and seminar course provides instruction in communication skills for the effective exchange of information with patients. Addressed in the course are patient-provider collaboration, health literacy, and communication techniques for patients across cultural and generational groups, and counseling techniques for patient education, treatment adherence, and health promotion.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 543 Ethical Issues in Physician Assistant Practice 2.0 Credits**

This is a lecture and seminar course addressing ethical and professional issues in Physician Assistant practice. Topics include medical ethics, ethical decision-making, professional responsibility, and commitment to patients' welfare. The link between health as a human right and medical ethics is explored.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 544 Clinical Assessment 5.0 Credits**

This course provides the PA student with the knowledge, demeanor, and motor skills required to professionally and proficiently elicit thorough medical histories and perform precise physical examination techniques for each body system. Accurate, organized recordings of clinical findings from patient encounters in the hospital setting are required.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Corequisite:** PA 540

**PA 545 Physician Assistant Practice 1.0 Credit**

Physician Assistant Practice is a one (1) credit lecture course that introduces the concept, history, and future directions of the PA profession, and discusses professional practice issues and theories of leadership applicable to PA practice. Stewardship and strategies for effecting change as a leader are discussed in the context of cases applicable to PA professional settings.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 546 Health Policy for Physician Assistant Practice 2.0 Credits**

This course explores the US health care system and health policy issues related to the costs of health care, inequities in quality and access to care, and current US policies. The role of Physician Assistants in the health care system are examined along with issues related to malpractice, reimbursement, and quality assurance.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 547 Evidence Based Medicine for Physician Assistants 3.0 Credits**

This is a three (3) quarter credit course designed to introduce PA students to evidence-based medicine, epidemiologic principles and research methodologies for application to primary care clinical practice. The course content includes an overview of epidemiologic and research concepts, ethics and the roles of politics and culture in research, quantitative and qualitative research methods and designs; and levels of scientific evidence for clinical practice. Through evaluation of published research and national practice guidelines, the skills of evidence-based practice are introduced. The course is lecture-based and utilizes cooperative learning strategies to engage students in individual and group inquiry learning outside the classroom.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 548 Principles of Medical Science I 2.0 Credits**

This course is the first of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease. Clinical applications enhance understanding and introduce the skill of clinical reasoning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 540 [Min Grade: B]

**Corequisites:** PA 551, PA 556, PA 559

**PA 549 Principles of Medical Science II 2.0 Credits**

This course is the second of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease. Clinical applications enhance understanding and introduce the skill of clinical reasoning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 548 [Min Grade: B]

**Corequisites:** PA 552, PA 557, PA 560

**PA 550 Principles of Medical Science III 2.0 Credits**

This course is the last of three courses which provide the physiologic foundation for clinical courses. Emphasizing the complex nature of bodily functions, the course reviews normal physiology and provides a bridge to the concepts of pathophysiology that underlie dysfunction and disease in geriatrics, women's health, pediatrics, emergency medicine, and surgery while refining clinical reasoning skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 548 [Min Grade: B] and PA 549 [Min Grade: B]

**Corequisites:** PA 553, PA 558, PA 561

**PA 551 Pharmacology and Therapeutics I 3.0 Credits**

This is the first in a series of three courses to provide Physician Assistant students with basic knowledge in pharmacology and therapeutics. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics are discussed for applications to primary care practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Corequisites:** PA 548, PA 556, PA 559

**PA 552 Pharmacology and Therapeutics II 2.0 Credits**

This is the second in a series of three courses to provide Physician Assistant students with basic knowledge in pharmacology and therapeutics. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics are discussed for applications to primary care practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 551 [Min Grade: B]

**Corequisites:** PA 549, PA 557, PA 560

**PA 553 Pharmacology and Therapeutics III 2.0 Credits**

The third in a series of three courses, this course provides Physician Assistant students with basic knowledge in pharmacology and therapeutics for specific patient populations. Principles of pharmacodynamics, pharmacokinetics, and clinical therapeutics across the lifespan are discussed for applications to primary care practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 551 [Min Grade: B] and PA 552 [Min Grade: B]

**Corequisites:** PA 550, PA 558, PA 561

**PA 554 Biopsychosocial Issues in Patient Care 5.0 Credits**

This course introduces the PA student to the biopsychosocial model of patient care. Covering topics ranging from normal psychological development and human sexuality across the lifespan to responses to stress, injury, illness, and death, the course also introduces psychiatric disorders common to primary care practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 556 Clinical Medicine I 5.0 Credits**

This is the first of two courses designed to prepare the PA student with a body-system, problem-oriented approach to diseases encountered in primary care. Discussion of the etiology, epidemiology, pathophysiology, clinical manifestations, and diagnostic studies for common disorders allows the PA student to problem solve through clinical reasoning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Corequisites:** PA 548, PA 551, PA 559

**PA 557 Clinical Medicine II 5.0 Credits**

This is the second of two courses designed to prepare the PA student with a body-system, problem-oriented approach to diseases encountered in primary care. Discussion of the etiology, epidemiology, pathophysiology, clinical manifestations, and diagnostic studies for common disorders allows the PA student to problem solve through clinical reasoning.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 556 [Min Grade: B]

**Corequisites:** PA 549, PA 552, PA 560

**PA 558 Topics in Clinical Practice 5.0 Credits**

The course prepares the PA student for clinical rotations through lecture and a problem-oriented approach to disorders in geriatrics, women's health, pediatrics, emergency medicine, and surgery.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 556 [Min Grade: B] and PA 557 [Min Grade: B]

**Corequisites:** PA 550, PA 553, PA 561

**PA 559 Clinical Skills I 2.0 Credits**

This is the first of three courses designed to prepare the PA student with a problem-oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills application laboratories based on clinical scenarios to facilitate skill development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 544 [Min Grade: B]

**Corequisites:** PA 548, PA 551, PA 556

**PA 560 Clinical Skills II 2.0 Credits**

This is the second in a series of three courses designed to prepare the PA student with a problem-oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills application laboratories based on clinical scenarios to facilitate skill development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 559 [Min Grade: B]

**Corequisites:** PA 549, PA 552, PA 557

**PA 561 Clinical Skills III 4.0 Credits**

This is the third in series of three courses designed to prepare the PA student with a problem oriented, clinical approach to the evaluation, diagnosis, and management of common primary care disorders. The course uses clinical reasoning and clinical skills laboratories based on clinical scenarios to facilitate skill development.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 559 [Min Grade: B] and PA 560 [Min Grade: B]

**Corequisites:** PA 550, PA 553, PA 558

**PA 570 Clinical Assessment Competency 1.0 Credit**

Clinical Assessment Competency is a required course for any PA student who experiences an interruption in the usual sequence of didactic and clinical training. The course provides the forum for the student to demonstrate competencies in knowledge and skills germane to clinical assessment requisite to patient evaluation and clinical practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 544 [Min Grade: B]

**PA 571 Competency for Clinical Training 1.0 Credit**

Competency for Clinical Training is a one-credit pass/fail course required for any physician assistant student who experiences an interruption in the usual sequence of didactic or clinical training in the program after the second quarter. The course provides the forum for the student to demonstrate competencies requisite for continued didactic and/or clinical training. The PA student undertakes supervised, independent study guided by identified areas of individual need to meet the course competencies.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 2 credits

**Restrictions:** Can enroll if major is PA.

**PA 581 Research Methods and Designs 5.0 Credits**

The course introduces the knowledge and skills necessary to evaluate published research for clinical practice. Topics in this web-based course are research concepts, hypotheses and questions; literature searches and reviews; ethics in research; qualitative and quantitative research methods and designs including sampling, data collection and interpretation; and levels of scientific evidence.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 582 Principles of Evidence-Based Practice 5.0 Credits**

With an emphasis on developing skills for clinicians to critically appraise the validity of medial literature, this online course offers a critical analysis of several types of research studies for use in clinical practice. The course requires knowledge and application of basic research and statistical concepts, and online searching skills.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 581 [Min Grade: C]

**PA 584 Health Policy 5.0 Credits**

This web-based course explores health policy issues relating to the cost of health care and disparities in access and quality of care, and strategies to address the deficiencies in the US health care system. Each student critiques a health policy imperative and proposes solutions to remedy the issues identified in the critique.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 585 Leadership and Stewardship 5.0 Credits**

Key concepts of leadership with a focus on servant and visionary leadership are discussed in this online course. Stewardship and strategies for effecting change as a leader are explored through cases applicable to professional settings. Synthesis of course content is evidenced in the compilation of a professional leadership portfolio.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**PA 629 Internal Medicine Rotation 5.0 Credits**

The Internal Medicine Rotation is a clinical course that provides the PA student with adult patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]



**PA 630 Pediatrics Rotation 5.0 Credits**

The Pediatrics Rotation is a clinical course that provides the PA student with pediatric patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

**PA 631 Women's Health Rotation 5.0 Credits**

The Women's Health rotation is a clinical course that provides the student with prenatal and gynecological patient care experience under the supervision of a licensed medical provider. Students apply knowledge and skills learned in the didactic year to patient evaluation and begin to apply patient management strategies to patients in an assigned clinical setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

**PA 632 Behavioral Medicine Rotation 5.0 Credits**

The Behavioral Medicine Rotation is a clinical course that provides the PA student with psychiatric/behavioral health patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and (PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B])

**PA 633 Surgery Rotation 5.0 Credits**

The Surgery Rotation is a clinical course that provides the PA student with surgical patient care experience under the supervision of a licensed medical practitioner. Students apply knowledge and skills learned in the didactic year to patient evaluation, and begin to apply patient management strategies to patients in an assigned clinical setting.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and (PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B])

**PA 634 Emergency Medicine Rotation 5.0 Credits**

The Emergency Medicine Rotation for the clinical phase PA student provides experiential learning opportunities to a wide variety of emergency health care problems in an emergency department setting and to understand the principles of emergency medicine. Students are introduced to medical and surgical problems commonly encountered in the emergency department setting. The emphasis is on gaining outpatient procedural skills, triage patients, and learning to recognize and begin treatment of emergent medical and surgical problems.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 550 [Min Grade: B] and PA 553 [Min Grade: B] and PA 558 [Min Grade: B] and PA 561 [Min Grade: B] and PA 546 [Min Grade: B]

**PA 635 Primary Care Practicum I 10.0 Credits**

The Primary Care Practicum I is a clinical course that provides the PA student with patient care experience in an ambulatory medicine setting under the supervision of a licensed medical practitioner. Students refine clinical skills learned in preparation for practice and increase knowledge of disease mechanisms and patient management for common primary care disorders.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 629 [Min Grade: B] and PA 630 [Min Grade: B] and PA 631 [Min Grade: B] and PA 632 [Min Grade: B] and PA 633 [Min Grade: B] and PA 634 [Min Grade: B]

**PA 636 Graduate Project I 3.0 Credits**

Graduate Project I is a three (3) credit course intended to prepare the graduate candidate for the development of a project that is related to the candidate's research interests. The Graduate Project provides students with the opportunity to creatively address a proven deficiency in the realms of clinical medicine, educational medicine (patient or medical provider material), or any other area that will further the student's and the profession's knowledge and/or resource base.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 547 [Min Grade: B] (Can be taken Concurrently)

**PA 637 Primary Care Practicum II 10.0 Credits**

The Primary Care Practicum II is a clinical course in which PA students continue to progress to higher levels of clinical responsibility for patient evaluation and management as clinical skills, medical knowledge, and professional confidence coalesce under the supervision of licensed medical providers. This course is the final clinical experience in the PA professional training program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 635 [Min Grade: B]

**PA 638 Graduate Project II 3.0 Credits**

Graduate Project II is a three (3) credit course sequenced after the Graduate Project I course in which the graduate student further develops and implements the project proposed in the Graduate Project I course. Continued review and critique of the literature related to the topic area are required to expound the project. The student works with a faculty advisor who will provide guidance and feedback.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 636 [Min Grade: B]

**PA 641 Clinical Update 5.0 Credits**

This web-based course explores recent advances in clinical knowledge and recommendations for clinical practice, and develops the student's lifelong learning skills. The student undertakes a broad review of clinical medicine and identifies areas for enhancement of clinical knowledge and skills through the use of reputable electronic information sources.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 582 [Min Grade: C]

**PA 680 Summative Remediation 1.0 Credit**

Summative Remediation is one credit course which provides an intensive review of major topics covered in the didactic and clinical phases of the PA program for any PA student who has not achieved minimum passing grades on two administrations of the Summative Examination /OSCE.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 637 [Min Grade: C]

**PA 697 Independent Study 3.0-6.0 Credits**

Independent Study is a variable (3-6) credit course in which the student works with in assigned advisor to review and catalogue the published literature related to the cognate topic of interest. The student composes a literature review and gap analysis, and critically appraises articles as the basis for the design and outline of the capstone project proposal within this course.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PA.

**Prerequisites:** PA 582 [Min Grade: C]

## Physics

### Courses

**PHYS 501 Mathematical Physics I 3.0 Credits**

Covers various topics in mathematical physics and their numerical implementations, including calculus of residues and further applications of complex variables; vector spaces, Fourier series, and generalized functions; integral transforms; theory and application of ordinary and partial differential equations; special functions; boundary value and initial value problems; Green's function theory and applications; and integral equations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 502 Mathematical Physics II 3.0 Credits**

Continues PHYS 501.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 506 Dynamics I 3.0 Credits**

Covers Lagrangian-Hamiltonian formulations, variational principles, particle kinematics and dynamics, and small oscillations and normal modes.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 511 Electromagnetic Theory I 3.0 Credits**

Covers electrostatics, magnetostatics, electromagnetic waves, boundary value problems of electromagnetic theory, theory of Fresnel and Fraunhofer diffraction, classical electrodynamics, special relativity, waveguides, and radiation theory.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 512 Electromagnetic Theory II 3.0 Credits**

Continues PHYS 511.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 516 Quantum Mechanics I 3.0 Credits**

Covers axioms of quantum mechanics and the basic mathematical tools, one-dimensional Schrodinger equation, spin and general two-level systems, harmonic oscillator, general theory of angular momentum, hydrogen atom, elements of atomic spectroscopy, quantum theory of scattering, electron spin, addition of angular momenta, stationary and time-dependent perturbation theory, fine and hyperfine structure of the hydrogen atom, interaction of light and matter, and Dirac Equation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 517 Quantum Mechanics II 3.0 Credits**

Continues PHYS 516.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 518 Quantum Mechanics III 3.0 Credits**

Continues PHYS 517.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 521 Statistical Mechanics I 3.0 Credits**

Covers thermodynamics; probability theory; Gibbs-Boltzmann formulation; relation between density of states and entropy; partition functions; ensembles; Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac, phonon, photon, and electron systems; and phase transitions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 522 Statistical Mechanics II 3.0 Credits**

Continues PHYS 521.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 531 Galactic Astrophysics 3.0 Credits**

The goal of this course is to present an introduction to the processes responsible for the formation, structure, evolution, and present-day appearance of the Milky Way and other galaxies. Using the Milky Way Galaxy as a guide, we will develop analytical and numerical tools to help us understand the properties of these magnificent objects, near and far. For the most part, these tools will be based on familiar concepts in classical mechanics and thermodynamics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 532 Cosmology 3.0 Credits**

Covers cosmological models, age and distance scales in the universe, the hot big bang, primordial nucleosynthesis, inflation, baryonic and non-baryonic matter, galaxy formation and evolution, dynamics of structure formation, statistics of cosmological density fields, and cosmic background fluctuations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 540 Big Data Physics 3.0 Credits**

This course provides the framework for physics students at all levels to begin interacting with large data sets in physics. Data analysis will be done using Python tools, including standard libraries for machine learning. Practical application of classification and regression techniques for both unsupervised and supervised data are emphasized, in addition to dimensionality reduction techniques and time-domain analysis. An introduction to statistical methods, Bayesian inference, and Markov-chain Monte Carlo methods provide a foundation for application of machine learning tools.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 553 Nanoscience 3.0 Credits**

Physical basis of nanoscale materials and systems including discussion of low-dimensional structures and their physical properties, the self-assembly of nanostructures, applications in various fields of science and technology, and techniques for fabrication and characterization on the nanoscale.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 554 Quantum Technology 3.0 Credits**

The course provides an applied physics/engineering treatise of the fundamental building blocks of quantum computers. The topics include the physics of quantum computing, different quantum bit (qubit) technologies (ion trap/ superconducting/ semiconductor spin qubits), full hardware and system level aspects, the state-of-the-art, challenges, and near future outlook of the paradigm.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 558 Quantum Information 3.0 Credits**

Introduction to the principles of quantum information and quantum information processing. Covers the basic postulates of quantum physics (e.g. superposition, entanglement, measurement) necessary for quantum computing and examines the way in which quantum information is stored and processed (e.g. quantum bits, quantum gates, quantum algorithms).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 561 Biophysics 3.0 Credits**

A one-course introduction to Biophysics. Topics may include structure of biomolecules, protein stability, electron transfer, protein folding, protein substrates, allostery, and self-assembly. No biological background is assumed.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 562 Computational Biophysics 3.0 Credits**

Covers mathematical applications of biological simulations. Using classical and statistical mechanics, we will cover topics including atomic scale simulations, statistical sampling, and models of molecular cellular systems and living processes.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 571 Nonlinear Dynamics 3.0 Credits**

This course introduces the basic ideas of the new science of nonlinear dynamics and develops methods to carry out fundamental computations of fractal dimension, Lyapunov exponents, and topological invariants.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 576 Introduction to Particle Physics 3.0 Credits**

This course provides an introduction to the physics of fundamental particles. Topics include the fundamental forces, quarks and leptons, Feynman diagrams, symmetries and conservation laws, relativistic kinematics, bound states, and experimental methods.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 601 Advanced Quantum Mechanics I 3.0 Credits**

Relativistic one-particle quantum mechanics; Dirac theory radiation theory; free fields; interactions; quantum electrodynamics; introduction to elementary particle theory; quantum chromodynamics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 626 Solid State Physics I 3.0 Credits**

Crystal lattices; Bloch theorem; classical and quantum theory of lattice vibrations; phonons, electron states in solids; calculation of energy bands and Fermi surfaces; dynamics of electrons in metals; electron-electron interactions; plasmons; electron-phonon interactions; polarons; semiconductor and insulator crystals; transport properties of solids; thermal properties; optical properties; magnetism; magnons; superconductivity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 627 Solid State Physics II 3.0 Credits**

Crystal lattices; Bloch theorem; classical and quantum theory of lattice vibrations; phonons, electron states in solids; calculation of energy bands and Fermi surfaces; dynamics of electrons in metals; electron-electron interactions; plasmons; electron-phonon interactions; polarons; semiconductor and insulator crystals; transport properties of solids; thermal properties; optical properties; magnetism; magnons; superconductivity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 631 Relativity Theory I 3.0 Credits**

Covers particle and field dynamics in special relativity, tensor calculus for Riemannian space-time manifolds, Einstein's gravitational field equations and their principal solutions in general relativity, black holes, general relativistic variational principles, big bang cosmology, and quantization of general relativity.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 676 Nuclear Physics I 3.0 Credits**

Review of systematics of experimental phenomena; nuclear structure theory, including shell model, interacting-boson model, Hartree-Fock approaches, and collective models; intermediate energy theory and experiment, including electron, nucleon, and pion scattering and reactions; group theoretical approaches; interfaces of quark-meson-nucleon coexistence.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 677 Nuclear Physics II 3.0 Credits**

Review of systematics of experimental phenomena; nuclear structure theory, including shell model, interacting-boson model, Hartree-Fock approaches, and collective models; intermediate energy theory and experiment, including electron, nucleon, and pion scattering and reactions; group theoretical approaches; interfaces of quark-meson-nucleon coexistence.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 679 The Standard Model 3.0 Credits**

This class will focus on classical fields in general, as well as the relationship between classical and quantum fields. It will include discussions of special relativity, group theory, and simple Lie groups, as well as the theoretical development of electromagnetism, the weak, and strong forces. The course will develop electroweak unification in particular, and unified theories in general. It will conclude with a discussion of Grand Unified Theories.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PHYS 898 Master's Thesis 1.0-9.0 Credit**

This course is open only to the students pursuing the MS degree in Physics, who are in the MS thesis track. Requires supervised research at the master's level.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 5 times for 54 credits

**PHYS 997 Research 1.0-12.0 Credit**

Research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS 998 Ph.D. Dissertation 1.0-12.0 Credit**

Ph.D. dissertation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS I599 Independent Study in PHYS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS I699 Independent Study in PHYS 1.0-6.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 4 times for 12 credits

**PHYS I799 Independent Study in PHYS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS I899 Independent Study in PHYS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS I999 Independent Study in PHYS 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS T580 Special Topics in Physics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS T680 Special Topics in Physics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS T780 Special Topics in Physics 0.0-9.0 Credits**

Assignment of readings and study in current topics of experimental and theoretical interest.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS T880 Special Topics in Physics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PHYS T980 Special Topics in Physics 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Physics - Environmental Science Courses



# Political Science

## Courses

### **PSCI 510 Civilians in Armed Conflict 4.0 Credits**

This course considers questions relating to civilians, and civilian protection, during armed conflict. We examine the definition and causes of armed conflict, before turning to key issues such as civilian coping strategies during armed conflict, common patterns of violence against civilians, legal and policy remedies for human rights violations, and the politics of human rights advocacy.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### **PSCI 553 International Human Rights 4.0 Credits**

This course examines the origin of the international human rights movement after World War II, and discusses key issues confronting the international community today. These include genocide, political repression, the rights of women, and religious and cultural minorities. It also considers the moral basis of the rights ideal.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### **PSCI 560 International Law 4.0 Credits**

The legalization of world politics is one of the most interesting and potentially transformational trends in international relations. Across substantive areas, including matters of security, trade, environmental affairs, and human rights, international law is playing an increasing role in international politics. The course considers theoretical approaches and contemporary events to better understand where international law comes from, how it is designed, and why states comply (or not). In addition, we consider contemporary debates and challenges, including the contested jurisdiction of international courts, the immunity of the United Nations, evolving law on humanitarian military intervention, and the fragmentation of international law in environmental affairs, among other topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

### **PSCI I599 Independent Study in PSCI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

### **PSCI I699 Independent Study in PSCI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

### **PSCI I799 Independent Study in PSCI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

### **PSCI I899 Independent Study in PSCI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

### **PSCI I999 Independent Study in PSCI 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

# Production Operations Management

## Courses

### **POM 510 Operations and Supply Chain Management 2.0 Credits**

This course is an introduction to some selected topics in the field of production and operations management. It covers process analysis, quality management, queueing and capacity management, lean operations, inventory management, aggregate planning and supply chain management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### **POM 601 Operations Management 3.0 Credits**

This course is an introduction to the field of production and operations management (POM). Production and operations activities such as forecasting, capacity planning, inventory control, scheduling, and ensuring quality are discussed from the supply chain perspective. The philosophies and characteristics of lean operations and responsive manufacturing/service systems are highlighted.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** STAT 601 [Min Grade: C] or STAT 610 [Min Grade: C] or ECON 540 [Min Grade: C]

### **POM 610 Supply Chain Management I 3.0 Credits**

This course, as the first of a two part comprehensive, in-depth coverage of Supply Chain Management, provides, first, a basic understanding of the operations function in organizations and the associated strategic, tactical and operational aspects of this functional area. Secondly, the nature and role of supply chains within the context of the major organizational functions, especially in the light of recent developments in manufacturing, transportation, information, communication and other relevant technologies, along with some supply chain policy formulation and decision making issues, receive thorough treatment. Topical coverage includes detailed discussions and problem solving in the areas of sales and operations planning, inventory management, MRP/DRP, operations scheduling, etc.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**POM 615 Supply Chain Management II 3.0 Credits**

This is a continuation of SCM I (POM 610). The remainder of the strategic, tactical and operational issues of Supply Chain Management are covered in this course. Building on and extending the concepts developed in the previous course, policy questions and decision making technologies relevant for designing and managing supply chains, operating in an intensively competitive global business environment, are addressed in detail. Some of the topics covered in this course include supply chain coordination, transportation planning, sourcing and supply chain contracts, revenue management, supply network design, sustainability and social/environmental issues, etc.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 610 [Min Grade: C]

**POM 624 Management of Service Firms 3.0 Credits**

Analyzes service firms (e.g., hotels, restaurants, transportation companies, and banking firms), including relevant decision models, such as manpower scheduling, and case studies.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**POM 628 Advanced Supply Chain Management 3.0 Credits**

This course covers some selected topics on supply chain management at the advanced level, including sourcing and procurement, network designs in supply chains, closed-loop supply chains as well as sustainable supply chains. Advanced analytical models on multi-echelon supply chains, supplier selection and others, together with case studies, are the main focuses of the course. The current best practices on the selected topics will also be discussed.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 615 [Min Grade: C] and OPR 601 [Min Grade: C] and STAT 610 [Min Grade: C]

**POM 630 Transportation & Logistics Management 3.0 Credits**

This course focuses on the role of the Transportation/Logistics function in complex supply chain networks. Strategic aspects of transportation infrastructure, as well as tactical planning and operational decision making, involving transportation and related activities, will be emphasized, towards gaining sustainable economic efficiencies and achieving competitive advantage in today's intensely competitive global economic environment. Topics covered include various modes of goods movement, the effects of public policy and regulations, costing and pricing of transportation activities, transportation planning/execution decisions and the inter-relationships between transportation/logistics and the other major supply chain activities across functional boundaries.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**POM 642 Sustainable Supply Chain Management and Logistics 3.0 Credits**

This course presents management case studies on designing, evaluating, and improving supply chain operations with the goal of promoting environmental, social, and economic sustainability. Topics include product and process design for sustainability, cradle-to-cradle design, "green" sourcing and procurement, reverse logistics and closed-loop supply chains, supply chain coordination for sustainability, end-of-life management, facilities location and design, sustainable transportation and logistics solutions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**POM 643 Managing Queues for Service Operations 3.0 Credits**

The emphasis of this course is on waiting time management. The course will introduce quantitative methods to analyze queueing models and build insights and intuition about various performance metrics in queueing systems. Specifically, the course will establish an understanding of the impact of variability and utilization on the waiting time, and demonstrate the wide applicability of queueing models across various industries. The course will draw examples and case studies from a wide array of applications in service industries such as restaurants, entertainment, health care, insurance, financial institutions, and air transportation. The analytical tools covered in class aim to guide appropriate process design choices to improve system performance.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (STAT 601 [Min Grade: C-] or ECON 540 [Min Grade: C-]) and POM 624 [Min Grade: C-]

**POM 644 Revenue Management 3.0 Credits**

The course will convey to future business leaders innovative ways to boost profitability. It will explore how firms can improve the operational management of the demand for their products (goods or services) to more effectively align it with their supply through business analytics lenses. It will introduce quantitative methods to improve decision-making, with special emphasis on spreadsheet modeling and analysis.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** OPR 601 [Min Grade: C-] and (STAT 601 [Min Grade: C-] or STAT 610 [Min Grade: C-] or ECON 540 [Min Grade: C-] or BSAN 601 [Min Grade: C-])

**POM 645 Supply Chain Analytics 3.0 Credits**

This course covers the critical decisions in a supply chain through data analysis and optimization techniques. It explores real-world applications in various areas of supply chain management, including supply chain network design, distribution and logistics, and inventory strategies. Students will learn to solve practical supply chain problems by applying theoretical principles and the usage of data-driven models and optimization tools.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 510 [Min Grade: C+] or POM 610 [Min Grade: C+]

**POM 770 Supply Chain Management and Logistics Capstone Project 3.0 Credits**

This course consists of an industry project to provide practical experience in identifying and solving supply chain management and logistics problems.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 12 credits

**Prerequisites:** POM 624 [Min Grade: C] and POM 628 [Min Grade: C]

**POM 900 Decision Processes in Operations Management 3.0 Credits**

This course is a broad survey of managerial decision making areas within the operations function of organizations. The focus is on design or strategic, as well as statistical and control issues, with a strong emphasis on mathematical modeling of decision processes and systems.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** OPR 922 [Min Grade: C]

**POM 922 Inventory Models Seminar 3.0 Credits**

Major managerial and economic issues involving inventory management in manufacturing and services firms are examined in detail. The focus is on the development and application of operations research and applied probability based mathematical modeling approaches towards inventory decisions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 900 [Min Grade: C]

**POM 925 Supply Chain Management Seminar 3.0 Credits**

Supply chain management encompasses all the physical and information flows that play a role in satisfying customer demand for goods and services. This course emphasizes mathematical approaches towards the development and implementation of solutions in the various strategic, tactical and operational aspects of integrated supply chains.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 922 [Min Grade: C]

**POM 930 Scheduling Theory 3.0 Credits**

This course focuses on issues of scheduling resources in organizations. In particular, problems that arise in operations, employee and project scheduling will receive attention. The major emphasis is on mathematical modeling techniques that aid and support managerial decisions in this area.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** POM 900 [Min Grade: C]

**POM 990 Service Operations Management 3.0 Credits**

This course focuses on services management in general and service operations in particular. It explores the elements that unite services that differentiate service processes from manufacturing processes, and that differentiate various types of services from each other. It covers strategic and tactical issues associated with designing and managing service operations, and it provides tools to help assess, design and improve processes, and establish systems to help ensure an excellent customer experience.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is PhD.

**Prerequisites:** POM 900 [Min Grade: C]

**POM 997 Research Activity for PhD Students in STAT 0.5-12.0 Credits**

PhD candidates in Decision Sciences and MIS in their second year undertake research activity with their advisor prior to defending their dissertation proposal. This course is designated to record that activity. The student is expected to conduct all major numerical studies and provide all theoretical support for their work, in the case of analytical modeling research, or to have built the model and started on the data collection, in the case of empirical research. It is expected that upon completion of this requirement, the student will make any final minor edits and submit the paper to a leading conference, preferably a referred one, by the end of the summer quarter.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM I599 Independent Study in POM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM I699 Independent Study in POM 0.5-4.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM I799 Independent Study in POM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM I899 Independent Study in POM 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM I999 Independent Study in POM 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**POM T580 Special Topics in POM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM T680 Special Topics in POM 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM T780 Special Topics in POM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM T880 Special Topics in POM 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**POM T980 Special Topics in POM 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Professional Studies

### Courses

**PRST 501 Communication for Professionals 3.0 Credits**

This course covers applications of the communication discipline in professional settings. Students explore and assess the role of organizational, interpersonal, non-verbal, group, and employment communications in today's professional world. The main goal is to provide students with the tools necessary to become effective communicators in the workplace.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 503 Ethics for Professionals 3.0 Credits**

This course will focus on the application of ethical principles to organizational systems and decision-making. Emphasis will be placed on how ethical principles affect and are applied to policy-making, leadership behavior, systems of communication, technology use, and systems of organization.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 504 Introduction to Research Methods & Design 3.0 Credits**

This course presents a systematic approach to managerial methods of conducting organizational research and analysis. Students will undergo the managerial research process of specifying the problem; translating the problem into specific research questions; designing the data collection and methodology; collecting, analyzing, and interpreting data; and reporting research results and recommendations.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 603 Communicating in Virtual Teams 3.0 Credits**

This course explores the roles of virtual teams and allows students to experience the opportunities and challenges associated with communicating in a virtual environment.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 612 Data Analysis and Interpretation 3.0 Credits**

This course covers the use of a computerized statistical analysis tool to calculate parametric and non-parametric statistics. Students will use creative and critical thinking skills to interpret, communicate, and defend results.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PRST 504 [Min Grade: C]

**PRST 615 Program Evaluation 3.0 Credits**

The course is designed to have students apply qualitative and quantitative methods to frame and implement an evaluation capable of being implemented in a broad range of for-profit and non-profit organizational settings, including those found in education, health care, government and private sector businesses. Students will study the purposes and models of program evaluation, roles of the evaluator and stakeholders, and address ethical issues associated with an evaluation. To gain practical experience with "continuous program improvement," students will design an evaluation of an existing program.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 640 Policy Analysis 3.0 Credits**

The course analyzes the entire process of policy agenda-setting, initiation, decision-making, implementation, evaluation and assessment. Students will be equipped with tools to analyze and understand the entire process of policy formation in any public or private enterprise. The skills developed in the course can be used in many professional fields.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 655 The Art & Science of Influencing Others 3.0 Credits**

This course will focus on the art and science of influencing others. In both our personal and professional lives, negotiation is an essential skill, and different approaches are required for different situations. Through lectures, readings, and simulated experiences, students will develop an understanding of the concepts, strategies, and tactics of negotiation, as well as the subtleties necessary to effectively influence those around them to achieve desired results.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit



**PRST 670 Fostering Diversity and Inclusion in the Workplace 3.0 Credits**

Diversity in the workplace has moved beyond calculating a broad range of employee demographics. Employers are focusing on including and elevating diverse voices and diverse perspectives at the table to create more innovative services and products to gain a competitive edge. Abundant evidence demonstrates that diverse teams are more creative and productive than those characterized by homogeneity. But, inclusion cannot happen in a vacuum. Leadership must foster and support diversity and inclusion to create an environment where all employees are empowered to be productive and innovative. Students will begin with a historical look at workplace diversity and inclusion, and examine companies with varying degrees of success in fostering diversity and inclusion--and consumer trust-- learning from successes/failures.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**PRST 700 Capstone I: Project Exploration 1.5 Credit**

The first of a two-course sequence in which students create a relevant, full-scale project in an area of interest that will showcase the student's learned professional skills and knowledge. Students complete four deliverables that will form the foundation for PRST 701.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PRST 501 [Min Grade: B] and PRST 503 [Min Grade: B] and PRST 504 [Min Grade: B] and PRST 603 [Min Grade: B] and PRST 612 [Min Grade: B] and PRST 615 [Min Grade: B] and PRST 640 [Min Grade: B] and PRST 655 [Min Grade: B] and ORGB 625 [Min Grade: B] and ORGB 631 [Min Grade: B]

**PRST 701 Capstone II: Topical Analysis 4.5 Credits**

The second of a two-course sequence allows students to integrate skills and knowledge learned in the classroom with his/her experience to research and report on a specific professional area of interest. Students will demonstrate their learned skills in communication, leadership, critical inquiry, and ethics, as well as speak in some manner to the student's professional development aspirations.

**College/Department:** GC-3690

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PRST 700 [Min Grade: B]

**PRST 1599 Independent Study in PRST 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST 1699 Independent Study in PRST 0.5-6.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated 12 times for 6 credits

**PRST 1799 Independent Study in PRST 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST 1899 Independent Study in PRST 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST 1999 Independent Study in PRST 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST T580 Special Topics in PRST 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST T680 Special Topics in PRST 1.0-12.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated 18 times for 18 credits

**PRST T780 Special Topics in PRST 1.0-12.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST T880 Special Topics in PRST 1.0-12.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

**PRST T980 Special Topics in PRST 1.0-12.0 Credit**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** GC-3690

**Repeat Status:** Can be repeated multiple times for credit

## Project Management

### Courses

**PROJ 501 Introduction to Project Management 3.0 Credits**

This course will prepare students to manage scheduling, supply management, project team recruiting, resource allocation, time/cost tradeoffs, risk assessment, task coordination, team-building, progress monitoring, and post-project assessment through a comprehensive overview of project management. Case studies are used to illustrate the principles and tools of project management as a process.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**PROJ 502 Project Planning & Scheduling 3.0 Credits**

This course will prepare students to master concepts in project planning, scheduling and control. Project scheduling methods are covered including: critical path systems, critical chain scheduling, statistical analysis, Program Evaluation Review Technique, linear resource leveling, and legal ramifications on contracted projects.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 510 Project Quality Management 3.0 Credits**

Quality management is related to project management. Examines basic quality concepts and explores the three sub-processes of quality management: quality planning, quality assurance, and quality control as they relate to project management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 515 Project Estimation & Cost Management 3.0 Credits**

This course will provide an overview of project financial and economic principles involved in product and system development. It is intended to familiarize project managers with methods in project accounting, budgeting, cost estimation, financial management, design optimization, and economics.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 520 Project Risk Assessment & Management 3.0 Credits**

Examines the risk factors throughout every phase of a project. Looks at the overall project planning process, explores the use of high-level risk assessment tools, and describes key ideas for project risk planning. Models for risk analysis, assessment, and classification are presented.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 525 E-Tools for Project Management 3.0 Credits**

This course will examine the use of electronic tools as a means of creating a virtual workplace. Issues related to the use of the e-tools for collaboration and decision making for project management will be explored.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 530 Managing Multiple Projects 3.0 Credits**

Examines the complex and simultaneous management principles and techniques required to manage multiple projects. Emphasis is placed on a theory and practice of project management that is rigorous and disciplined, yet flexible.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 535 International Project Management 3.0 Credits**

Examines the uniqueness and adaptations of project management when operating in an international context. Details the investigation of cultural, legal, and regulatory environments as the context of international project management.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 540 Project Procurement Management 3.0 Credits**

Examines role of procurement in project management including processes and activities needed to acquire products, services and results required to accomplish a project from outside the project organization. Planning, conducting administering and closing procurements are course components as are relevant legal and ethical issues, contract capacity, authority, public and private bidding processes and dispute resolution methods.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 601 Project Leadership 1.5 Credit**

Examines the environments required for building, maintaining, and leading successful project teams.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B] (Can be taken Concurrently)

**PROJ 602 Project Teamwork 1.5 Credit**

Examines the environments needed for being a successful and contributing member of a project team.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B] (Can be taken Concurrently)

**PROJ 645 Project Management Tools 3.0 Credits**

Examines theories relating to project management software acceptance, use of project management tools, and how tools relate to project success. Develops in-depth skills in a widely-used project management software package, and provides exposure to other selected project management tools for successful collaboration in collocated and virtual project teams.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ 650 Project Stakeholder Management 3.0 Credits**

Examines theories and processes required to identify the individuals, groups, organizations, and other stakeholders that could impact or be impacted by a project. Also covers analyzing stakeholder expectations and their influence on the project, and developing strategies for engaging project stakeholders in effective project decisions to ensure successful project outcomes.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**PROJ 665 Managing Project Knowledge 3.0 Credits**

Examines how knowledge services are designed, developed, and implemented within an organization and a project. The goal is to build expertise with knowledge management materials and skills needed to succeed in building an effective knowledge strategy within a project, a program, and an organization. Students learn strategies for building knowledge services, including the theories, models, methods, processes, and social factors that promote successful change.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**PROJ 670 Project Management Methodologies: Managing Project Lifecycles 3.0 Credits**

Examines project management methodologies, including Project Management Institute (PMI)® global standards, Agile, PRINCE 2, SCRUM, ITIL, and other leading methodologies. Reviews how project lifecycles are designed, developed, and implemented within a project and across the organization. Builds knowledge and expertise with major project management methodologies and materials and develops skills needed to select, adapt, and apply an effective strategy for a project, a program, and an organization. Students learn strategies for managing projects throughout their lifecycles, including the theories, models, methods, processes, and other factors that enhance project success.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**PROJ 695 Capstone Project in Project Management 3.0 Credits**

Provides an opportunity for the student to successfully integrate knowledge and skills acquired during their master's program in project management. Students will evaluate the project management practices in an organization and create a report that identifies strengths and weaknesses in an organization and recommend strategies for improvement.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PROJ 502 [Min Grade: B] and PROJ 510 [Min Grade: B] and PROJ 515 [Min Grade: B] and PROJ 520 [Min Grade: B] and (PROJ 525 [Min Grade: B] or PROJ 645 [Min Grade: B]) and PROJ 530 [Min Grade: B] and PROJ 535 [Min Grade: B] and PROJ 540 [Min Grade: B] and PROJ 601 [Min Grade: B] and PROJ 602 [Min Grade: B]

**PROJ I599 Independent Study in PROJ 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**PROJ I699 Independent Study in PROJ 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 9 times for 120 credits

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ I799 Independent Study in PROJ 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**PROJ I899 Independent Study in PROJ 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**PROJ T580 Special Topics in PROJ 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**PROJ T680 Special Topics in PROJ 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**Prerequisites:** PROJ 501 [Min Grade: B]

**PROJ T780 Special Topics in PROJ 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**PROJ T880 Special Topics in PROJ 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Property Management

### Courses

**PRMT 610 Facilities Management 3.0 Credits**

This course focuses on the strategic role property managers play in facilities management. Property managers must be aware of all operational issues and are active participants in making strategic facilities decisions including in-house or outsourcing services, service specifications, managing service providers, and creative method of addressing sustainable development issues.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**PRMT 625 Property Financial Analysis & Strategies 3.0 Credits**

This course focuses on the importance of financial analysis to the strategic decision-making process employed by property managers including cash flow, tax implications, and risks of various projects. Decision-making models, lease valuation, and sensitivity analysis are employed in real situation. Current marketing conditions are discussed including alternative financing choices, cost of funds, tax incentive development options, and capitalization rates.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**PRMT 645 Property Management Technology Strategies 3.0 Credits**

This course focuses on the use of technology to effectively manage and market property. Successful strategies employing technology to gain operating efficiencies, increase employee and tenant communications, optimize rent management, increase tenant retention, and maximize security systems are featured. Best practice examples of integrated technology stems are reviewed and students perform a technology audit.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**PRMT 695 Capstone in Property Management 3.0 Credits**

The Property Management Capstone Course, the graduate degree's final course, comprises a research project and paper on a topic with implications for the real estate management industry and/or built environment. The goal of this course is for students to synthesize, integrate, and apply theoretical and practical knowledge gained throughout their graduate school tenure. This course is an opportunity for students to design a research study, conduct primary and secondary research, and demonstrate their core competencies in real estate management and the built environment. Students are expected to analyze and synthesize research data, recognize data patterns, identify useful information, extrapolate meaningful conclusions that support suggested business decisions, and summarize in an academic research paper.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PRMT 603 [Min Grade: B-] and PRMT 610 [Min Grade: B-] and PRMT 625 [Min Grade: B-] and PRMT 640 [Min Grade: B-] and PRMT 645 [Min Grade: B-] and REAL 568 [Min Grade: B-] and REAL 572 [Min Grade: B-] and REAL 574 [Min Grade: B-] and REAL 575 [Min Grade: B-] and BUSN 502 [Min Grade: B-] and STAT 601 [Min Grade: B-]

## Psychology

### Courses

**PSY 510 Research Methods I 3.0 Credits**

Develops a practical, conceptual understanding of statistical data analysis, the logic of hypothesis testing, and statistical inference. Requires students to identify researchable topics, critically review evidence from prior studies, and prepare proposals for gathering appropriate evidence.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 511 Research Methods II 3.0 Credits**

This course will focus on topics regarding the development, execution, analysis, and interpretation of psychotherapy outcome investigations in the clinical psychology across a variety of topical areas (e.g., psychopathology, behavioral medicine).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PSY 510 [Min Grade: C]

**PSY 512 Cognitive Psychology 3.0 Credits**

Emphasizes understanding normal cognition as a basis for recognizing and identifying when abnormality may exist. Covers topics including perception and pattern recognition; attention, learning, and memory; language and communication; and problem-solving and decision-making.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 514 Behavioral Assessment I 3.0 Credits**

Reviews the major principles of learning developed by major theorists in psychology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 515 Clinical Case Conceptualization 3.0 Credits**

This course will provide a review of the principles, assumptions, and purpose of clinical case formulation. The course is designed to provide a practical guide of how to integrate various assessment methods such as clinical interviews, direct observation in both analogue and naturalistic settings, applied behavioral analysis, psychological testing, self-report questionnaires, self-monitoring inventories, cognitive assessment, assessment of emotional regulatory processes, interpersonal patterns of behavior, and psychophysiological techniques in order to construct a case formulation leading evidence-based treatment.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 516 Developmental Psychology 3.0 Credits**

Studies the nature of developmental processes across the life -perceptual, intellectual, emotional, social, and neuropsychological-and the factors influencing or limiting them.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 518 Social Psychology 3.0 Credits**

Studies the causes of social influence and the effects of others on behavior and cognitions of the individual, in such areas as attitude formation and change, social perception, affiliation, and attraction.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 520 Psychopathology 3.0 Credits**

Familiarizes the student with existing categories of mental disorders, their diagnosis, and their treatment.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 522 Psychological and Intellectual Assessment 3.0 Credits**

Covers the theoretical and practical uses of tests designed to measure intellectual, cognitive, and academic abilities, including administration and interpretation of the most widely used measures.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 524 Professional Issues and Ethics 3.0 Credits**

Discusses issues in the delivery of professional psychology, including confidentiality, supervision, standards of practice, and ethics in clinical psychology. Uses case studies to emphasize state and APA regulations.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.



**PSY 530 Neuroanatomy and Behavior 3.0 Credits**

Explores the structure and function of the central nervous system, with emphasis on the physiological basis of behavior. Covers topics including the senses, nerve function, cognition and brain structure.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 542 Neuropsychological Assessment 3.0 Credits**

Covers the theory and practical use of major neuropsychological assessment devices, including the Halstead-Reitan and other tests used in contemporary neuropsychology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 550 Multicultural Perspectives in Psychology 3.0 Credits**

Provides an overview of the impact of cultural, ethnic and racial factors on the practice of applied psychology with the goal of developing multicultural competency in clinical practice.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 552 Proseminar in Diversity 2.0 Credits**

The seminar series will focus on contemporary issues in psychology related to issues of diversity, especially with regard to clinical research and treatment. Seminars will involve a mixture of group discussions, lectures, and guest speakers.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 560 Clinical Supervision and Consultation in Psychology 2.0-3.0 Credits**

Consultation and Supervision of Psychology is designed to teach psychology graduate students how to consult and provide supervision within the discipline of psychology. Students will become grounded in the theoretical basis for, models of, and guidelines for the practice of supervision. Students who opt for the experiential option (3-credit option) will also practice and receive feedback about the skills associated with clinical supervision. Students will become grounded in models of consultation and learn about practical application of these models.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 600 Current Topics in Applied Cognitive and Brain Sciences 3.0 Credits**

Each term it is offered, this seminar-based course will address a different current topic in cognitive psychology or cognitive neuroscience. Potential topics include new developments in semantic memory, creativity, problem solving, cognitive electrophysiology (EEG), neuroimaging, brain stimulation, and specialized statistical methods for research. The course will include faculty-led and student-led presentations and discussions of readings, outside presenters, and writing research proposals. The course is limited to graduate students in the Department of Psychological and Brain Sciences' doctoral program in Applied Cognitive and Brain Sciences (ACBS), except by permission of the instructor. ACBS students are required to register for this class each term that it is offered.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 601 Introduction to Data Science for Psychology 1.0 Credit**

This course is a high-level introduction to data science for psychology graduate students. It is designed for students without previous programming experience to develop basic literacy and comfort with data science. The course will cover rudimentary programming skills in three languages that are commonly used in graduate-level academic research in psychology and neuroscience (R, Python, and MATLAB). By gaining a foundational understanding of key programming concepts and practicing with basic syntax and skills in multiple (similar) programming languages, students will feel prepared to take graduate-level data science and statistics courses in which basic programming skills are assumed.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and classification is PhD and program is MS.

**PSY 615 Judgment & Decision-making 3.0 Credits**

This course will provide a comprehensive overview of classical and recent results in the psychology and neuroscience of human judgment and decision-making. Modern research in this area is highly multidisciplinary, combining results in psychology, economics, game theory, computer science and machine learning, and neuroscience (to name a few). The goal of the course is to provide an accessible introduction to the important results from all of these fields as they relate to the central question of how (and how well) humans decide among alternatives, and learn from feedback.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 616 Motivation and Emotion 3.0 Credits**

Considers the behavioral consequences of psychological levels of motivation and emotion.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 618 Psychology of Loss & Bereavement 3.0 Credits**

Covers the study of human attachment and loss, such as death, separation, job loss, and retirement.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 620 Personality Assessment 3.0 Credits**

Introduces theories underlying the assessment of personality via the use of objective instruments. Teaches students to administer and interpret a select sample of major personality tests.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 621 Theories of Personality 3.0 Credits**

Reviews different theories of personality, including behavioral, psychoanalytic, cognitive, and medical, as they apply to normal human functioning and abnormal behavior.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 624 Behavior Analysis 3.0 Credits**

The course will provide an overview of learning theories as applied to both adaptive and pathological behavior. The assumptions underlying learning and conditioning of complex systems will also be presented. A behavior laboratory will provide problem-based projects for students to integrate and analyze their observation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 630 Biological Basis of Behavior and Treatment 3.0 Credits**

This course examines neuroanatomy and physiology, with a particular emphasis on the interaction of physiology and anatomy on behavior and clinical syndromes. This course also examines the major classes of psychotropic medications used in clinical practice, with a particular emphasis on empirically supported psychopharmacological treatments and practical considerations relevant to effective clinical and psychopharmacological practice.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 648 Forensic Assessment I 3.0 Credits**

Discusses the use of psychological testing procedures as they relate to testimony in court and legal proceedings. Concentrates on the practical and ethical problems for the clinician involved in clinical practice.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 649 Forensic Assessment II 3.0 Credits**

The course focuses on distinguishing forensic assessment from other kinds of assessment performed by mental health professionals, and describing core principles that can serve to guide forensic clinicians. Using frequently identified legal issues as a guide; the course provides a combination of practical training and empirical overview of various relevant topics within the area of forensic assessment. Students may have the opportunity to be involved in a supervised forensic assessment during the period over which the course is taught. Course requirements include writing a report based on hypothetical data, and a paper on a topic approved by the instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PSY 648 [Min Grade: C]

**PSY 650 Child Psychopathology & Treatment 3.0 Credits**

This course will explore empirical literature on the diagnosis, assessment, etiology, course, and treatment of various psychological disorders of childhood and adolescence. Students will understand the DSM-IV-TR diagnostic criteria's application to children, symptom presentation in children, and issues of differential diagnosis. Empirically supported treatments for childhood disorders will be examined.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 675 Mindfulness and Acceptance-based Treatments 3.0 Credits**

This course is designed to provide an introduction to third generation acceptance-based behavior theory and therapies (ABBTs), broadly writ. The goal is to enhance students' theoretical, empirical, and practical understanding of ABBTs as it relates to the etiology, maintenance, assessment, and treatment of various forms of psychopathology, and to lay the foundation for the development of basic competencies in various ABBT technologies. Readings and lectures will address a variety of topics, including basic learning, behavioral, cognitive, and biological processes and mechanisms, as well as various assessment and intervention strategies developed within or associated with the applied behavioral tradition.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 680 Data Analysis in Psychology I 3.0 Credits**

The purpose of this course is to acquaint Masters students in Psychology with the problems confronted by the social scientist in creating and working with a numerical database, including some coverage of the use of computers in calculating both parametric and non-parametric statistics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is MS.

**PSY 681 Data Analysis in Psychology II 3.0 Credits**

The purpose of this course is to acquaint Masters students in Psychology with the advanced statistical tools most frequently used in clinical psychology research. The class will give you a basic theoretical background in the procedure, and it will familiarize you with computer-based analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PSY 680 [Min Grade: C]

**PSY 682 Data Analysis in Psychology III 3.0 Credits**

The purpose of this course is to acquaint Masters students in Psychology with advanced statistical tools most frequently used in psychological research. The class will give you a basic theoretical background on the procedures, and it will familiarize you with computer-based analysis. Emphasis will be placed on the application and interpretation of statistics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is MS.

**Prerequisites:** PSY 680 [Min Grade: C] and PSY 681 [Min Grade: C]

**PSY 709 Data Analysis in Psychology I 3.0 Credits**

The purpose of this course is to acquaint PhD students in Psychology with problems confronted by the social scientist in creating and working with a numerical database, including some coverage of the use of computers in calculating both parametric and non-parametric statistics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 710 Data Analysis in Psychology II 3.0 Credits**

The purpose of this course is to acquaint PhD students in Psychology with the advanced statistical tools most frequently used in psychological research. The class will give you a basic theoretical background in the procedure, and it will familiarize you with computer-based analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**Prerequisites:** PSY 709 [Min Grade: C]

**PSY 711 Data Analysis in Psychology III 3.0 Credits**

The purpose of this course is to acquaint PhD students in Psychology with advanced statistical tools most frequently used in psychological research. The class will give you a basic theoretical background on the procedures, and it will familiarize you with computer-based analysis. Emphasis will be placed on the application and interpretation of statistics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**Prerequisites:** PSY 709 [Min Grade: C] and PSY 710 [Min Grade: C]

**PSY 712 History and Systems 3.0 Credits**

Covers the history and various systematic theories of psychology. Explores the conceptual foundations of psychology from its inception to the present day.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 720 Health Psychology 3.0 Credits**

Discusses the role of the clinical psychologist in the medical setting. Involves didactic and clinical training focusing on behavioral medicine, sleep disorders, hypnosis, consultation-liaison services, and biofeedback.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 721 Principles of Psychotherapy 3.0 Credits**

Introduces fundamental clinical interviewing skills.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 722 Theories of Intervention 3.0 Credits**

A review of the major theoretical foundations of psychotherapeutic intervention derived from neuroscience, interpersonal, psychodynamic, and learning theories, including contextual/mindfulness-based approaches. The course will translate the various theoretic foundations toward a united approach to assessment and intervention.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**PSY 740 Neuropsychological Evaluation and Interpretation of Adults 3.0 Credits**

Covers the neuropsychological assessment of adult patients with brain injury and the subsequent design of reports and rehabilitation programs. Discusses both assessment instruments and rehabilitation techniques for brain injuries and associated problems. Emphasizes clinical experience with patients.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 742 Neuropsychological Case Analysis and Integration 3.0 Credits**

Reviews the analysis of neuropsychological data, including the integration of historical, interview, behavioral, and formal assessment data. Emphasizes integrating traditional interview and observation techniques and the ability to conceptualize actual clinical cases in oral and written form.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**Prerequisites:** PSY 522 [Min Grade: C] and PSY 542 [Min Grade: C]

**PSY 746 Neuropsychological Evaluation and Intervention of Children and Adolescents 3.0 Credits**

Covers the neuropsychological assessment of younger patients with brain injuries, learning disabilities, or developmental disorders.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 750 Autism Spectrum Disorders 3.0 Credits**

In this course we will investigate autism spectrum disorders including characteristics, assessments, systems and family issues, and current theories about the nature and biological basis for autism.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 809 Statistical Programming and Modeling with R for Psychology 3.0 Credits**

This course provides an introduction to applied statistical modeling with R in psychology. It covers R basics including how to program in R, writing R functions, debugging and organizing R codes. In addition, students will learn foundational data science tools, such as data cleaning, data visualization, creating reproducible data analysis reports, and building interactive web applications. Examples and data will be provided to illustrate how to conduct effective data analysis using R. Advanced statistical modeling tools will be discussed including linear models, logistic regression, Poisson regression, and models for data with a zero-inflated distribution. Step-by-step tutorials on how these analyses can be conducted using R will be provided. No previous experience of using R is required.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is MS or PHD.

**PSY 810 Behavioral Data Mining 3.0 Credits**

This course provides an introduction to different data mining techniques, with emphasis on practical applications of them by using software such as R. These techniques are particularly useful for the analysis of large data sets, as can arise in clinical, survey, psychometric, genomic and marketing research. The course begins by introducing several examples of supervised and unsupervised learning. Beginning with well-established techniques, we discuss methods such as discriminant analysis, support vector machines, and clustering techniques. The second half of class is devoted to Big Data or high dimensional data analysis using dimension reduction and variable selection techniques. In addition to reading papers demonstrating the use of these techniques in behavioral research, we will provide step-by-step tuturi.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 811 Multilevel Regression 3.0 Credits**

Multilevel regression is an advanced regression technique (closely related to hierarchical linear modeling) that was developed to model nested data -- data that contain multiple observations from each source, such as longitudinal data or repeated measures data. This course will provide hands-on training in the application of this method using the R statistical programming language. It will also cover advanced data visualization and data manipulation techniques using R.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**Prerequisites:** PSY 709 [Min Grade: C] and PSY 710 [Min Grade: C] and PSY 711 [Min Grade: C]

**PSY 812 Cognitive Neuroscience 3.0 Credits**

This course provides an overview of the field of Cognitive Neuroscience, including a review of sophisticated modeling and neuro-imaging technologies to answer important questions about behavior, the mind and the brain.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 814 Neuroimaging & Physiology of Behavior 3.0 Credits**

Since the cognitive revolution in the 1960's, scientists have tried to understand what the brain is doing while we are thinking. Because they allow us to directly measure what the brain is doing, neuroimaging techniques continue to gain popularity as research and clinical tools. In this course, we will explore some of the commonly used imaging techniques and gain an appreciation for the data that they generate, and how that data is transformed into something interpretable.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PSY 530 [Min Grade: C]

**PSY 815 Evidence-Based Psychotherapy 3.0 Credits**

This advanced elective course will provide training in scientifically supported psychological assessment and treatment methods. A range of methods (e.g., Problem-Solving Therapy, Gottman marital therapy, etc.) will be presented through book chapters, videos, role plays, etc.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 820 Cognitive-Behavioral Therapy 3.0 Credits**

This course is designed to provide an introduction to cognitive behavior theory and therapy.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**PSY 821 Family Therapy 3.0 Credits**

Family therapy theories will be reviewed including historically important, current and innovative approaches. In this course students will: 1) learn/integrate concepts and methods of family therapy, 2) appropriately apply these concepts and methods to case material, (3) critically evaluate psychotherapy outcome research relevant to family therapy.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 822 Pediatric Psychology 3.0 Credits**

The focus of pediatric psychology is the understanding, assessing, and intervening in the relationship between physical and psychological health. In this course students will: (1) learn pediatric psychology theory and practice including professional issues, assessment strategies and intervention approaches, (2) apply concepts to develop appropriate and effective treatment plans for case examples.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY.

**PSY 823 Substance Use 3.0 Credits**

This course examines the effects of drugs on human thinking and behavior. Both illicit (street) and licit (prescription) drugs are examined in an attempt to understand how these drugs produce their physiological and psychological effects. The course will focus on understanding the etiology and epidemiology of drug use and drug abuse/dependence, the pharmacology of psychoactive substances, and empirically supported prevention and intervention strategies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 825 Seminar in Mind and Body Studies 3.0 Credits**

Through a seminar format, this course will provide an exploration and analysis of the scientific literature concerning health and disease, regarding the integration of biomedical, psychological, social, spiritual, and philosophical domains.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 827 Behavioral Stress Management 3.0 Credits**

This graduate level seminar will provide hands-on teaching of various behavioral stress management strategies. These strategies (e.g., progressive muscle relaxation) are the fundamental skills often part of larger anxiety reduction or stress management protocols for a wide variety of psychological problems. The emphasis of this course is on knowing when to apply these strategies and learning how to competently implement these skills for adult populations. The instructor will model the various strategies and students are expected to role play simulated therapy cases.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit



**PSY 828 Weight and Eating Disorders 3.0 Credits**

The purpose of this course is to review psychological determinants of body weight and eating behavior as well as psychological treatments for obesity and eating disorders.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 830 Advanced Topics in Health Psychology 3.0 Credits**

This advanced seminar covers current empirical research in health psychology relevant to theory, epidemiology, and evidence based mental health assessment and intervention, focusing on medical conditions and chronic illnesses that psychologists most often encounter across varied populations, as well as the increased role psychologists play in medical and health settings.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 840 Advanced Cognitive-Behavioral Therapy 3.0 Credits**

This course will include didactic training, in class demonstrations, video demonstrations, in-class practice sessions implementing cognitive and behavioral therapy techniques for specific psychological disorders including panic disorder, agoraphobia, obsessive compulsive disorder, depression and post-traumatic stress disorder.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PSY and program is PHD.

**Prerequisites:** PSY 820 [Min Grade: C]

**PSY 845 Neuropsychological Evaluation & Intervention of the Elderly 3.0 Credits**

Covers the neuropsychological assessment of elderly patients with brain injury, such as primary degenerative conditions (e.g., dementia and Alzheimer's disease).

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 850 Psychology of Disability 3.0 Credits**

Reviews disability determination and discusses issues of disability.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 854 Psychology of Rehabilitation 3.0 Credits**

Discusses issues of psychological assessment and intervention as they apply to rehabilitation.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 897 Clinical Psychology Practicum Seminar 3.0 Credits**

Consistent with APA requirements for accredited programs, the class serves a colloquium function, brings students together to learn about and discuss clinical- and practicum-related issues, and provides a vehicle for information on practice-related issues.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PSY 898 Master's Thesis in Psychology 1.0-12.0 Credit**

Requires supervised research at the master's level.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY 899 Practicum 1.0 Credit**

According to APA guidelines, students are required to accumulate clinical training hours during their course of studies. This course is intended to award students credit for each successful year of completed practicum work.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 4 times for 4 credits

**PSY 998 Ph.D. Dissertation in Psychology 1.0-12.0 Credit**

Requires supervised research, including literature research, data collection, and writing of doctoral thesis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY 999 Internship 1.0-12.0 Credit**

Provides advanced, one-year full-time placement in a clinical setting determined by the clinical director and the student.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 8 times for 108 credits

**PSY I599 Independent Study in PSY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY I699 Independent Study in PSY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY I799 Independent Study in PSY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY I899 Independent Study in PSY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY I999 Independent Study in PSY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY T580 Special Topics in Psychology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY T680 Special Topics in Psychology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY T780 Special Topics in Psychology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY T880 Special Topics in Psychology 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PSY T980 Special Topics in Psychology 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Public Health

### Courses

**PBHL 500 Practical Experience for the Master of Public Health 0.0 Credits**

All graduate professional public health degree students must develop skills in basic public health concepts and demonstrate the application of these concepts through a practice experience that is relevant to students' areas of specialization. "Practice" refers to the implementing (doing) of public health rather than the understanding (researching) of public health. The Practical Experience will give students both a breadth of experiences to expand their knowledge and exposure to public health broadly, and a depth of experience and skill in an area closely related to their academic and professional goals.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 501 Introduction to Public Health 0.0 Credits**

The purpose of this course is to provide a broad introduction to public health, as well as an understanding about how specialized health research contribute to achieving the goals of public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 2 times for 0 credits

**PBHL 502 Evidence and Practice in Global WASH: Hygiene Promotion 3.0 Credits**

This course will allow students to analyze the importance of community hygiene promotion in WASH projects, demonstrate how to implement participatory community hygiene promotion campaigns, define approaches used to hygiene promotion in successful WASH projects, recognize practical hygiene promotion strategies used in WASH and global health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 504 Evidence and Practice in Global WASH: Behavior Change, Social and Software Aspects of WASH 3.0 Credits**

Upon completion of this course, students will be able to: analyze the importance of behavior change to successful WASH projects, define WASH behavior change theories, describe behavior change approaches used in successful WASH projects, and recognize BC models and frameworks that can be applied to WASH and global health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 510 Public Health Foundations and Systems I 4.0 Credits**

This 4-credit course is part 1 of a two quarter, multi-disciplinary introduction to the theory and practice of public health. The course is divided into two 5-week modules: Determinants of Health and Human Rights, Ethics and History. The first lecture session provides background in the determinants of health, followed by a lecture describing human rights, ethics and history in relationship to the module theme. Weeks 2 through 4 address course objectives with examples that tie back to the focus for the module. The last two sessions of each module address translating knowledge into action and public health leadership, again with the theme highlighted in that module.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 511 Public Health Foundations and Systems II 4.0 Credits**

This 4-credit course is part 2 of a two quarter, multi-disciplinary introduction to the theory and practice of public health. The course is divided into two 5-week modules: Translating Knowledge Into Action, and Public Health Leadership. The first lecture sessions provide background in the determinants of health, followed by a lecture describing human rights, ethics and history in relationship to the module theme. Weeks 2 through 4 address course objectives with examples that tie back to the focus for the module. The last two sessions of each module address translating knowledge into action and public health leadership, again with the theme highlighted in that module.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PBHL 510 [Min Grade: C]

**PBHL 707 Monitoring and Evaluation in Global Health 3.0 Credits**

This course is designed to provide students with a systematic approach to planning, implementing, monitoring, and evaluating global programs. Students will learn the general principles of monitoring and evaluation (M&E) as well criteria for selecting indicators and metrics and various tools/ models will be introduced to offer students an overview of the program planning and M&E process.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 709 Global Health Capstone Project 6.0 Credits**

This course is designed to provide guidance on the successful completion of a capstone project. Components of the project may include systematic review/meta-analysis, data collection, data management and analysis, and/or developing a monitoring and evaluation plan or policy analysis/recommendation.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 711 Global Issues in Sanitation 3.0 Credits**

Sanitation was one of the most off-track MDGs and progress in urban sanitation is proving especially difficult to achieve. In this course students will learn about the global sanitation crisis; analyze and compare issues related to water, sanitation, and hygiene; learn about the need to develop measures to reduce the global burden of disease from poor sanitation and hygiene; as well as affordable and context-specific sanitation solutions, sector planning tools, and community-led frameworks.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Not repeatable for credit

**PBHL 995 Ph.D. Dissertation Companion 1.0-9.0 Credit**

PhD Dissertation Companion.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**PBHL 1599 Independent Study in PBHL 0.0-12.0 Credits**

Independent study concerning concepts, methods, or specific health issues in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 84 credits

**PBHL 1699 Independent Study in PBHL 0.0-12.0 Credits**

Independent study concerning concepts, methods, or specific health issues in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 84 credits

**PBHL 1799 Independent Study in PBHL 0.0-12.0 Credits**

Independent study concerning concepts, methods, or specific health issues in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 84 credits

**PBHL 1899 Independent Study in PBHL 0.0-12.0 Credits**

Independent study concerning concepts, methods, or specific health issues in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 84 credits

**PBHL 1999 Independent Study in PBHL 0.0-12.0 Credits**

Independent study concerning concepts, methods, or specific health issues in public health.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated 6 times for 84 credits

**PBHL T580 Special Topics in PBHL 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**PBHL T680 Special Topics in PBHL 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**PBHL T780 Special Topics in PBHL 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**PBHL T880 Special Topics in PBHL 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

**PBHL T980 Special Topics in PBHL 0.5-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Dornsife School of Public Health

**Repeat Status:** Can be repeated multiple times for credit

# Public Policy

## Courses

**PLCY 503 Theory and Practice of Policy Analysis 3.0 Credits**

The aim of this course is to develop an understanding of the social, political, and ethical context of policy research, and how this understanding can be translated into an applied practice of policy analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 504 Methods of Policy Analysis 3.0 Credits**

Course focuses on the logic and procedures used in carrying out social research for policy purposes. The aim of the course is to develop the student's capacity to conceptualize, design, and conduct research.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 506 Institutional Dynamics of the Policy Process 3.0 Credits**

Introduces students to the American policy process, looked at through the lens of historical institutional analysis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 507 Nonprofit Organizations 3.0 Credits**

This course focuses on distinctive features of managing and governing nonprofit organizations and draws on current theories, concepts, and real world examples to explore particular management challenges. Course includes a mix of lecture, discussion, case applications, and presentations by practitioners from the local nonprofit community.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 509 Sustainability & Public Policy 3.0 Credits**

Course introduces students to the concept of sustainability as it relates to policy planning, design, and implementation, and examines how different definitions of sustainability (e.g. environmental, economic, and social) can be translated into best practices, performance benchmarks, and other metrics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 510 Introduction to Case Study Research 1.0-3.0 Credit**

An introductory course for public policy students to engage in case study research and choose their policy research topic.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is PLCY.

**PLCY 511 Case Study Literature Review 1.0 Credit**

A tutorial course for public policy students to review and report on academic literature relevant to their chosen case study topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

**PLCY 512 Case Study Document Review 1.0 Credit**

A tutorial course for public policy students, to collect and report on original documents (legislation, hearing transcripts, reports, etc.) relevant to their chosen case study topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PLCY 511 [Min Grade: C] (Can be taken Concurrently) and PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

**PLCY 513 Case Study Interviews 1.0 Credit**

A tutorial course for public policy students to interview personnel relevant to their chosen case study topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PLCY 511 [Min Grade: C], PLCY 512 [Min Grade: C] (Can be taken Concurrently) and PLCY 504 [Min Grade: C] and (PLCY 510 [Min Grade: C] or PLCY 514 [Min Grade: C])

**PLCY 515 Case Study Colloquium 3.0 Credits**

A group discussion course for public policy students to consolidate and report on their case study research and to comment on the research of other students.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**Prerequisites:** PLCY 510 [Min Grade: C] (Can be taken Concurrently)

**PLCY 516 Case Study Research II 1.0-3.0 Credit**

A tutorial course for public policy students to collect and report on original documents (legislation, hearing transcripts, reports, ect) relevant to their chosen case study topics.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 5 times for 18 credits

**PLCY 517 Case Study Final Project 1.0-3.0 Credit**

A final tutorial course for public policy students writing their case studies. Students complete and submit their final case study reports. Passage of this course is contingent completing an oral defense of their case studies.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**PLCY 521 City Policy and Political Systems 3.0 Credits**

Emerging theory as well as real-life demographics indicate that the world is becoming heavily urbanized. Though the US has been and continues to be less urbanized than the rest of the world, American cities have re-emerged as very attractive economic, cultural and social engines; they are understood to be an essential 'working unit' of how we live. With that, comes a concomitant belief that cities are where most of the pressing problems of the day will need to be solved: in sustainability, in education, in economic development and in poverty and economic inequality. Students will be expected to read select articles and books, produce weekly blog-posts in response to readings and presentations and produce a final paper on a topic of their choosing from within the course outline.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY 571 Science and Technology Policy 3.0 Credits**

This graduate seminar examines how science informs public policy, and how public policies foster advances in science and technology. Topics addressed include public trust in science, and democratic participation in science- and technology-related decisions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PLCY I599 Independent Study in PLCY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY I699 Independent Study in PLCY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY I799 Independent Study in PLCY- 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY I899 Independent Study in PLCY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY I999 Independent Study in PLCY 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY T580 Special Topics in Public Policy 0.0-9.0 Credits**

Course covers on a rotating basis a variety of topics of interest to students in public policy, including (though not limited to) urban policy, environmental policy, and technology.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY T680 Special Topics in Public Policy 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY T780 Special Topics in Public Policy 0.0-9.0 Credits**

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PLCY T880 Special Topics in Public Policy 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit



**PLCY T980 Special Topics in Public Policy 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Publishing

### Courses

**PUB 504 Drexel Publishing Group Special Projects 3.0 Credits**

The English Department is home to the Drexel Publishing Group. Students in the program will have the opportunity to assess the publications produced by DPG, create ways to build upon or improve an aspect of the group or an individual publication within the group, develop a proposal, and implement those ideas. These projects will be considered on a case-by-case basis, approved, and overseen by the director.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 1 times for 6 credits

**PUB 530 The Publishing Environment 3.0 Credits**

This course provides an overview of the publishing industry from inception to the current time. It covers publishing fundamentals, genres and formats, discusses publishing trends, and begins development of the students' contacts in the industry. The course emphasizes the changes and trends in the publishing industry brought about by the advancement of digital technology. This course helps students identify their real interest and the avenue they want to take in the publishing industry.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB 631 Publication Design: Print and Digital 3.0 Credits**

This course introduces both the theoretical and practical fundamentals of publication design, spanning books and magazines in print as well as digital formats including ebooks, webzines, etc. (These principles are applicable not just to general books and magazines but to a wide variety of professional publications, from trade journals and corporate reports to blogs and coffee-table books.)

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB 635 Periodicals Publishing 3.0 Credits**

Provides the student with a thorough understanding of periodical publishing and the current environment. Students learn how to publish a successful periodical from launch to sales and distribution. Strategy and implementation are stressed. Current publishing methods are emphasized and students gain directly applicable experience.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB 701 Independent Project in Publishing 1.0-3.0 Credit**

In this course, students will work under the direction of one of the Publishing teaching faculty members. The subject matter will cover a specific research area in publishing or an area of academic study not offered in an existing Publishing course. Only students with sufficient background work, and a clear vision of his or her project will be accepted the instructor. A contract will be drawn between the student and appropriate overseeing faculty or professionals.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 2 times for 9 credits

**PUB 720 The Ebook and Online Magazines 3.0 Credits**

This course will concentrate on the practical differences between electronic and print publishing, the possibilities of new platforms, and the (positive and negative) impact of the industry's movement away from print. Students will research the expanding world of indie publishers, innovative products and business models. Students will engage in practical exercises, producing working examples of ebooks, websites, and social media. Students will study various delivery models, analyze reader engagement, and develop a complete digital marketing platform. This course provides information about how the business of digital publishing works, how to effectively market and sell your digital publication, and how to write a simple business plan for a digital publishing endeavor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB 730 Book Publishing 3.0 Credits**

Analyzes managerial decisions including acquisitions, development, design, financial, and copyright implications of books publishing. Includes books of all genres: non-fiction, fiction, scientific, children's and others.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB 750 Small Press Development 3.0 Credits**

For graduate students who wish to study the history, ideas, and practice of small press publishing, including acquisition, page and cover design, book structure, and marketing. This course covers the how-to, economic, copyright, technical, and mailing regulation considerations of founding a press or magazine and examines the current, important phenomenon of the developing small-press movement in the American literary scene. Course includes an electronic publication component. This course provides an opportunity to explore book binding, book structures, limited-edition runs and writing for small-press publishing.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**PUB I599 Independent Study in PUB 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**PUB T680 Special Topics in Publishing 3.0 Credits**

In this course, students will explore specific areas not covered in the regularly offered Publishing courses. The course will be taught by teaching faculty members of the Publishing, or by visiting professors. This is a three-credit elective course for the MA in Publishing. It may also be used as a free elective course for a variety of students.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

# Real Estate

## Courses

### REAL 568 Real Estate Development 3.0 Credits

This course will provide a comprehensive exploration of the development process for real estate development projects. Residential, multi-family, single family, apartments, office buildings, retail projects, industrial developments and the development process for each market segment.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 571 Advanced Real Estate Investment & Analysis 3.0 Credits

This course will explore the market analysis and feasibility methods in framing and supporting investment decision making for real estate projects. Detailed market analysis strategies will be employed and case studies will be analyzed to deepen the student's knowledge and judgment for investment decision making.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 572 Advanced Market Research & Analysis 3.0 Credits

This course will explore the market research methods used to understand and dissect geographical and demographical real estate markets. Detailed market research strategies will be employed and case studies will be analyzed to deepen the student's knowledge of market research techniques and resources.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 573 Sales & Marketing of Real Estate 3.0 Credits

This course will explore the strategies for successful marketing of real property bases on market research and development strategies.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 574 Real Estate Economics in Urban Markets 3.0 Credits

This course will offer a unique and detailed perspective on urban real estate development and the special sub-markets in which they exist. Attention will be given to the characteristics of the particular economic factors relevant in urban real estate markets.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** REAL 568 [Min Grade: C]

### REAL 575 Real Estate Finance 3.0 Credits

This course will focus on the options and implications of different financing methods with the unique tradeoffs associated with each considered.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 576 Real Estate Valuation & Analysis 3.0 Credits

This course will introduce the concepts of real estate valuation, appraisals, and the relationship of these to financing and cash requirements.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL 577 Legal Issues in Real Estate Development 3.0 Credits

This course will explore the unique legal requirements of the real estate business including property rights, involuntary transfers, easements, private restrictions, public restrictions, zoning and land development laws.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

### REAL I599 Independent Study in Real 12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL I699 Independent Study in Real 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL I799 Independent Study in Real 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL I899 Independent Study in Real 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL I999 Independent Study in Real 0.0-12.0 Credits

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL T580 Special Topics in REAL 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL T680 Special Topics in REAL 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL T780 Special Topics in REAL 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

### REAL T880 Special Topics in REAL 0.0-12.0 Credits

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**REAL T980 Special Topics in REAL 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Rehabilitation Sciences

### Courses

**RHAB 763 Biomechanics in Rehabilitation 3.0 Credits**

The first half of the class focuses on statics (muscle forces and stress-strain analysis), and the second half concentrates on dynamics (kinematic and kinetic analysis of human motion) with applications. Some minor computer work is required for this class, mainly using the Microsoft Excel spreadsheet program.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**RHAB 764 Biomechanics in Human Movement 3.0 Credits**

The first half of the class focuses on the development of the tools necessary to conduct biomechanics research, process the data, and perform biomechanical data analysis. The second half of the class works through common biomechanics questions related to human movement in three dimensions.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**RHAB 765 Introduction to Movement Science 3.0 Credits**

This class focuses on structures and mechanisms underlying human movements, principles of movement control and learning, and methods of motor control and learning research using current theories of motor control and motor learning in healthy populations. Applied lab activities are used to enhance student learning of theoretical concepts. May be repeated once for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 3 credits

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**RHAB 768 Advancing the Practice of Rehabilitation 3.0 Credits**

This course examines how leaders and educators promote professional development and expertise in the field of rehabilitation. The course provides an in-depth look at processes including conceptualization of knowledge, critical reasoning, professional judgment, and reflective practice. The course considers how the therapist and practice setting affect these processes.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RHAB 812 Interpretation of Data 3.0 Credits**

This is an advanced seminar on issues such as power and effect size calculations and interpretation of results of statistical analysis including outputs of statistical software packages.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 3 credits

**RHAB 817 Sensors & Transducers in Rehabilitation 3.0 Credits**

This course combines clinical, electronics and engineering background, and a step-by-step process of understanding the different instrumentation used to gather information about the status of human activity and motion. The course provides the student with knowledge needed to choose, use and improve measurement systems for application in rehabilitation sciences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**RHAB 823 Research Practicum 1.0-6.0 Credit**

Prepares the student for dissertation research through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and method, IRB, grant writing, subject recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of results. May be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 12 times for 12 credits

**Restrictions:** Can enroll if major is PT or major is RHAB.

**RHAB 825 Teaching Practicum II 2.0 Credits**

This course requires a negotiated agreement, leading to a contract among the Course Director/Instructor, the student and the student's advisor.

The student develops a syllabus, write goals and objectives, prepare and present materials, develop assessments strategies, and participate in the administrative responsibilities of the course. May be repeated twice for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 4 credits

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**Prerequisites:** NHP 762 [Min Grade: C]

**RHAB 830 Dissertation Research 1.0-12.0 Credit**

Through dissertation a student demonstrates mastery of the research process unique to his/her specialty and produces an original contribution of knowledge. The dissertation process provides the student with the foundation for a continued career as a scholar. May be repeated for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 12 times for 12 credits

**Restrictions:** Can enroll if major is HRSC or major is RHAB.

**RHAB I899 Independent Study 1.0-4.0 Credit**

Independent study is offered to graduate students to afford them the opportunity to develop various components of their research or for content related to their interests. The course is structured with a contract and is designed to allow students access to avenues and resources (personnel, mentorship, institutional) to enrich their learning. May be repeated three times for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 16 credits

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

**RHAB T880 Special Topics 1.0-4.0 Credit**

The course description will be developed by the Course Director depending upon the course content. May be repeated three times for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 2 times for 12 credits

**Restrictions:** Can enroll if major is HRSC or major is PT or major is RHAB.

## Research

### Courses

**RSCH 503 Research Methods and Biostatistics 3.0 Credits**

This course provides an exploration of research concepts, literature searches, research methods, designs, data collection, analysis, and interpretation techniques. This course is designed to provide graduate students with the skills necessary to evaluate the relationship between practice and published research.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 504 Evaluation and Translation of Health Research 3.0 Credits**

This course provides specific approaches to the evaluation of the quality and translation of relevant research. The student will learn to conduct efficient literature searches, evaluate the quality of that research through the appraisal of research design, methodology, and data analysis. Each student will develop and evaluate a plan for the translation of the research into their practice.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 503 [Min Grade: B]

**RSCH 519 Introduction to Biostatistics 3.0 Credits**

This is an introductory course which focuses on the fundamentals of biostatistics for health sciences graduate students. Excel-based and SPSS assignments will be used to supplement the content.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HI or major is NURS.

**RSCH 700 Foundations in Quantitative Research 3.0 Credits**

This course is a survey of quantitative research methodology for the health and rehabilitation sciences. Doctoral students completing the course will develop skills to understand, evaluate, and apply quantitative research across the sciences and the health professions. This course emphasizes why a particular methodology is suited to a particular research agenda and introduces students to measurement theory and psychometric properties of quantitative measures.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 714 Qualitative Research Methods I 3.0 Credits**

This course provides students foundation knowledge in inductive inquiry, including philosophical assumptions, interpretive frameworks, and common approaches to qualitative research. Students will learn basic skills in qualitative design, data collection, and data analysis.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 715 Qualitative Research Methods II 3.0 Credits**

This is an advanced seminar course for doctoral students in qualitative research methods. Through assigned readings, experiential exercises, and class discussions, students will engage in in-depth discussions of philosophical, theoretical, ethical and practical aspects of qualitative research methodologies. Using existing data sets as well as those collected during the course, students will demonstrate skills in qualitative research with particular emphasis on identifying and aligning analytical strategies compatible with their research topics.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 714 [Min Grade: B]

**RSCH 720 Foundations of Biostatistics 3.0 Credits**

This is an introductory course that focuses on the fundamentals of biostatistics for nursing and health sciences graduate students. Excel-based and SPSS assignments are used to supplement the content. May be repeated once for credit.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 1 times for 6 credits

**RSCH 721 Intermediate Statistics in Health I 3.0 Credits**

This is an advanced level statistics course focusing on general linear models and selected multivariate statistical tests used in the rehabilitation and health sciences and biomedical engineering.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 720 [Min Grade: B]

**RSCH 722 Intermediate Statistics in Health II 3.0 Credits**

This is an advanced level statistics course focusing on selected multivariate, measurement and correlational statistical tests used in rehabilitation, health and medical sciences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 721 [Min Grade: B]

**RSCH 723 Interpretation of Data 3.0 Credits**

The focus of this course is on understanding the methods used to analyze and interpret the results of quantitative data analyses in the health and rehabilitation sciences and determine their meaningfulness (clinical significance). Fundamental to this process is an understanding of the interrelatedness of statistical power, effect size, sample size, and alpha.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 720 [Min Grade: B]

**RSCH 741 Foundations in Scholarly Inquiry & Writing 3.0 Credits**

The focus of this course is on the development of competencies in scholarly writing in health sciences research. Strategies for approaching writing assignments in other courses and in preparation for dissertation research and manuscript writing are discussed and practiced.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit



**RSCH 742 Scientific Writing 3.0 Credits**

This is an advanced seminar on scientific writing. Emphasis is on conceptualization, writing, and revising research products (e.g. journal article). Topics include components of providing peer-review and how messaging changes for different audiences.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** RSCH 700 [Min Grade: B] (Can be taken Concurrently)

**RSCH 743 Grantsmanship 3.0 Credits**

This course focuses on the organization, development and preparation of a grant application as well as understanding grant application processes and opportunities. Students are expected to prepare components of their grant application under the direction of their mentor using the guidelines for an appropriate funding organization.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 758 Application of Evidence to Practice 3.0 Credits**

The focus of this web-based course is on finding, appraising, communicating, and applying knowledge and research to the health professions. Participants will develop competencies in decision-making, knowledge translation and development and evaluation of health care services.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 813 Measurement Theory in Healthcare 3.0 Credits**

The emphasis of this course is on the assessment of the uses, advantages, validity, reliability, and sources of error in measurement tools commonly used in healthcare and on methodological and outcome research methods.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**RSCH 816 Intermediate Mixed Methods Research 3.0 Credits**

This intermediate mixed methods research course prepares PhD students to design and implement mixed methods research studies. The course builds on knowledge gained in other introductory level mixed methods research courses. Through readings, class discussions, and implementation of a mixed methods research project, this course addresses complex design and data collection, analysis and integration challenges that are specific to mixed methods research. Students wishing to take the course but who have questions about the prerequisites should contact the instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CATX 715 [Min Grade: B] or NURS 863 [Min Grade: B]

**RSCH 823 Research Practicum 1.0-6.0 Credit**

Prepares the student for dissertation research through faculty-supervised research experiences. Focuses on one or more stages of the research process, such as developing a question, literature review, design and method, IRB, grant writing, subject recruitment, instrumentation, measurement, data collection, data analysis, interpretation of results, and/or dissemination of results.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 12 times for 78 credits

**RSCH T880 Special Topics in Research 1.0-4.0 Credit**

Course consists of content that faculty or students have requested to meet special needs or interests. Content is variable and offered on a one-time, infrequent, or trial basis. Actual course description will be determined by the instructor.

**College/Department:** College of Nursing Health Professions

**Repeat Status:** Can be repeated 3 times for 16 credits

## Retail & Merchandising

### Courses

**RMER 500 Retail Merchandising 3.0 Credits**

This seminar course explores the omni-channel retail system. Through a series of case studies students will analyze and investigate past, current and future global retail strategies and trends. Such topics as brick-and-mortar retailing, retail data analytics, brand development and management, social media, online and digital retail shopping, buying and product development, supply chain management, visual merchandising, as well as customer service and sales will be introduced.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 510 Research Methods in Retail & Merchandising 4.0 Credits**

This course provides students with a rigorous and comprehensive look into the skills and techniques required for conducting research and understanding their findings. Discussing the principles of research methods as they apply to merchandising, the course is divided into four sections: theory, practice, application and interpretation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 520 Retail: Social and Cultural Issues 3.0 Credits**

In this course students examine a multi-disciplinary approach to examining style change, bringing together theory from consumer studies, cultural studies, economics, sociology, psychology, and more. This course will discuss a wide range of contemporary case material, which provides practical examples of trend analysis and change.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 530 Omni-Channel Product Promotion & Retail Analytics 3.0 Credits**

Statistics and retail analytics will allow students to investigate historical data, analyze and participate in the present and consider the future uses of traditional communications and new technologies in retail merchandising as well as the financial means to achieve them.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 535 Retail Lifestyle Product Forecasting 3.0 Credits**

Retail Lifestyle Product Forecasting is a course that will help adult learners understand how retailers predict the products that we purchase. Using the ideas of forecasting, analysis and popular culture, students will learn what retail businesses look for to obtain economic success.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 540 Brand Management & Intellectual Property 3.0 Credits**

Students will read branding case studies to comprehend why the phenomena of branding continues to drive our consumer society. Intellectual property rights, ethics and the legality surrounding various types of products and their branding will be investigated as students understand how to engage consumers in the global branding process.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 550 Merchandising Technologies 3.0 Credits**

This course focuses on integrated retail buying and merchandise management and strategy development using technology. Students explore and analyze past, current and future trends in ecommerce technologies that primarily support the back end inventory, logistics and front end operations of the fashion apparel, accessory and home products industries.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 560 Selling Techniques & Strategies 3.0 Credits**

Taking a seminar approach, this course applies inquiry and interpretation of sales strategies as essential planning for a retail business. Students will examine various types of selling strategies and how they influence the retail environment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 570 Retail Supply Chain Analysis 3.0 Credits**

This course presents the concepts, practical tools, and support systems that are important to effective interaction with retail supply chains considering the lifestyle products of apparel, footwear, home goods and beauty. Strategic design and tactical and operational issues will be examined including retail and merchandising support technology such as CAD, PDM, PLM, RFID and EDI. Emerging concepts related to globally optimal decision-making will be emphasized.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 575 Globalization in Retail & Merchandising 3.0 Credits**

This course will examine aspects of Retail Merchandising including brand communication, product design & development, retail models, store layout and visual merchandising, and product promotion within a specific region of the globe. Emphasis on social, cultural, historical and geographical variables will be measured, as well as ethical aspects and financial influences on foreign economies will be examined.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 580 Retail & Merchandising Seminar in Leadership 3.0 Credits**

This course will be taught in a seminar format and feature talks from various leadership areas in the retail, merchandising, and lifestyle product areas. Topics will consider how managers and leaders must develop teams to understand corporate culture, retail management & analysis, product quality, customer service, human resources, merchandising strategies, and future goals.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 585 The Inclusive Retail Leader 4.0 Credits**

This course will engage learners in diverse idea-generation approaches for retail management and how to apply them. Learners will shift away from linear retail leadership thinking and engage in the process of creativity. Learning activities will also explore how creativity and motivation drive this development. An inclusive retail leader needs to understand the importance of professional relationships, networking, and how to establish and manage a local and global workforce.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 600 Retail Futures 3.0 Credits**

This course addresses the new forces in retailing and the related disruptions, challenges and opportunities. Through research, in-depth analysis, and discussion, these topics will be assessed and the related impact on this critical sector of business in most developed as well as emerging economies will be measured.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**RMER 697 Research & Data Collection 3.0 Credits**

This rigorous course is designed to develop understanding and experience in empirical research in order to build and design a final project or thesis. Emphasis will be placed on data collection, organization, interpretation and presentation. Students will follow-up with their instructor through web-based platforms and will be required to turn-in reports and output for their project or thesis.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** RMER 500 [Min Grade: B] and RMER 510 [Min Grade: B]

**RMER 698 Project/Research Thesis 4.0 Credits**

This final course will build the student's concentrated coursework producing a finalized project or thesis (such as a publishable academic journal article) synthesizing an area of Retail & Merchandising based upon their specific research and data collection. Students will be responsible for working with their course professor on the final outcome that documents the proposal, base research and conclusions.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 16 credits

**Prerequisites:** RMER 500 [Min Grade: B] and RMER 510 [Min Grade: B]

**RMER I599 Independent Study in RMER 0.5-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 48 credits

**RMER T580 Special Topics in Retail & Merchandising 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 6 times for 84 credits

**RMER T680 Special Topics in Retail & Merchandising 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 6 times for 84 credits

# School Psychology

## Courses

### EDSP 500 Professional School Psychology 3.0 Credits

This course provides an overview and introduction to the field of school psychology and the practice of school psychologists. This introductory course reviews the history of school psychology, the role and function of a school psychologist, the relationship of school psychology to other specialties in psychology and education, diversity of populations served, diversity of practice settings, as well as applications of research to practice. Students will gain an understanding of professional activities of school psychologists in various settings.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 1 times for 6 credits

### EDSP 510 Academic Assessment in School Psychology 3.0 Credits

Students will be introduced to academic assessment within the scope of curriculum-based measures and standardized achievement assessments. Students will be required to participate in the administration of universal screenings in reading and math basic skills, or comprehension and applied problems. Data will be analyzed to identify the at-risk of academic failure population. Students will then search the school psychology and education literature and implement and progress monitor one evidence-based intervention in both reading and math using a single-subject design. Students will administer two academic achievement tests (one WJIII and a student chosen assessment).

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 512 Cognitive Assessment in School Psychology 3.0 Credits

This course introduces students to the theory and research that supports cognitive assessment in the field of school psychology. Students will learn to administer, score, and interpret results of major cognitive assessments in the context of recent cognitive theories and research. The primary framework for interpretation of assessment results will be the Cattell-Horn-Carroll (CHC) Theory of Cognitive Abilities, using Cross-Battery Assessment approach.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 514 Social, Emotional and Psycho-behavioral Assessment 3.0 Credits

This course is the third course in the assessment sequence and will cover the assessment of social-emotional, adaptive and behavioral functioning of youth. Through this course, students will be expected to develop knowledge of and demonstrate skills with administering and interpreting the results of a variety of social-emotional, adaptive, and behavioral assessments. Assessment techniques will include self-report measures, behavior rating scales, and clinical interviews that may be utilized in school and/or community settings.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 521 Typical and Atypical Development in Early Childhood Education 3.0 Credits

This course addresses the multifaceted complexities of typical and atypical child development, through the discussion of classic and emerging theories. The primary aim of the course is to foster the students' ability to recognize and apply the connections among developmental domains and of theory and research with educational practice. The readings and class assignments make use of research-based, real-world, and cross-cultural examples. In this course students will apply their knowledge of typical growth and development in childhood to those children whose development is atypical. An ecological systems approach will be taken to explain possible reasons for atypical and atypical developmental patterns. Systems include biological, environmental, and societal.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 523 Teaching and Learning Environments for Children 3.0 Credits

With a foundation in typical and atypical child development, this course provides students with an in-depth understanding of culturally and developmentally responsive teaching and assessment. Emphasis will be placed on examining the interrelationship of the literature that relates to child development, teaching and learning environments, assessment and family. Students will gain an understanding of the forms, functions, methods, and roles of developmentally appropriate teaching and assessment. Participants in this course will examine the many factors that influence the total home and school learning environments for children between the ages of 3 and 8 years old.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 530 School Psychology Legal and Ethical Requirements 3.0 Credits

This course will cover the National Association of School Psychologists (NASP) Principles for Professional Ethics and the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct, as guiding documents for ethical and legal professional practice in school psychology. These guidelines and principles are required readings for those engaging in psychological services and to sit for state and national certification in School Psychology.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

### EDSP 540 Multicultural Awareness, Competence and Sensitivity in School Psychology 3.0 Credits

This course is highly experiential and focuses on the development of the students' awareness of cultural issues, skills in intercultural communication, and emphasizes gaining knowledge about diverse groups and individuals. This course is designed to provide an overview of mental health issues that are critical to understanding the psychological functioning of diverse individuals and groups in the U.S. The course covers general principles and models that are applicable to various underserved and/or oppressed populations, including gays, lesbians, and bisexuals and with an emphasis on culturally diverse ethnic groups within the U.S.—Latino Americans, African Americans, Native Americans, Asian Americans, Jewish Americans, and Americans from Middle Eastern cultures.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDSP 600 Practicum in School Psychology 1.0-3.0 Credit**

This course is a required practicum for all school psychology students. It is to be taken each academic quarter the students are in class with related school psychology course work and will follow local school district calendars. In this practicum, students are required to be engaged in assessment, intervention and/or consultative activities, related to the field of school psychology. The practicum may take place in school settings, behavioral health settings, clinics and hospital settings.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDSP 601 Advanced Practicum in School Psychology 1.0-3.0 Credit**

This course is a required practicum for all second year, school psychology students. It is to be taken each academic quarter (fall, winter, spring) and will follow local school district calendars. In this practicum, students are required to be shadow a school psychologists and engage in assessment, intervention and/or consultative activities, report writing and supervision related to the field of school psychology. The practicum may take place in school settings, behavioral health settings, clinics and hospital settings.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDSP 700 School Psychology Internship 1.0-3.0 Credit**

This course is a required internship for all school psychology students. It is to be taken each academic quarter the students are on internship. During internship, students are required to be engaged in assessment, intervention and/or consultative activities, related to the field of school psychology. The practicum may take place in school settings, behavioral health settings, clinics and hospital settings.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Science, Technology and Society

### Courses

**SCTS 501 Introduction to Science, Technology and Society 3.0 Credits**

This seminar introduces students to the study of science, technology, and society. Students will investigate different approaches to the study of STS, including methods of problem selection and research questions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 502 Research Methods 3.0 Credits**

This graduate seminar will provide an in-depth exploration of many of the research methods used by science and technology studies [STS] scholars. Participants will learn how to define a meaningful research question and to identify which methods will best answer that question. They will also learn how to design interview guides and conduct interviews, surveys, focus groups, fieldwork, content analysis, experiments and archival research. Strategies for analyzing data will also be addressed. A thorough understanding of research design and methodologies is crucial to the STS toolkit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 503 Advanced Research Methods 3.0 Credits**

This course focuses on a single social scientific research method. The course takes students through the inception of research ideas, research design, implementation and data-analysis in order to understand the limitations and possibilities of the research process according to methodology. The method focused on will vary according to instructor. Course may be repeated for credit.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 504 Science, Technology & Society Theories 3.0 Credits**

This course is designed to provide participants with a rigorous introduction to important social theories used in the study of science, technology and society. In this course, we will read work by classical and contemporary theorists, exploring a variety of explanations and critiques of contemporary social life. Wrestling with these ideas will allow students to experience the diversity and richness of social theory and to explore how theory allows us to see topics in new, unique ways.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 550 Special Topics in STS Lab 3.0 Credits**

In this course, students, faculty and community members team up in a hands-on, immersive social science laboratory setting to address contemporary social issues. Course covers on a rotating basis a variety of topics related to science, technology and society.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS 561 Mobilities Lab 3.0 Credits**

This course will address the large-scale transitions toward “sustainable” and “smart” technologies in transportation systems with an emphasis on how new information and communication technologies are transforming or disrupting the transport sector. Unlike other courses, it will do so through an innovative problem-based, hands-on, interdisciplinary “lab” experience in which students collaborate with others to work on “real-world” problems and solutions.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 562 Identity and Intersectionality Lab 3.0 Credits**

The practices of modern science, technology and medicine are deeply raced and gendered. This class moves beyond studies of singular social categories to explore intersections among individuals’ identities (race, class, gender, sexuality, [dis]ability, age, etc.) through critical reading of primary and secondary sources undertaken in a social-science “laboratory” setting.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit



**SCTS 563 Philadelphia in a Changing Climate Lab 3.0 Credits**

In this Science, Technology and Society (STS) lab course, participants will learn and use STS approaches and tools to conduct interdisciplinary research on climate change in Philadelphia. Philadelphia is a dynamic space for climate adaptation work in municipal, nonprofit, health, and educational sectors. Local initiatives are backed by robust climate science from leading experts, emerging data techniques, state-of-the-field intersectoral work, and community-based networks of climate science educators who engage Philadelphia's public in multiple arenas. This course offers hands-on research experience in which participants will make use of a digital platform for research so that they can collaborate and share their research along the way.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 570 Environmental Policy 3.0 Credits**

This interdisciplinary seminar investigates how interests and ideas interact in environmental policymaking. Students will explore how conceptual and political innovations play out across several environmental issues, including wildlife management, energy development, and the regulation of environmental risks.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 575 Digital Power and Resistance 3.0 Credits**

This course examines how power and resistance operate in these times of ubiquitous connectivity. Digital infrastructure and technology do not merely connect but also transform the way we think about, experience, and inhabit the world we live in. This course will examine the historical forces, social processes and economic mechanisms that contribute to such a transformation. It will examine the values, rationalities, and norms inherent to the design of connected existence. It will scrutinize the effects of connectivity on social inclusion and exclusion, as well as on participation in public life. We will draw upon conceptual tools and empirical work from science and technology studies. A variety of teaching methods will be used, including lecturing, group discussions, and the projection of short films.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 580 Special Topics in Science, Technology and Society 3.0 Credits**

This seminar will focus on graduate level topics in the area of science, technology and society selected by the professor. The exact content, readings, and grading will be determined by the professor on a course by course basis.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 584 Historiography of Science 3.0 Credits**

This course is an introduction to the advanced study of the history of science and will explore major themes, debates, and theoretical approaches in the discipline.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 600 Contemporary Feminist Theory 3.0 Credits**

This course surveys contemporary feminist theory with an emphasis on "new materialist" approaches to sex and sexual difference. An umbrella term, new materialism refers to a variety of recent attempts to re-imagine nature, sex, body, and matter. During the "linguistic turn" of the 20th century, many postmodern feminists retreated from these materials and their associated sciences; enamored of texts but allergic to bodies, postmodern feminists tended to embrace radical constructivism and reject scientific methods and knowledges. Today, new materialists return to biology, nature, sex, body, and matter in order to move beyond the logics of essentialism and somatophobia. This course will survey the results of this return with a special emphasis on understandings of sex and sexual difference.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 610 Material Culture 3.0 Credits**

This course explores the relationship between human beings and material objects. Drawing from literature in anthropology, archaeology, cultural studies, and science and technology studies, we will explore the cultural and social life of things: how they move across borders, accumulate and disperse, and lend our lives weight and meaning.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 612 Medical and Healthcare Ethics 3.0 Credits**

This course will introduce students to a range of topics including the role of explanatory narratives and patient experience in healthcare, the ethics of the design and conduct of clinical trials, the evolution of diagnostic categories, and the problem of healthcare access both in the US and in a global context.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 614 Technology, Progress, and Determinism 3.0 Credits**

In this course, students will examine multi-disciplinary approaches to the meaning of technology. Students will focus on two major themes in the history of technology: progress and technological determinism. Students will examine the historical context of contemporary technologies as well as criticism of technology and industrialization.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 615 The Biopolitics of Health 3.0 Credits**

This course explores theories of biopolitics and its application to ethical debates in health and medicine. Biopolitics is a powerful lens for examining how modern societies shape and define life itself.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 620 Medicine, Technology and Science 3.0 Credits**

This graduate seminar focuses on the social dimensions of medicine, health and illness. Students will explore how definitions and experiences of health and illness are shaped by technology use, cultural contexts, institutional practices, health care policies, and inequalities. Students will examine social trends in medical technology and science as well as how illness categories are created, negotiated, and resisted. Participants in this course will gain the ability to assess the changing role of science and technology in medicine as well as think critically about the social dimensions of the experience of health and illness.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 639 Politics of Life 3.0 Credits**

In this course students will explore the sociological implications of advancements that have been made in genetic engineering, biotechnologies and other areas of biomedical research. Starting with earlier examples of "power over life" from the 18th and 19th centuries, we will explore themes, dilemmas and complications embedded in the scientific control over life. Topics to be explored include biopower and biocapital, eugenics, race and class, stewardship and bioengineering, new reproductive technologies and reproductive choice, among much, much more. Consideration to feminist, queer and critical race theories will frame much of our discussion in class. This is a reading and discussion-intensive course.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 640 STS Perspectives on Risk and Disaster 3.0 Credits**

This course introduces students to critical debates and methods of analysis in science, technology, and society (STS) through the consideration of the modern history of global risk and disaster.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 641 Risk and Disaster Policy 3.0 Credits**

This course introduces students to critical debates and methods of analysis in science, technology, and society (STS) through the consideration of public policy formation around global risk and disaster concerns.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 643 Contemporary Stem Workforces: Organizations of Labor in Lab, Shop and Clinic 3.0 Credits**

In response to a growing national concern with STEM workforce development, this class critically analyzes scientific and technical labor and management practices in factories, laboratories, and clinics, and the social implications of STEM training and education. US and global cases are explored through the study of primary documents, artifacts, and the spaces of STEM work.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 645 War and Technoscience 3.0 Credits**

Students will examine technology in the context of warfare and military institutions. Students will study major questions in the history of military technology, including the Revolution in Military Affairs, arms races and technological determinism. Students will also examine the technological relationships between military institutions and the broader societies in which they are embedded.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 650 Global Subjects of Biocapital 3.0 Credits**

Students explore issues related to capitalism based on biotechnologies, the life sciences, medicine, agriculture and other related industries globally. Students consider specific cases of human trafficking, the global trade in human organs, global agribusiness and biotech, global clinical trials and medical tourism. The experiences of workers, farmers, research participants, and donors will be a central focal point. This is an intensive reading, writing and discussion course.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 651 Transnational Science, Technology & Capitalism 3.0 Credits**

This course will explore the importance of considering the "transnational" in understanding the historical role of science and technology in the making of capitalism and the modern world.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 660 Theoretical and Sociological Aspects of Measurement 3.0 Credits**

This course familiarizes students with theoretical and sociological issues related to measurement by focusing on topics at the crossroads of the history and philosophy of science and technology such as the notion of theory, the nature and epistemology of experiments, and related themes of instrumentation, measurement and coordination.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 665 Advanced Topics in Philosophy of Science 3.0 Credits**

This course studies advanced topics in the philosophy of science such as confirmation theory and theory choice, rationality and objectivity, scientific realism, laws of nature, scientific models and representation, explanation, reduction, computer simulations and climate change.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 697 Internship in Science, Technology and Society 0.5-3.0 Credits**

Internships provide opportunities for students to clarify career interests; synthesize prior academic knowledge with direct experience; and sharpen critical thinking, analytical, and observational skills. Learning from and networking with professionals in the field is enhanced. This course requires formulation and investigation of a research problem and a written paper.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Not repeatable for credit

**SCTS 798 Master's Research 0.5-9.0 Credits**

Through this graduate course, students will engage in independent study intended to help them formulate a research question, collect and analyze data, and present their research effectively. Students will be encouraged to improve their skills in reading and analyzing the literature and collecting and analyzing their own data. This course will require students to use the knowledge of science, technology and society that they have acquired throughout their training.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS I599 Independent Study in Science, Technology and Society 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS I699 Independent Study in Science, Technology and Society 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS I799 Independent Study in Science, Technology and Society 0.5-3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated 3 times for 12 credits

**SCTS I899 Independent Study in Science, Technology and Society 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS I999 Independent Study in Science, Technology and Society 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS T580 Special Topics in Science, Technology and Society 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS T680 Special Topics in Science Technology and Society 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS T780 Special Topics in Science Technology and Society 3.0 Credits**

Course covers on a rotating basis a variety of topics related to science, technology and society, including (though not limited to) environmental issues, the social dimensions of health and medicine, and the ethical, cultural and political dimensions of new technologies and scientific practices. May be repeated for credit when topics vary. Course content will vary so syllabus will be designed based on topic related to science, technology and society.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS T880 Special Topics in Science Technology and Society 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

**SCTS T980 Special Topics in Science Technology and Society 0.0-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Arts and Sciences

**Repeat Status:** Can be repeated multiple times for credit

## Screenwriting & Playwriting

### Courses

**SCRP 500 Reading as a Screenwriter 3.0 Credits**

This is an on-line course whose purpose is to teach and promote the use of active reading as a methodology of acquiring expertise in screenwriting. This course will give students a common language with which to discuss screenwriting as the basis for creation and inspiration.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 550 Screenwriting Workshop 3.0 Credits**

The Screenwriting Workshop is an on-line writing workshop that introduces core principles and gives students a common language with which to create, analyze and discuss screenplays within a workshop environment. Subjects covered include: visual writing, character development, vivid scene crafting, film structure, and screenplay form and function.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 555 Screenwriting Packet Exchange I 3.0 Credits**

This is a distance learning screenwriting mentorship course whose purpose is to enable students to practice and develop their craft. The format of the class is packet exchange. This course is part of a two-course sequence which allows writers to complete sustained work on longer projects aimed at filmed entertainment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 556 Screenwriting Packet Exchange II 3.0 Credits**

This is a distance learning screenwriting mentorship course whose purpose is to enable students to practice and develop their craft. The format of the class is packet exchange. This course is the second part of a two-course sequence which allows writers to complete sustained work on longer projects aimed at filmed entertainment.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 601 Professional Residency in Los Angeles 3.0 Credits**

This is a five-day residency for screenwriters with an intensive focus on career development. Daily schedule consists of peer-critique, faculty-led master workshop, and intensive career development modules.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 670 Writing for Television 3.0 Credits**

Teaches the essentials of writing the one-hour television drama. Students will be expected to conceive and write their own sixty-minute pilot script plus a 'bible' for their show.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**SCRP 691 Thesis in Screenwriting I 3.0 Credits**

The Masters Thesis cycle of classes is a two-course sequence that will lead you through the process of developing and writing a complete feature film or equivalent work (telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy).

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CW 690 [Min Grade: CR]

**SCRP 692 Thesis in Screenwriting II 3.0 Credits**

The Masters Thesis cycle of classes is a two-course sequence that will lead you through the process of developing and writing a complete feature film or equivalent work (telefilm, full-length stage play, television pilot, at least two spec episodes of an existing one-hour TV drama or four of an existing TV comedy).

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCR 691 [Min Grade: CR]

**SCRP 1599 Independent Study In Screenwriting 0.5-12.0 Credits**

This course allows students to put their creative writing skills to use in self-selected intensive projects. This course recognizes that writers have a limitless variety of interests and inspirations. Students are invited to propose Independent Study projects that draw inspiration from Drexel's unique resources.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**SCRP 1699 Independent Study In Screenwriting 0.5-12.0 Credits**

This course allows students to put their creative writing skills to use in self-selected intensive projects. This course recognizes that writers have a limitless variety of interests and inspirations. Students are invited to propose Independent Study projects that draw inspiration from Drexel's unique resources.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**SCRP T580 Special Topics in Screenwriting 3.0 Credits**

The purpose of the course is for students gain experience in specific genres and/or techniques such as but not limited to: pilot development, adaptation issues, branded content, etc.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**SCRP T680 Special Topics in Screenwriting 3.0 Credits**

The purpose of the course is for students gain experience in specific genres and/or techniques such as but not limited to: pilot development, adaptation issues, branded content, etc.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## Software Engineering

### Courses

**SE 570 Agile Software Development Process 3.0 Credits**

This course focuses on agile software production, introducing agile methodologies with the emphasis on software quality, mainstream development technology, and state-of-the-art frameworks. This course was built with the help of Agile Manifesto founders, software industry authors, consultants, trainers, and pedagogy experts, using Java systems to demonstrate Test-Driven Development (TDD) and Extreme Programming (XP).

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**SE 572 Web Services and Mobile Architectures 3.0 Credits**

This course introduces students to web-based and mobile development technologies and practices, including tiered application development, Service-Oriented Architectures and associated exchange protocols, and web-database programming. This course explores development and integration of web services from well-known providers as well as services created by the student, using a cross platform approach as a vehicle for interactions with the services.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**SE 575 Software Design 3.0 Credits**

This course provides fundamental knowledge of software design and management. Topics include software design principles, abstraction and modularization, hierarchical structures and software families, design modeling and analysis, pattern-oriented design, and technical debts. The course strikes a balance between teaching principles of software design and analysis, and providing a basis for understanding cutting-edge techniques and concepts, using open source projects as case studies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]



**SE 576 Software Reliability and Testing 3.0 Credits**

This course provides in-depth coverage of testing and other software validation techniques intended to produce reliable, correct software. Topics include formal and informal specification, core testing techniques, approaches to comparing quality of test suites, principles of reasoning about software correctness, guided automatic test generation, designing software to support validation, and using current and future tools to automatically validate or find bugs in software. The course strikes a balance between teaching principles of reasoning about programs, techniques in current use, and providing a basis for understanding cutting-edge techniques still in early stages of adoption.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 504 [Min Grade: C]

**SE 577 Software Architecture 3.0 Credits**

This course provides fundamental knowledge of software architecture needed by modern software architects. Topics include the basis skills and knowledge needed by a software architect, architecture modeling and analysis, architecture styles and patterns, architecture quality attributes, architecture in open source projects and industrial projects, etc. The course strikes a balance between teaching principles of software architecture and analysis, and providing a basis for understanding cutting-edge techniques and concepts, using open source projects as case studies.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 575 [Min Grade: C]

**SE 578 Security Engineering 3.0 Credits**

This course introduces students to foundational concepts pertaining to the broad area of security engineering. It starts with the central concept of a security protocol, and proceeds to human-computer interface issues, access control, crypto, and distributed system security. The course considers security from the viewpoint of different interest groups such as companies, consumers, criminals, police, and spies. Students also partake in a study of at least one of a number of important application areas, such as, for example, military communications, medical record systems, cash machines, and mobile phones.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 502 [Min Grade: C] and CS 503 [Min Grade: C]

**SE 610 Open Source Software Engineering 3.0 Credits**

Explores tools, techniques, process, and culture of free and open source software (FOSS) projects. Addresses open source project evaluation, business models, and FOSS as a source of software engineering innovation. Includes student participation in an existing humanitarian FOSS project. Introduces concepts of computing for social good.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**SE 627 Requirements Engineering and Management 3.0 Credits**

Provides students with an opportunity to explore and experience methodologies, tools, and techniques for eliciting, analyzing, specifying, and managing requirements in modern software development organizations. Focuses on the intersection of requirements engineering, strategic IS and business planning, and business process reengineering. Students will also learn about change management in the context of requirements engineering. Upon completion of the course, each student should have new skills and insights that are immediately applicable to the performance of the requirements engineering project function.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] or CS 502 [Min Grade: C] or INFO 600 [Min Grade: C]

**SE 630 Software Engineering Economics 3.0 Credits**

Focuses on concepts of software engineering economics applied to software projects and IT services. Coverage includes product and service selection and evaluation, impact of emerging technologies, standards, and vendor strategies. Emphasizes financial considerations including return on investment, time cost of money, depreciation, and system life applied to analysis of alternative designs.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**SE 636 Software Engineering Process 3.0 Credits**

Explores software engineering process models, techniques, and tools. Covers evolution of software process ideas including plan-based and agile methods. Emphasizes current practices including mainstream agile and lean software processes. Explores process selection and customization considering factors such as scale, control, and application domain.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] or CS 520 [Min Grade: C] or CS 502 [Min Grade: C]

**SE 638 Software Project Management 3.0 Credits**

Focuses on first-line management of software system development. Covers major themes including estimation (software cost factors, estimation models, and risk management), planning (work breakdown, scheduling, staffing, resource allocation, and creation of a project plan), and execution (team building, leadership, motivation, process tracking, control recovery, and communication within and outside the project).

**College/Department:** College of Computing and Informatics

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] or CS 502 [Min Grade: C] or SE 630 [Min Grade: C] or INFO 532 [Min Grade: C]

**SE 691 Software Studio 3.0 Credits**

Provides a multi-term integrative experience involving application of software engineering tools and techniques. Students work in teams to develop or contribute to large-scale software products. Requires participation in a development process that includes planning, specification, design, implementation, evaluation, and documentation.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated 2 times for 9 credits

**Prerequisites:** SE 570 [Min Grade: C]

**SE T680 Special Topics in Software Engineering 0.0-12.0 Credits**

Special Topics Covers topics of special interest to students and faculty.

**College/Department:** College of Computing and Informatics

**Repeat Status:** Can be repeated multiple times for credit

## Special Education

### Courses

**EDEX 514 Special Education Student Teaching Seminar 6.0 Credits**

The seminar course is designed to develop the student's special education teaching knowledge, skills and abilities through field placement, supervision and reflective practice. Each week, the instructor and students will meet to share experiences, participate in best practice workshops, resource exploration, case study presentations and to reflect on what is being learned while student teaching in classrooms. Students will be required to complete 12 weeks of full time student teaching with increasing responsibilities to simulate the role of the PK-12 special educator. For more than half of the student teaching experience, students will assume full responsibility for the planning and delivery of instruction. Students will be assigned a university supervisor and be observed 5 times over the course of the term.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 536 [Min Grade: B] and EDEX 543 [Min Grade: B] and EDEX 549 [Min Grade: B] and EDEX 550 [Min Grade: B] and EDEX 552 [Min Grade: B] and EDEX 555 [Min Grade: B] and EDEX 575 [Min Grade: B] and EDEX 578 [Min Grade: B] and EDEX 568 [Min Grade: B] and EDEX 588 [Min Grade: B] and EDUC 521 [Min Grade: B] and EDUC 515 [Min Grade: B] and EDUC 522 [Min Grade: B]

**EDEX 534 Foundations of Inclusive Education 3.0 Credits**

This course provides an overview of the essentials of special education and how to manage instruction for students with diverse learning and behavioral profiles. The course will cover the purposes and uses of various forms of assessment in special education with an emphasis on legal and ethical considerations in assessment as part of the eligibility process for students with disabilities. The etiology, characteristics and prevalence of specific disabilities will also be highlighted. Curricular, environmental and instructional intervention adaptations to address learning and behavioral needs in the inclusive classroom will be reviewed. Research on inclusive education approaches of collaboration, co-teaching, differentiated instructional delivery models and universal design for learning will be discussed.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 536 Special Education Law and Process 3.0 Credits**

This course focuses on special education processes available for students with disabilities in grades PK-12. Specifically, this course provides an overview of child find, evaluation and education and IEP/IFSP development, implementation and monitoring concepts; as mandated by IDEA and Section 504 of the Rehabilitation Act of 1973. Students will apply special education process strategies such as collaboration, problem solving, progress monitoring and early dispute resolution techniques. Specific legal cases will be reviewed throughout the term. A field experience component is required for this course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 542 Fundamentals of Special Education 3.0 Credits**

This course provides an overview of the essentials of special education for today's teachers. Specific emphasis is placed on the history of special education, purposes of formal and informal assessments and current research on inclusive classrooms. Additional focus will be placed on legal/ethical considerations in testing and the translation of data.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 543 Emotional and Behavioral Support of Individuals with Disabilities 3.0 Credits**

The focus of this course is on both low and high-incidence emotional and behavioral problems encountered in general and special education environments. Specific emphasis will be on understanding of characteristics and interventions that work with the most challenging students. The course also emphasizes behavior reduction strategies that are consistent with a positive behavioral support approach. Research in the area of behavior disorders will also be introduced. Field experience hours are required for this course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 544 Inclusive Practices 3.0 Credits**

This course focuses on the management of instruction for all students in the inclusive classroom by examining the diverse cognitive, physical, social, behavioral and language development of children and emphasizes curricular, environmental and instructional adaptations in addressing students' needs. This course has a field component.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: C]

**EDEX 549 Teaching Individuals with High Incident Disabilities 3.0 Credits**

This course focuses on high-incidence disabilities, specifically learning disabilities and language disorders encountered in the general and special education environments. Additional emphasis is placed on an understanding of characteristics and interventions that support these students. Research-based instructional strategies and accommodations will also be discussed. Field observation hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

**EDEX 550 Teaching Individuals with Low Incident Disabilities 3.0 Credits**

This course focuses on curriculum development approaches, instructional strategies and accommodations for students with low incident and moderate/severe disabilities, with emphasis on age-appropriate functional education in school and community based programs. Additional emphasis is placed on disabilities such as low vision and blindness, hearing impairment and deafness and severe health and physical disabilities. Field observation hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

**EDEX 552 Integrating Technology for Learning & Achievement 3.0 Credits**

This course is designed to teach educators how to integrate technology into instruction to support achievement in general and special education classes, specifically to support reading, writing and mathematics achievement. It also focuses on the use of technology for universal design for learning and using assistive technology with students with disabilities. Field observation hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: C] and EDEX 544 [Min Grade: C]

**EDEX 555 Teaching Students with Autism Spectrum Disorder 3.0 Credits**

The focus of this course is on students with an Autism Spectrum Disorder (ASD). Specific emphasis will be on the understanding of characteristics, instructional strategies, and interventions that work with the range of students with ASD. The course also emphasizes behavior reduction strategies that are consistent with a positive behavioral support approach for use with students with ASD. Research in the area of ASD will also be emphasized. Field experience hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 556 Characteristics & Methods: Autism 3.0 Credits**

This course furthers the student's understanding of the diagnosis of Autism. Students will explore current issues and best practices in providing educational services that meet the unique characteristics and needs of students with Autism. Field observation hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 555 [Min Grade: B] or ABA 630 [Min Grade: B]

**EDEX 558 Characteristics & Methods: High Functioning Autism 3.0 Credits**

This course furthers the student's understanding of the diagnosis of High-Functioning Autism. Students will explore current issues and best practices in providing educational services that meet the unique characteristics and needs of students with High-Functioning Autism. Field experience hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 551 [Min Grade: B] or EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

**EDEX 560 Communication & Language Interventions: Autism Spectrum Disorders 3.0 Credits**

The focus of this course is on communication and language skills, deficits, needs, and interventions for students with Autism Spectrum Disorders (ASD). Students will gain an understanding of the development of communication and interventions for students with ASD who are non-verbal, limited verbal, or verbal. Social pragmatics will be covered. Fieldwork hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 551 [Min Grade: B] or EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

**EDEX 562 Behavior & Sensory Support: Autism Spectrum Disorders 3.0 Credits**

The focus of this course is on specific behavioral and sensory issues of students with Autism Spectrum Disorders (ASD). Students will gain skills in research-based interventions for the behavioral issues and sensory needs of students with ASD. Close attention will be paid to prevention strategies that are effective for students with ASD. Field observation hours are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 551 [Min Grade: B] or EDEX 630 [Min Grade: B] or ABA 630 [Min Grade: B]

**EDEX 568 Literacy and Content Skill Development PK-12 3.0 Credits**

The focus of this course is literacy skill development of students at-risk for reading disabilities and those students currently identified with reading disabilities. The course will teach a variety of instructional interventions and strategies for improving student decoding, encoding and comprehension in the content areas. The course will also focus on improving vocabulary, fluency, and motivation in students who struggle with reading. Writing strategies and Common Core standards will be addressed. The course includes assessing and progress monitoring in order to determine the success of the interventions and strategies. This course requires a field experience.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 570 Integrating Assistive Technology for Individuals with High Incident Disabilities 3.0 Credits**

This course is designed to teach educators how to integrate assistive technology into instruction to support achievement in general and special education classes for students with disabilities in high incidence programs.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 552 [Min Grade: C]

**EDEX 572 Integrating Assistive Technology for Individuals with Low Incident Disabilities 3.0 Credits**

This course is designed to teach educators how to integrate assistive technology into instruction for students with low incidence disabilities, including communication impairments, intellectual disabilities, autism, and physical disabilities.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 552 [Min Grade: C]

**EDEX 575 Teaching STEAM in an Inclusive Environment PK-12 3.0 Credits**

The focus of this course is the teaching of science, technology, mathematics and the arts to all students in an inclusive environment. STEAM is an educational approach that uses content for guiding students in inquiry, dialogue, creative and critical thinking. These are critical life skills that students with disabilities often struggle to master. This course will teach instructional interventions and co-teaching strategies for improving student understanding of complex concepts and fostering experiential and creative learning opportunities. Field experience hours are required for this course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 578 Special Education Practicum PK-12 3.0 Credits**

The focus of this course is on instructional strategies to meet the unique learning needs of students with disabilities. Lesson planning, unit planning and grouping strategies are key elements in this course. Collaboration with other teaching and non-teaching staff members in all delivery settings also is emphasized. Students choose, evaluate, and construct instructional materials. This course has a stage III field experience and candidates will be observed by a university supervisor a minimum of three times during the term.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 580 Social Emotional Wellness and Evidence-Based Preventative School Practices 3.0 Credits**

This course is designed to teach educators the critical role that social emotional wellness plays in the academic, social and behavioral development of children and youth. Research based programs and practices, including but not limited to, universal screening and school-wide PBIS and proactive educative approaches to encouraging coping and resiliency will be highlighted. Students will develop an understanding of universal screenings, assessments and instructional strategies related to resiliency and social emotional wellness. 15 hours of field placement are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 581 Understanding Social Emotional Disorders 3.0 Credits**

This course is designed to provide educators with an understanding of social emotional wellness and common types of mental health issues that children and youth in school experience. An understanding of the role adverse childhood experiences and trauma has on the growth, development and learning of children and youth will be stressed. Additionally, the role of the teacher and the school in contributing information to the assessment process and their responsibility to provide support according to a student's classification and/or diagnosis will be explored. 15 hours of field placement are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 582 Evidence-Based School Interventions and Trauma Informed Education/Care 3.0 Credits**

This course is designed to teach educators about research-based interventions that schools use to support individual students in the general education setting who are struggling with mental health issues or students who have experienced trauma or adverse childhood experiences. Students will gain an understanding of the critical features of mandated and best-practice programs (e.g., trauma-informed care, PBIS, crisis planning) that support students within school settings. Evidence-based tools that can be used on a daily basis will be presented as well as crisis de-escalation. This course will focus on the use of data to inform educational practices and interventions. 15 hours of field placement are required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 583 Collaboration and Community Based Practices to Promote Social Emotion Wellness 3.0 Credits**

This course will highlight the need to work collaboratively and authentically with parents, students and the community to address and promote social emotional wellness as well as intervening with students who are experiencing mental health issues at an intensive level. Tools and processes to communicate and advocate on behalf of students will be highlighted. Structured, intensive interventions, curriculum, and best practices will be addressed that have research support to address the needs of the individual students most in need of supports. This is a 3-credit course with 15 hours of field placement required.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 588 Implementing Academic Interventions in Inclusive Educational Environments 3.0 Credits**

This course is designed to teach educators how to use assessment and progress monitoring data to identify, implement, and modify academic interventions for students with disabilities. This course will focus on interventions in mathematics, literacy, science as well as problem solving and organization. Students will implement these interventions with a working knowledge of the Pennsylvania Academic Standards in core content areas. Students will learn how to match specific interventions to the instructional areas of need and how to document these interventions in student IEPs. Field experience is a requirement of the course.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 542 [Min Grade: B] and EDEX 544 [Min Grade: B]

**EDEX 600 Family, School and Community Engagement in Special Education 3.0 Credits**

This course is designed to provide an understanding of how to effectively implement the spirit of the Individuals with Disabilities Education Act (IDEA) and Section 504, using a collaborative approach among families, educators, and service providers. Specifically, this course focuses on the structure and operation of efficacious collaborative teams, facilitating co-educator partnerships and integrating internal and external supports through positive family engagement.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDEX 601 Special Education Advocacy 3.0 Credits**

This course is designed to provide students with an opportunity to explore and master collaborative advocacy practices critical to the special education process.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 602 Special Education Dispute Resolution and Skills Training 3.0 Credits**

This course is designed to provide a comprehensive understanding of special education dispute resolution opportunities and training in the communication skills necessary to successfully participate within each of those opportunities.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 701 Field Experience in Applied Behavior Analysis 3.0 Credits**

This course allows students to discuss and apply technical knowledge, professional skills, and ethical guidelines to their experiences in the field of applied behavior analysis. The course requires a field experience placement of 30 hours per week under the supervision of a Board Certified Behavior Analyst (BCBA) in a behavioral health and/or educational or community-based setting. In addition, students will participate in bi-weekly collaborate meetings with the instructor. The focus of the collaborate meetings is behavior analysis in practice with an emphasis on practical and professional issues that arise in the workplace as well as a review and discussion of the course assignments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 630 [Min Grade: B]

**EDEX 702 Field Experience in Applied Behavior Analysis II 3.0 Credits**

This is the second course in a 2-course series designed to allow students to discuss and apply technical knowledge, professional skills, and ethical guidelines to their experiences in the field of applied behavior analysis. The course requires a field experience placement of 30 hours per week under the supervision of a Board Certified Behavior Analyst (BCBA) in a behavioral health and/or educational or community-based setting. In addition, students will participate in bi-weekly collaborate meetings with the instructor. The focus of the collaborate meetings is behavior analysis in practice with an emphasis on practical and professional issues that arise in the workplace as well as a review and discussion of the course assignments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDEX 701 [Min Grade: B]

**EDEX 710 School Law & Policy in Special Education 3.0 Credits**

This course provides an overview of the legal rights of students and families in the field of special education. Students will explore the source, history, current status, and litigation affecting special education. This course relates equal protection and procedural due process to school practices and policies affecting students with disabilities.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 712 Instructional & Curriculum Leadership in Special Education 3.0 Credits**

This course explores the administration of teaching/learning as a system in an inclusive school. Students learn leadership practices for universal screening, integrating assistive technology, research/evidence based-practices, and assessment systems responsive to and linguistic diversity. Special focus on leadership issues related to the urban, suburban, and rural context.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 714 Development, Supervision, & Support: Special Education Leadership 3.0 Credits**

This course provides an overview of personnel functions: recruitment, selection, orientation, support, evaluation, and development; interpersonal skills; motivation/change theories; and the utilization of technology in the process. In addition, it will look at the unique issues of co-leading personnel with other administrators, collective bargaining, and the grievance process.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 716 Organization & Administration of Special Education 3.0 Credits**

This course is designed to provide an overview of the organizational practices for the administration of special education programs. Students will be introduced to special education revenue sources, compliance, child count, and budget monitoring as well as the special education plan.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 721 Supervisor of Special Education Internship: Special Education Leadership 1.0 Credit**

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the first of a four-term internship. The focus is on legal and policy issues in special education leadership.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 722 Supervisor of Special Education Internship: Instructional Leadership 1.0 Credit**

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the second of a four-term internship. The focus is on instructional leadership in special education leadership.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 723 Supervisor of Special Education Internship: Collaboration & Personnel 1.0 Credit**

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile activities in a portfolio. This is the third of a four-term internship. The focus is on collaboration and personnel issues: special education leadership.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX 724 Supervisor of Special Education Internship: Finance & Management 1.0 Credit**

The student will be required to log at least 75 hours of mentored leadership activities during each quarter to total at least 300 hours and compile in a portfolio. This is the fourth of a four-term internship. The focus is on school resources in special education.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDEX I599 Independent Study in EDEX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX I699 Independent Study in EDEX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX I799 Independent Study in EDEX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX I899 Independent Study in EDEX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX I999 Independent Study in EDEX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX T580 Special topics in EDEX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX T680 Special topics in EDEX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX T780 Special topics in EDEX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX T880 Special topics in EDEX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDEX T980 Special topics in EDEX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Sport Coaching Leadership

### Courses

**SCL 501 Coaching Theory and Principles 3.0 Credits**

This course will include understanding the various roles of the coach and introduce students to the field of coaching. An emphasis is placed on creating an athletic environment to enhance the social-emotional growth of athletes.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 502 Ethical Considerations in Coaching 3.0 Credits**

This course will include the various ethical situations coaches encounter within their organizations and with other coaches and athletes. Students will gain an understanding of the ethical considerations in sport and develop strategies to become ethical coaches and develop athletes who understand the importance of ethics in sport.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 503 Learning Strategies in Coaching 3.0 Credits**

This course focuses on coaching pedagogies and the ways in which humans learn movement skills through instructional practices. Skill acquisition is critical to sport success and coaches must understand the complexities of motor skill development and how athletes learn in varying situational contexts. This course provides a foundation in various pedagogical theories for coaches.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 504 Coaching Psychology 3.0 Credits**

This course includes a comprehensive look at mental skills training in athletic populations and the ways in which coaches can use this type of training to improve athletic satisfaction and performance outcomes. The major areas of focus include each of the psychological skills athletes can use to increase satisfaction and improve performance and how coaches can create a mental skills training program for their athletes to best utilize these skills.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 525 Athlete Leadership Development 3.0 Credits**

This course is designed to provide students with an understanding of athlete leadership development and its importance in sport programming. Various athlete leadership models at the youth, scholastic, collegiate, and professional levels will be reviewed and students will have the opportunity to create their own athlete leadership development program.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 580 Kinesiology 3.0 Credits**

This course provides an introduction and overview to the science of human movement. Students will apply basic kinesiology concepts to the areas of physical activity, athletics, and recreation/fitness.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 614 Sport Performance & Energy Systems 3.0 Credits**

This course covers nutrient categories and how they function in the body, with a particular emphasis on how to instill in athletes the advantages of healthy eating, and how to impart good information regarding food and food choices to a group of athletes in a team environment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 615 Athletic Recruiting 3.0 Credits**

This course is designed to provide students with the necessary tools to become effective recruiters of athletic talent. Students will learn how to identify and recruit talent that will have a high impact within their athletic programs and be compliant with NCAA, NAIA, and NJCAA rules when recruiting.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 616 Sport Conditioning 3.0 Credits**

This course will take a multi-faceted approach to the general science of strength training and sports conditioning. Students will gain a basic understanding behind training principles by covering the following topics: exercise physiology concepts and applications, testing and evaluation, flexibility and exercise techniques, program design, periodization, aerobic and anaerobic training considerations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 617 Prevention & Care of Athletic Injuries 3.0 Credits**

This course is designed to introduce the student to the care and prevention of athletic injuries. The course content will include a review of pertinent anatomical structures and their relationship to injuries. The course will also cover mechanisms of injuries, intrinsic and extrinsic variables of injuries, and basic preventative and treatment measures for common sports related injuries.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 618 NCAA Compliance 3.0 Credits**

This course is designed to provide students with the opportunity to learn the basic regulatory and due process rules that govern NCAA competition. Students will be introduced to the basic elements of NCAA regulations, rules interpretations, enforcement decisions and sanctions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 619 Global Coaching Seminar 6.0 Credits**

This course is designed to expose coaches to a variety of international coaching methods and concepts via a study abroad experience for 7-10 days. This seminar is offered each summer and locations vary by year. Each student in the Sport Coaching Leadership program will attend this study abroad experience. An emphasis is placed on athlete interaction and engagement, practice planning, recruiting, and sport for development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 620 Biomechanics in Rowing 1.5 Credit**

This course is designed to provide students with an understanding of the fundamental concepts of biomechanics in the sport of rowing. The principles of biomechanics and their relationship to boat speed will be reviewed in detail.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 621 Physiology and Training Methods for Rowing 3.0 Credits**

This course is designed to provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the sport of rowing. The significance of the effects of physical conditioning and training on the rower will be examined and students will have the opportunity for practical application through the development of their own comprehensive rowing-focused physiological training program.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 623 Equipment Management and Rigging for High Performance 1.5 Credit**

This course will provide students with an opportunity to learn about selecting, purchasing, and managing equipment in rowing. Special focus will be placed on how to properly rig racing shells based on specific athlete needs.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 624 Rowing Safety and Risk Management 1.5 Credit**

This course is designed to provide students with an understanding of the safety and risk management principles and procedures critical to providing a safe environment for their athletes. Rowing-specific safety basics and best practices for risk management and emergency protocol will be examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 625 Racing: Rules, Preparation, and Strategy 1.5 Credit**

This course is designed to provide students with the tools needed to manage athletes and environments associated with competition in rowing. Managing coxswains, the rules of racing, strategic race plans, athlete selection, and communication with other coaches and officials will all be covered.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 626 Rowing Technique 1.5 Credit**

This course will cover principles associated with rowing technique. Students will learn to evaluate technical aspects of the stroke and work with athletes to make improvements for increased speed and performance.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 627 Emerging Trends in Sport 1.5 Credit**

This course focuses on emerging technologies and new trends in sport. Contemporary developments in sport will be explored in order to provide students with the information necessary to best utilize these technologies and trends for sustained success and prepare athletes for successful competition.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 630 History of Lacrosse 1.5 Credit**

This course is designed to provide students with an understanding of the origins of lacrosse and the significance of how "America's first sport" developed over time into the youth, interscholastic, professional and international modern sport of lacrosse played today. The history and evolution of the sport of lacrosse will be explored and students will have the opportunity to gain in-depth knowledge about how lacrosse has become one of the world's fastest growing sports.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 631 Physiology and Training Methods in Lacrosse 3.0 Credits**

This course is designed to provide students with an understanding of the fundamental concepts of the physiological functions and training principles associated with the sport of lacrosse. The significance of the effects of physical conditioning and training on the lacrosse player will be examined and students will have the opportunity for practical application through the development of their own comprehensive lacrosse-focused physiological training program.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 632 Emerging Technologies and Trends in Lacrosse 1.5 Credit**

This course focuses on the state of the game of lacrosse through emerging technologies and new trends. Contemporary developments in lacrosse will be explored in order to aid students with the information necessary to best approach a changing landscape for sustained success and prepare players for the modern game.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 633 Equipment and Field Management in Lacrosse 1.5 Credit**

This course provides a foundation for the equipment and field management needs fundamental to the sport of lacrosse. Modern-day equipment and field standards will be explored and current advancements in equipment for enhanced performance will be examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 634 Lacrosse Safety and Risk Management 1.5 Credit**

This course is designed to provide students with an understanding of the safety and risk management principles and procedures critical to providing the safest playing environment for players. Lacrosse-specific safety basics and best practices for risk management and emergency protocol will be examined.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 635 The Women's Lacrosse Game: Rules, Preparation, and Strategy 3.0 Credits**

This course delivers a strategic approach to game preparation and management with a focus on skill development specific to the women's lacrosse game at a variety of age, skill and competitive levels. Effective methods for teaching both technical and tactical skills are investigated and students will acquire the tools necessary to manage athletes and environments associated with competition in women's lacrosse.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 636 The Men's Lacrosse Game: Rules, Preparation, and Strategy 3.0 Credits**

This course delivers a strategic approach to game preparation and management with a focus on skill development specific to the men's lacrosse game at a variety of age, skill and competitive levels. Effective methods for teaching both technical and tactical skills are investigated and students will acquire the tools necessary to manage athletes and environments associated with competition in men's lacrosse.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 695 Coaching Practicum I 0.5 Credits**

This is the first practicum in a series of three coaching practicums. This practicum experience will focus on using basic coaching theory and principles under the guidance of the current coaching or administrative staff.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 696 Coaching Practicum II 0.5 Credits**

This is the second practicum in a series of three coaching practicums. This practicum experience will focus on gaining experience in the administrative aspects of coaching under the guidance of the current coaching or administrative staff.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**SCL 697 Coaching Practicum III 2.0 Credits**

This is the final practicum in a series of three coaching practicums. This practicum experience will focus on designing and completing a coaching project for a particular team under the guidance of the current coaching or administrative staff.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCL 696 [Min Grade: C]

**SCL I599 Independent Study in SCL 0.0-12.0 Credits**

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit



**SCL I699 Independent Study in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL I799 Independent Study in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL I899 Independent Study in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL I999 Independent Study in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL T580 Special Topics in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL T680 Special Topics in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL T780 Special Topics in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL T880 Special Topics in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit**SCL T980 Special Topics in SCL 0.0-12.0 Credits****College/Department:** School of Education**Repeat Status:** Can be repeated multiple times for credit

## Sport Management

### Courses

**SMT 601 Sports Industry Management 3.0 Credits**

This course provides detailed overview of the sports industry and its management and business practices. Students will study organizational theory, human resources, decision making, policy development, planning, governance and the management functions necessary to provide them with the appropriate skills and knowledge for the effective management of sport organizations.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 602 Sport Law 3.0 Credits**

This course will examine the diverse and complex nature of sport law by providing an overview of the legal issues that are of particular concern to sport managers. In addition, the course will expose students to the legal standards, principles and practices that can be applied to the various management challenges that exist within the sports world. Students will be introduced to sport law through lectures, readings and assignments.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 603 Sports Marketing 3.0 Credits**

The course provides a study of marketing, sponsorship and public relations concepts with an application to the sports industry. Students will cover topics including licensing, merchandising, sponsorships, ticketing, consumer behavior, market segmentation and pricing. The role of research in marketing and practices of mainstream marketing will also be examined.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 604 Sport Media & Technology 3.0 Credits**

An analysis of the sport media's changing landscape and the role it plays in political, social and technological climates. Emphasis on professional and intercollegiate sports and the implications of simultaneous production and consumption. Course will examine new information technologies, commercial pressures in sport media and global sport media expansion.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 605 Sports Economics 3.0 Credits**

Students explore general economic principles as they apply to the sports industry. Economic analysis is utilized to study sports markets: demand, supply and pricing; league organization, monopoly power and market failure; labor relations, labor market problems and remedies, public finance of sports.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 606 Social Issues in Sport 3.0 Credits**

This course provides a detailed analysis of the sociology of sport in our society. Sports are connected to the many areas of our life including the family, the economy, the media, politics, education, and religion. This course will provide an opportunity for students to explore each of these components in an in-depth manner.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 607 Sport Budgets & Fiscal Practices 3.0 Credits**

Basic theory in accounting and finance applied to managerial control of sport organizations. Includes forms of ownership, taxation, financial analysis, capital budgeting, and economic impact studies.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 608 Sport Media & Public Relations 3.0 Credits**

Course is an overview of the discipline of sports information/public relations and its role in the field of sport management. Course will cover a wide variety of skill sets and roles necessary to succeed in this continually evolving discipline. New media issues and procedures will be covered.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit**SMT 609 Sports Ticket Sales & Strategies 3.0 Credits**

Course will examine changing environment of ticket and operation sales in the sport industry. Course will expose students to the standards, practices and strategies that can be applied to the multitude of areas that ticketing touches within the sports industry.

**College/Department:** LeBow College of Business**Repeat Status:** Not repeatable for credit

**SMT 610 Seminar on Sports Research 1.0 Credit**

This course will consist of an integration of real world issues with the rigor of academic research. It will involve a series of lectures by leaders in the field of sports management, which will then stimulate further research and discussion by the students in a seminar setting.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Corequisite:** SMT 601

**SMT 611 Corporate Sponsorship Sales & Strategies in Sport 3.0 Credits**

Course will examine marketing strategy and techniques used by industry professionals to increase revenues for sports properties. Students will gain an understanding of sponsorship sales terminology, cold calling and prospecting techniques, marketing proposal presentation guidelines and relationship building strategies to increase overall sales.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 612 Development & Fundraising Strategies in Sport 3.0 Credits**

Course will examine skills, strategies and techniques needed for successful annual and major gift solicitation in the field of athletic development. Topics include understanding annual fund and major gift fundraising; examining booster club organization structure, benefits; priority seating programs and importance of donor research in the fundraising process.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 615 Introduction to the College Sport Industry 3.0 Credits**

College sport as a multibillion dollar industry rests at the intersection of higher education, corporate America, and global commerce. This course offers an in-depth view of the college sport industry from historical, educational, financial, legal, political, and social perspectives.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 618 NCAA Compliance 3.0 Credits**

This course is designed to provide students with the opportunity to learn the basic regulatory and due process rules that govern NCAA competition. Students will be introduced to the basic elements of NCAA regulations, rules interpretations, enforcement decisions and sanctions.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 621 Leadership in Sport Management 3.0 Credits**

Students will discuss the process of leadership and leadership development in sports organizations. Leadership styles, qualities, philosophies and the ability to adapt to different situations are addressed. Information on recruiting, training, supervising and evaluating personnel are examined as are current sporting issues and their impact on sport leadership.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 622 Labor Relations & Collective Bargaining in Sport 3.0 Credits**

Course examines various aspects of professional sports including the unique office of the league commissioner, the antitrust and labor law dimensions of the player-labor market and the peculiar institution of the player agent in a unionized and collective bargained industry.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SMT 602 [Min Grade: C]

**SMT 625 Sports Promotion and Sales 3.0 Credits**

Promotions and sales within the context of sport management. This provides a comprehensive study of promotions and marketing practices in the industry. Analysis of sport sponsorship, retention strategies and evaluation methods, plus fundraising and promotion of sports services and products to the sports consumer.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 626 Globalization of Sport 3.0 Credits**

An analysis of the impact of globalization on the Sport Industry. Students will be introduced to managerial, human resource and cultural differences that impinge upon the sports industry. An oversight of the different governance structures employed throughout the industry overseas will also be examined.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 627 Sports Tournaments & Events 3.0 Credits**

The organizing, planning and running of sporting events is crucial to any sport manager at any level. Issues of staffing, volunteers, location, security, medical and risk management considerations are just a number of areas that this course will cover. Students will be expected to organize and run their own sporting event.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 629 Managing Coaches & Teams 3.0 Credits**

Course will include setting performance goals in coaching, the various roles of the coach, ethical conduct in coaching, coach-athlete compatibility, burnout, personality of the coach and coaching youth sports. Emphasis will be placed on how administrators can best manage coaches for continued athletic program success.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 630 Sports Industry Practicum 3.0 Credits**

The practicum is designed to develop greater breadth and depth of student's understanding and experience within the industry. The practical application of the knowledge and skill acquired in classes will help students to extend their expertise by working in a sport management related organization.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 633 Sport Tourism Strategies 3.0 Credits**

Course will examine sport tourism as a marketing strategy for cities, sport tourist consumer behaviors, the interrelationships of businesses involved in sport tourism and the economic, environmental and social-cultural impact of sport tourism. Other course topics include event bidding, facility and financing.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 635 Sport Facilities & Event Management 3.0 Credits**

Course is designed to provide learning experience in managing sports facility operations, planning new sports facilities and renovating and maintaining existing facilities. Course also provides student exposure to comprehensive event planning and management for sport and special events.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 640 Consumer Behavior in Sport 3.0 Credits**

Course will examine consumer behavior in the sport industry and its impact on fan retention and revenues. Students will examine customer services philosophies and techniques used by successful companies and sport organizations to improve the overall experience of consumers. Students will conduct research to measure fan and sponsor experience.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 642 Administration of Interscholastic Sports 3.0 Credits**

Interscholastic sports represent the largest and most complex sector of the sport enterprise in the United States. This course offers an in-depth exploration of the challenges that administrators confront in running interscholastic athletic programs.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 645 Gridiron Glory 3.0 Credits**

For over 100 years, higher education and college football have shared an interesting and tenuous relationship. College Football brings a dynamic to a college campus unlike many other features. The United States is the only country in the world to link sports and academics so intricately. But that nexus creates tensions and challenges, for students on the team, for the athletic department and for the College Administration. So much of higher education's sense of place and self has revolved around football on campus. Those who wish to work in Higher Education will be exposed to the dynamics that football brings to a college campus. This course will cover the finances, oversight, enrollment, and campus climate and will include discussions on NCAA Divisions I, II and III, as well as community colleges.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 648 Gender Equity in High School & College Sports 3.0 Credits**

This course is designed to provide students with the opportunity to about the impact Title IX and other gender equity laws have had in shaping high school and college athletic programs. Consideration is given to the challenges associated with achieving equity in a system that is sex-segregated.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 650 Sports Contracts 3.0 Credits**

Course is designed to provide students with the opportunity to learn the legal issues and strategies surrounding a wide variety of contract issues in sports. Students will be introduced to the core elements of contract law and see it applied by the court system in the context of the sports industry. An understanding of the importance of contracts in sports will be gained through a review of legal cases, actual industry contracts, speakers, and other standard classroom material.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 655 March Madness: The Economics, History, & Social Impact of the NCAA Basketball Tournaments 3.0 Credits**

This course will examine the business of one of sport's most lucrative and popular properties. Consideration will be given to the economics of this sport mega-event, its history, and its social impact.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 698 Research Design & Techniques in Sport 3.0 Credits**

An examination of research designs, methodology and techniques used in developing the research project or thesis. Historical, empirical and experimental methods will be discussed plus skills related to writing reviews and critiques of literature. Students will learn to design an original study and begin to develop the outline for their final Masters work.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**SMT 699 Project/Research Thesis 3.0 Credits**

The course requires the preparation of a substantial research and writing project/research thesis planned and completed under the guidance of a graduate faculty advisor. It is the culminating work of the Masters program and hence is expected to include research design, organization, analysis, evaluation, literature review, plus the student's conclusions pertaining to the research findings.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SMT 698 [Min Grade: C]

**SMT I599 Independent Study in SMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT I699 Independent Study in SMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is SMT.

**SMT I799 Independent Study in SMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT I899 Independent Study in SMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT I999 Independent Study in SMT 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT T580 Special Topics in Sport Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT T680 Special Topics in Sport Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT T780 Special Topics in Sport Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT T880 Special Topics in Sport Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**SMT T980 Special Topics in Sport Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Systems Engineering

### Courses

**SYSE 510 Systems Engineering Process 3.0 Credits**

This course covers the complete system engineering process, touching on the many facets of engineering systems from needs and requirements generation to production and construction to operation. Engineering involves application of science to perform a myriad of technical processes including development, manufacturing, and maintenance, sustainment and operation of systems. Engineering education is concerned with cognitive, hardware, and software tools to attack technical problems. Engineers are normally introduced to component level problems before proceeding to more complex ones. Systems engineering covers a higher level system concept, applying well tested engineering practices to address processes critical to most large engineering efforts, and optimizing them for effectiveness and financial success.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 511 Systems Engineering Tools 3.0 Credits**

This course focuses on teaching a variety of tools and applications. Stochastic modeling and simulation tools used for systems engineering analysis are covered. Course provide a comprehensive understanding of use of tools as well as modeling and simulation concepts to perform simulation analysis of physical and conceptual systems. Systems engineering has great potential for solving problems related to physical, conceptual and esoteric systems. The power of systems engineering relies on the ability to conduct elaborate analysis in an attempt to employ the most optimal integrated system. This approach requires understanding of tools for conducting requirements analysis, analysis of alternatives and systems architectural design. Students will learn how to apply "state of the art" tool.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

**SYSE 520 Global Sustainment and Integrated Logistics 3.0 Credits**

This course focuses on logistics activities that are associated with the operations, maintenance and sustainment stage of the systems life cycle. This includes reliability, availability and maintainability analysis as well supply chain management to support the system during operational phases. This course discusses traditional methods and contemporary topics associated with logistics and global sustainment. It also elaborates logistics from a systems engineering perspective as the focus is to prepare a system for operations, maintenance and sustainment activities that are associated with the back end of the systems engineering life cycle. This course also introduces methodologies and tools for achieving affordable integrated logistics.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 521 Integrated Risk Management 3.0 Credits**

Will expose students to various methodologies for the evaluation of strategic alternatives to allow analysis and organizational visibility of the underlying assessment of risk, communication and organizational debate of the decision choices among plausible strategic alternatives. Assessment of uncertainty, identification of risk variables, formulation of mitigation plans and real options will be covered. The role of financial analytics to provide consistent criteria and illustrate the impact of alternative decisions and uncertain market scenarios will be discussed. Provide understanding of most sensitive factors that influence risk for each strategy or project allows an organization to select a risky strategy that meets the risk tolerance of the enterprise and leverages value of future gains.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 531 [Min Grade: C]



**SYSE 522 Engineering Supply Chain Systems 3.0 Credits**

Covers the concepts and methods used for designing, modeling, and managing the supply chain as a strategy that organizations use to be competitive in the global marketplace. The course has broad applications for different types of industries such as manufacturing, service, and retailing. Includes both practical and analytical approaches used for managing supply chain. Students in this course will apply industrial and systems engineering tools to design, analyze, and optimize the supply chain such as, mathematical optimization, inventory management, transportation and network location, facilities planning and material handling. More advanced topics are interrelated such as: value of information sharing in the supply chain, customer value, strategic alliances, international issues and decision support systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 572 [Min Grade: C]

**SYSE 523 Systems Reliability Engineering 3.0 Credits**

The course focuses in modeling and analysis of systems reliability using probability models. The primary reason for modeling reliability systems is to improve the reliability and availability of a product or a system. The course covers three major aspects of reliability: reliability models, analysis of failure and repair distributions, and finally preventive maintenance and warranty models. Upon completion of the course, students will be able to apply reliability models for a product or system during its life-cycle: design, production, and warranty.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

**SYSE 524 Systems Reliability, Availability & Maintainability Analysis 3.0 Credits**

Introduction to systems reliability, maintainability and availability analysis (RM&A) for systems. The course has an application to all phases of the systems engineering process including requirements definition through systems design and development. Introduces design for sustainability of systems during the life cycle of operation. Discusses RM&A and modeling, trade off analysis and cost-effective maintenance concepts for optimization of reliability and availability of a system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C]

**SYSE 525 Statistical Modeling & Experimental Design 3.0 Credits**

This course focuses on statistical modeling to systems engineering problems; relationships between experimental measurements using regression and correlation theory and analysis of variance models; design of experiments with one and more than one levels; emphasis on inherent variability of systems and processes; response surface methodology, control chart techniques and statistical process control.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 572 [Min Grade: C]

**SYSE 530 Systems Engineering Design 3.0 Credits**

Course introduces the student to the design of complex systems. Specific topics include needs analysis, conceptual physical and implementation architectures, technology quality and fundamentals of great system designs, selecting system designs, system and design requirements, system element designs, system design verification and validation, and sustainability design.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 531 Systems Architecture Development 3.0 Credits**

System architecture development is the most important activity in a complex system solution: pick the wrong architecture and the final system may not work, be overcome by displacement technology, or never be implemented because of cost, complexity, or other issues. Course Topics include architecture frameworks, architecture drivers, selection criteria, depiction, generic alternatives, trade studies, architecture selection, open closed architectures, vendor independence and technology choices, and architecture information products.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 532 Software Systems Engineering 3.0 Credits**

Many of our systems today are extremely software intensive. This course introduces software intensive systems engineering. This course is for software and non-software engineers. Topics from the systems perspective include capability maturity models (CMM, CMMI, SE CMM), systems and software interaction, deriving allocating software requirements, traceability, certification needs, mission critical software, software safety, software fault tolerance, human software interface, system and software architectures, reuse and breakthrough software, software interface management, software maintainability, software testability, technology considerations, software change control and configuration management, software quality, software integration verification and validation, software planning and management.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 533 Systems Integration and Test 3.0 Credits**

The systems engineering process applies well tested engineering practices to address the processes which are critical to most large engineering efforts, and optimizing them for effectiveness and financial success. The process covers the complete engineering system evolution from needs and requirements generation to production and construction and operation. Throughout the systems engineering process, various disciplines of engineering as well as various forms of information and technology need to be integrated, and the effectiveness of each step of the process ascertained. This course will address the processes, methods, and tools to integrate, test and evaluate the myriad of engineering information, technology, and products that are encountered throughout the systems engineering process.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 540 Systems Engineering for Peacebuilding 3.0 Credits**

Peace Engineering is a relatively new topic. This course will apply systems thinking and systems tools in the context of peacebuilding. The course is intended to give an introduction to systems engineering and system dynamics and utilize them for this new application. Topics include system architecting, systems mapping, causal loop diagrams, stock and flow diagrams, data sourcing, decision making and game theory. Specific examples of conflict will be presented and various theories of change will be tested with the system models. This course will utilize some recent literature on systems engineering use in peacebuilding.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 598 Capstone in Systems Engineering 3.0 Credits**

The capstone course is completed independently or within a group class setting over a full quarter term. The capstone course is the culmination of the student's academic and professional experience, and it will be completed under the direction of a Systems Engineering faculty member. Over the course of the term, students will apply the knowledge gained during their tenure in the program to create a Capstone Project. This project will integrate the skills necessary for analyzing issues, thinking creatively, working collaboratively, and presenting impactful ideas. The Capstone Project should be one of the most comprehensive and applied works a student completes in his or her academic career.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 571 [Min Grade: C] and EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C] and (EGMT 685 [Min Grade: C] or SYSE 685 [Min Grade: C]) and EGMT 531 [Min Grade: C] and (EGMT 688 [Min Grade: C] or SYSE 688 [Min Grade: C]) and (EGMT 690 [Min Grade: C] or SYSE 690 [Min Grade: C]) and SYSE 510 [Min Grade: C] and SYSE 520 [Min Grade: C] and SYSE 521 [Min Grade: C] and SYSE 533 [Min Grade: C]

**SYSE 605 Naval Systems Engineering 3.0 Credits**

Systems engineering is an elaborate guide for the development of complex systems, including new technology. It is an interdisciplinary approach that encompasses the entire technical effort, through a fundamental process for the purpose of providing solutions that satisfy customer needs. This course serves as an introduction to systems engineering with emphasis on application to Naval Systems. It teaches students the art of systems engineering as established by the Department of Defense (DoD) Systems Engineering Fundamentals Guide throughout the system life cycle. Upon completion of the course, students will understand the DoD approach to systems engineering and apply it to Naval Operations.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 610 Naval Engineering for the 21st Century 3.0 Credits**

This course serves as an introduction to the theory and design of engineering machinery and equipment aboard modern ships. Primary emphasis is placed on helping the student acquire an overall view of the development, design, construction and operation of ships and weapon systems and an understanding of the mechanical systems encountered onboard navy ships. An emphasis will be placed on the propulsion and auxiliary systems for conventional and nuclear steam propulsion, gas turbine power plants and internal combustion engines.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 611 Advanced Naval Engineering 3.0 Credits**

This course provides students with the knowledge and skills needed to plan and execute operations on naval vessels. Topics include the design, operating principles, construction, safety, testing and maintenance needed to ensure safe and efficient operation of the system.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SYSE 610 [Min Grade: C]

**SYSE 615 Naval Systems Integration and Test 3.0 Credits**

Systems integration & test is the process that addresses the testing and evaluation of the system of interest to verify that the system meets customer requirements and validates that the system performs as expected. The ability to test and evaluate systems are critical to large scale engineering efforts from the perspective of functional and financial successes. The systems engineering process covers the complete engineering system evolution from needs and requirements generation to design, build, test, and integration of these systems. Finally, this course also covers naval systems integration of shipboard systems, test & evaluation of ship sea trials, and application of the modular open systems approach to naval systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 640 Model Based Systems Engineering 3.0 Credits**

System complexity is continually increasing, demanding more rigorous approaches to modeling. Document based approaches become cumbersome with large scale systems and a model based approach helps to better manage complexity, improve quality and lower cycle time. This course addresses modeling of the system description as well as its functions using OMG SysML. This formal modeling language supports all aspects of the systems engineering process from specification through verification and is applicable across a broad range of industries.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SYSE 605 [Min Grade: C] or SYSE 685 [Min Grade: C] or SYSE 688 [Min Grade: C]

**SYSE 682 Introduction to Systems Science 3.0 Credits**

Course provides a background on Systems Science in the context of practical knowledge and applicability to everyday problems, systems, and solutions. Covers the principles of Systems Science, which provides the basis for understanding, manipulating and creating natural and synthetic/engineered systems. This course examines the major principles of systems, the history of Systems Science, structural and functional aspects of systems, and other critical factors affecting systems, including complexity, evolution of systems, emergence, networks, systems dynamics, modeling, and how Systems Science provides a basis for and feeds into Systems Engineering.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 685 Systems Engineering Management 3.0 Credits**

Course teaches the art of systems engineering. Students will learn SE processes and skills to integrate user needs, manage requirements, conduct technological evaluation and build elaborate system architecture, to assess risk, establish financial and schedule constraints. Course provides pedagogically sound approach to the subject matter. Any graduate students involved with new product development, technology development and/or integration will find this course useful.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 688 Systems Engineering Analysis 3.0 Credits**

Introduces multiple System Engineering Analysis practices used to execute systems engineering processes. Provides foundation to execute, monitor, and manage the traditional practices and also develops ability to modify and establish new practices based on this massive foundation. Instills confidence so student can contribute, lead, monitor or manage any systems effort.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SYSE 690 Modeling, Simulation and Other Tools 3.0 Credits**

This course is a crossover course for Engineering Management majors and Systems Engineering majors. The course focuses on a combination of deterministic and stochastic quantitative techniques and tools used for systems analysis, engineering analysis, and managerial analysis. Associated topics will be Probability Theory to support Decision Analysis, Pareto Trade Off Models, Analytical Hierarchy Process, Inventory Management & Control Operations, Waiting Line Models and Simulation & Modeling techniques. Emphasis will be placed on spreadsheet modeling and Monte Carlo simulation. The primary focus will be on utilizing excel based models and tools to support quantitative systems analysis.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EGMT 572 [Min Grade: C] and EGMT 573 [Min Grade: C]

**SYSE 898 Master's Thesis in Systems Engineering 1.0-9.0 Credit**

The thesis option is intended to familiarize a student with the techniques for guiding an entire project and to develop a student's creativity in solving real problems. An academic research thesis generally involves more than an industrial project in that the goal is not merely to solve the specific problem but also to understand its relevance to previous work and to the discipline in which one is working. It is expected that the thesis work will represent an advance in understanding of the state-of-the-art and that it will be suitable for publication in an engineering journal or for inclusion as part of a more comprehensive publication. The thesis generally takes a considerable amount of time and effort, with successful completion of the entire process taking more than a year's time. The study and investig.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE I599 Independent Study in SYSE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE I699 Independent Study in SYSE 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE I799 Independent Study in SYSE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE I899 Independent Study in SYSE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE I999 Independent Study in SYSE 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE T580 Special Topics in SYSE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE T680 Special Topics in SYSE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE T780 Special Topics in SYSE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE T880 Special Topics in SYSE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**SYSE T980 Special Topics in SYSE 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

# Taxation

## Courses

### TAX 611 Tax Research 3.0 Credits

This course requires a student to conduct tax research via on-line tax services to resolve a series of taxpayer's situations. Moreover, students are required to communicate their findings by preparing a three-page memo for submission to the client. Students should have some familiarity with federal individual income taxes and have access to a personal computer to complete the research.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 341 [Min Grade: C] or TAX 342 [Min Grade: C] or TAX 620 [Min Grade: C] or TAX 630 [Min Grade: C]

### TAX 615 Tax Practice and Procedure 3.0 Credits

Covers the history and organization of the Internal Revenue Service, audit and conference procedures, administrative and judicial procedures governing tax controversies, and rights and obligations of the taxpayer.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### TAX 620 Individual Taxation 3.0 Credits

Covers fundamentals of federal income taxation with respect to individuals, addressing items of income inclusion and exclusion and statutory deductions in arriving at tax liability. Students who have taken individual taxation at the undergraduate level should not enroll in this course.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### TAX 630 Corporate Taxation 3.0 Credits

In this course students will gain an understanding of the fundamentals of the taxation of business entities: C Corporations, Partnerships, and S corporations. Students will compare, evaluate, and analyze the tax effects of the entire lifecycle of a business including the formation of a business, property acquisitions and dispositions, taxable income, dividends and distributions, redemption of an ownership interest, and liquidation of the different types of business entities.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 620 [Min Grade: C]

### TAX 631 Advanced Corporate Taxation 3.0 Credits

Continuation of TAX 630 with emphasis on consolidated tax returns.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 630 [Min Grade: C]

### TAX 645 Flow Through Entity Taxation 3.0 Credits

Examines tax planning for the structure, operations, and tax impact of joint ventures, partnerships, LLC's and S Corporations, Estates and Trusts. Extends the study of the taxation of flow through entities in Business Entity Taxation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 342 [Min Grade: C] or TAX 630 [Min Grade: C]

### TAX 660 Tax and Business Strategy 3.0 Credits

Federal and state income taxes impact decision making by individuals and business taxpayers. To gain an appreciation for the influence that tax laws play on various decision making, a series of taxpayer cases that pertain to business strategy, business operations, investments, and personal planning situations are examined through the use of Excel and Tableau. In some situations, a student may need to do some basic research on the applicable tax law(s) that apply to the situation.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### TAX 675 Taxation of Multi-national Corporations 3.0 Credits

Examines provisions of the Internal Revenue Code relating to the taxation of income earned by corporations doing business in the United States and one or more other countries.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### TAX 710 Accounting for Income Taxes 3.0 Credits

This course examines how income taxes are reported in the financial statements including current and deferred income taxes on the balance sheet, income tax expense on the income statement, and required disclosures. This course gives students an in-depth look at major and significant differences between financial accounting principles and income tax rules commonly known as the book to tax differences.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 342 [Min Grade: C] or TAX 630 [Min Grade: C]

### TAX 715 Tax Experiential Learning 3.0 Credits

In this experiential, service-learning class, student participate in Volunteer Income Tax Assistance (VITA), a nationally recognized program supported by the IRS. Students complete a short IRS training program and then prepare actual individual income tax returns using IRS tax software to help those in need of pro bono assistance in the Philadelphia community through a neighborhood service project.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

### TAX 740 State and Local Taxation 3.0 Credits

This course introduces state and local taxation, with a focus on taxes imposed on corporations. The course is designed to encompass the major topics relevant to multistate taxation, from jurisdiction to tax to audit examinations and appeals.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit

**Prerequisites:** TAX 620 [Min Grade: C] or TAX 341 [Min Grade: C]

### TAX 790 Tax Policy Seminar 3.0 Credits

In-depth discussion and analysis of current tax issues including the specific dynamics of legislation and the effect on taxpayers. Topics will vary and will be dependent on current legislations and court decisions relative to tax policy.

**College/Department:** LeBow College of Business

**Repeat Status:** Not repeatable for credit



**TAX I599 Independent Study in TAX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX I699 Independent Study in TAX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX I799 Independent Study in TAX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX I899 Independent Study in TAX 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX I999 Independent Study in TAX 3.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated 3 times for 9 credits

**TAX T580 Special Topics in TAX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX T680 Special Topics in TAX 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX T780 Special Topics in TAX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX T880 Special Topics in TAX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

**TAX T980 Special Topics in TAX 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** LeBow College of Business

**Repeat Status:** Can be repeated multiple times for credit

## Teacher Education

### Courses

**EDUC 506 Assessment of Young Learners 3.0 Credits**

Candidates will demonstrate a thorough understanding of the role of the assessment process in early childhood education. The content will provide graduate candidates with an in-depth review of informal evaluation procedures and classroom-based data collection strategies for young children in inclusive early child care and education settings.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 521 [Min Grade: C]

**EDUC 507 Teaching the Middle School Child 3.0 Credits**

This course will explore the middle school environment, developmentally appropriate middle school programs, strategies for supporting students through the transition to middle school, and the impact of peer pressure on the middle school child. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 508 Creating a Positive Classroom Climate 3.0 Credits**

Teacher Leadership skills and strategies are examined toward developing individual approach to leading and managing a classroom for pre-service teacher candidates. Topics include the practical, theoretical, philosophical and ethical aspects of classroom management, school safety and other critical social issues that relate to providing a positive and productive learning environment are examined with a focus on classroom settings located in high-need and under-served schools. The teacher's role in "knowing the learner," identifying individual student needs, building rapport, and constructing a "democratic classroom" are addressed.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 512 Focus on World Geography 3.0 Credits**

Through the study of geography, students will be encouraged to find a meaningful framework for understanding the system of human culture on Earth and become familiar with the vast interactive system involving humanity and its natural environment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 513 Elementary Science Teaching Methods 3.0 Credits**

Methods for teaching elementary school science are explored including strategies and technologies to support student learning as defined by the state and national science standards. Inquiry-based model of learning and assessment emphasized. Theory and practice bridged to provide hands-on experiences in application of constructivist learning theory and effective classroom experiences.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 514 Science Teaching Methods 3.0 Credits**

This course bridges theory and practice, providing hands-on experience in the application of constructivist learning theory to designing and delivering effective classroom experiences. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 515 Adolescent Learners 3.0 Credits**

Enables students to understand the organizational structure of middle and high school programs as related to the diverse needs of the adolescent learner. Students will acquire competence in designing learner-oriented communities of practice in the classroom to foster achievement and overall well-being of the adolescent learner. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 516 Diversity and Today's Teacher 3.0 Credits**

This course explores major issues related to the increasing diversity of students in elementary and secondary classrooms in the United States. The multifaceted challenges of teaching heterogeneous student populations (and strategies for).

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 520 Professional Studies in Instruction 3.0 Credits**

For students who lack professional-level classroom teaching in grades K to 12. Examines and develops skills in instructional planning, pedagogy, motivation, classroom management and discipline, interrelationships among diverse populations within school settings, and identification of instructional resources. Discusses current principles of developmental and learning theories and instructional design applied to teaching.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 521 Typical and Atypical Development in Early Childhood Education 3.0 Credits**

This course addresses the multifaceted complexities of typical and atypical child development, through the discussion of classic and emerging theories. The primary aim of the course is to foster the students' ability to recognize and apply the connections among developmental domains and of theory and research with educational practice. The readings and class assignments make use of research-based, real-world, and cross-cultural examples. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 522 Evaluation of Instruction 3.0 Credits**

Enables the student to acquire competence in evaluation techniques including portfolios, journals, performance assessments, individual and collaborative projects, and presentations. The course covers qualitative and quantitative assessment used in measuring student achievement. Techniques for grading will also be explored.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 524 Current Research in Curriculum & Instruction 3.0 Credits**

Examines the relationship of curricula and instruction to current research in learning and knowledge construction, developing higher-order thinking in specific disciplines and content areas, and the role of understanding and metacognition in learning. Complex problems of pedagogy are identified and analyzed (e.g., interdisciplinary curricula, team teaching, collaborative learning), with attention to designing learning goals and outcomes with effective instructional strategies.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 526 Language Arts Processes 3.0 Credits**

Applies contemporary research to processes and problems in teaching oral and written communication, with the basic assumption that listening, speaking, writing, and reading are integrated processes and should be taught as such. Covers analysis and use of instructional strategies for teaching developmental reading and writing, reading and writing in content areas, written correspondence, research reports, journal writing, poetry, and appreciation of children's literature.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 529 Early Literacy 3.0 Credits**

Course examines research-validated literacy instruction and literacy interventions. Topics include; phonics, fluency, comprehension, vocabulary, and the reading-writing connection. Significant emphasis is placed on the socio-cultural aspects of reading: appreciating linguistic diversity, integrating cultural narratives, building reading communities, and motivating children through authentic reading and writing experiences. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 530 Advanced Techniques in Instruction & Assessment 3.0 Credits**

Major professional and educational issues associated with college teaching are addressed. Provides multiple opportunities to develop and enhance teaching skills, as well as exposure to alternative assessment.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 538 English Teaching Methods 3.0 Credits**

This course is designed to support the development of pre-service teachers in the secondary English/Language Arts Classroom. Students will be provided opportunities to integrate and apply theories of learning, curriculum and pedagogy of English and L. Arts in the secondary classroom. Additional classroom-based observation hours will be required. This course has a Stage 3 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 539 Expressive Arts 3.0 Credits**

The focus of this graduate course is to teach future educators to develop and incorporate relevant curriculum for the expressive arts (dance, music, theatre and visual arts), into the PK-4 classroom. Through observation, curriculum development and assessment, educators will be able to identify, administer, interpret and plan instruction for PK-4 learners.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 521 [Min Grade: C]

**EDUC 540 Field Experience 3.0 Credits**

Provides supervised field experience at a cooperating school designed to develop skills in instructional planning, pedagogy, motivation, classroom management and discipline, interrelationships among diverse populations within school settings, identification of instructional resources, and applications of current research on effective teaching. This course has a Stage 4 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 520 [Min Grade: B]

**EDUC 541 Student Teaching Seminar 3.0 Credits**

This seminar course is designed to compliment the Student Teaching capstone field experience by developing the pre-service teacher's teaching knowledge and strengths throughout their field placement, supervision, and reflective practice. The goal of the seminar is to create reflective practitioners by providing a forum for collaborative, critical inquiry based on the field experience.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC 545 Engaging the Learner 3.0 Credits**

This course provides multiple approaches to the critical linked processes of assessment, curriculum development, and inclusive instruction of all young children. Topics of study include: planning and preparation, using appropriate materials, scope and sequence and strategies for student-centered assessments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 555 Social Studies Teaching Methods 3.0 Credits**

Course prepares the preservice teacher in making appropriate decisions about students and instructional processes in the social studies classroom. Perceptions and perspectives as it relates to social studies instruction in the following areas are explored: curriculum standards, unit development, assessment design and construction, interdisciplinary/integrated curriculum planning, specific group strategies, individualizing techniques, instructional technology, and professional development.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 556 Secondary Social Studies Methods (7-12) 3.0 Credits**

Course provides understanding of effective Social Studies methods in secondary classrooms. History of pedagogical debates within Social Studies, is examined to incorporate effective Social Studies teaching methods. Careful attention is given to the Common Core Standards for Social Studies. This course has a Stage 3 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 515 [Min Grade: B]

**EDUC 562 Middle Years Social Studies Methods 1.5 Credit**

This course prepares pre-service teachers with the skills to plan, design and teach adolescents a social studies curriculum with appropriate assessments based on national and state standards related to middle year social studies (e.g., National Council for Social Studies, PA Department of Education) encompassing geography, history, civics and government, and economics. Preparation includes exploration of adolescent development, subject matter pedagogy, assessment and intervention for students with disabilities and English Language Learners. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 563 Middle Years Mathematical Methods (4-8) 1.5 Credit**

This course focuses on critical knowledge and skills for teaching mathematics in middle years, including learning theories and psychology in mathematics education, mathematics curricula, teaching mathematics, technology, assessment, and meeting individual student needs. The major goal is to provide prospective middle school teachers the opportunity to develop concepts, skills, and pedagogical procedures for effective teaching of mathematics in middle years. Important social and cultural aspects of teaching math that impact student learning will be considered, as well as reflection occur on how teaching mathematics can be made exciting, intriguing, and understandable for students.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 564 English/Language Arts Teaching Methods for the Middle Years 1.5 Credit**

The course prepares pre-service teachers to teach reading and writing to adolescents in middle years classrooms by providing knowledge of the literacy needs of middle level learners with emphasis on reading and writing development, methodology, assessment and accountability. The latest research findings are reflected in studies of how middle level learners require instructors to be adept at a breadth of instruction. Strategies and methods for assisting adolescents are provided as they become fluent readers and writers. This course has a Stage 3 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 565 Foundations in Instructing English Language Learners 3.0 Credits**

This is a foundations course to prepare all pre-service teachers to work with English Lang. Learners. Focus will be on gaining an understanding of the linguistic, social and academic needs of ELLs and the roles and responsibilities of the classroom teacher in meeting those needs. Field-based observation hours will be required. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 567 Middle Years Science Methods 1.5 Credit**

This course examines the many aspects of the teaching of science in elementary schools today. The role of national and state standards (e.g., National Science Education Standards, the Next Generation of Science Standards, and the Pennsylvania State Standards) in curriculum development and reform is explored in depth. Topics covered include planning science instruction to include inquiry and integrated concepts, developing authentic assessments involving a variety of tools, creating and maintaining a safe laboratory and learning environment that meets the needs of diverse learners, and the integration of technology into science education. This course has a Stage 3 field component, successful completion of the field component is req'd for recommendation for certification. See SoE Field Placement Office website.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 576 Teaching in Urban Contexts 3.0 Credits**

This course enables students to understand the complex conditions that have led to issues that impact urban education. The course will explore recent reform efforts focused on changing the organizational structure and curriculum. Specific emphasis will be placed on the teacher's disposition towards the learner, the impact of racism and knowledge and skills related to teaching in urban settings. This course will introduce historical references for the current condition of urban schools as well as the aspects of teaching that lead to a classroom of respect and rapport for the urban learner and his/her family.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 599 Pre-Student Teaching Field Experience Lab 0.0 Credits**

This lab course serves as the school-based, classroom field placement component for the Pre-Student Teaching courses that prepare students pursuing teacher certification for their capstone Student Teaching course. It includes supervision from a Drexel Site Director as well as active student reflective practice. The course requires a range of 20-30 hours of work throughout the term in an appropriate school setting appropriate for the area of teacher certification being pursued.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC 602 Language Learning & Teaching 3.0 Credits**

This course introduces participants to theory and practice in second language learning and instruction, with a focus on English learners (ELs) at the level of primary and secondary education. The course explores how ELs acquire language, what factors influence the learning process, and how instruction could effectively facilitate language, culture, and content learning. Course readings include accounts of second language theory, research, and practice. Topics include linguistic and learning theories, language teaching methods and approaches, the relationship between academic and social language, cultural issues surrounding language teaching and learning, and the roles of teachers and learners in the classroom. This course has a Stage 1 field component. See field placement website for all requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 604 Structure and Sound System of English 3.0 Credits**

This course focuses on the structural features of the English language, including phonetic, phonological, morphological, syntactic and pragmatic features. In the practicum component, participants will collect and analyze language from both native and non-native speakers of English, using it to develop targeted structural exercises for English instruction. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 606 Design and Assessment 3.0 Credits**

This course emphasizes the role of ESL teachers as course developers and action researchers, focusing on effective lesson planning, task design, materials development, assessment and evaluation, and the use of computers in instruction. In the practicum component, participants will design thematic units, determine objectives, develop materials, and design assessment tools. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDUC 608 The Intercultural Learner 4.5 Credits**

This course explores the needs, experiences, values, and beliefs of culturally and linguistically diverse learners and their families and communities. Building home/school relations and adapting and supporting curriculum through school services will be a focus. For a practicum, participants will engage in a case study of an English language learner. This course has a Stage 1-2 field component, successful completion of the field component is required for recommendation for certification. See SoE Field Placement Office website for all clearance policy and field experience requirements.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 609 Language & Culture in Education 3.0 Credits**

The purpose of this course is to explore the identity and cultural backgrounds of English Language Learners (ELLs) in our schools and to discuss the impact of these backgrounds on students' educational progress. The course will address the ways in which teachers can provide an appropriate learning environment for students of diverse backgrounds.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 611 Social Media in Education 1.5 Credit**

This course investigates the current K-12 social media landscape and its implications for student success in formal and informal learning environments, potential pitfalls, and possible administrative uses. In addition, the course introduces students to the participatory culture of social media through an emphasis on community activities. The course is designed to focus on learning to lead in the area of social media in schools.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 699 Student Teaching Field Experience Lab 0.0 Credits**

This lab course serves as the school-based, classroom field placement component for the Student Teaching capstone course for students pursuing teacher certification. It includes supervision from a Drexel Site Director as well as active student reflective practice. The course requires a minimum of 400 to 480 hours of work of the state-mandated, minimum 12 weeks of student teaching in an appropriate school setting appropriate for the area of teacher certification being pursued.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC 750 Introduction to Doctoral Study in Education 3.0 Credits**

This course is offered in the style of a "proseminar" that consists of reading, reflection and discussion with a faculty member on a focused critical issue in education. Specific foci will change each term and be aligned with faculty expertise and student interests. The course is designed to inform doctoral students on educational issues to impact their teaching and research agenda.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 2 times for 9 credits

**EDUC 751 Educational History and Foundations 3.0 Credits**

This course provides a foundation for understanding how the educational systems in America function. Students will learn about various institutional-internal and external environments and systems that comprise the PK-20 education system. Students will be continuously asked to analyze how examined environments and systems influence changes in the education system.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 752 Education, Learning, and Technology 3.0 Credits**

This course provides a foundation for understanding some of the ways that learning, and technology takes place in education settings. Students will learn about scientific based research in education, design based research, and other related research topics on education, learning, and technology. Students will have a better understanding of how learning perspectives in research, educational technology, and examine different forms of research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 753 Educational Critical Theories and Practice 3.0 Credits**

This course provides a foundation for understanding critical theories and practice in education research. Students will learn about the origins of critical theory, a wide variety of critical theories, and the ways that they are utilized in practice. Students will be continuously asked to reflect on how critical theories are implemented into each step of the research process.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 754 Educational Change, Equity, and Social Action 3.0 Credits**

This course is designed to move from students through the foundations of social justice, educational equity, and critical educational theory to application and action within the PK-20 system through a review of literature, experience sharing, reflection and dialogue. This course will push students to engage with foundational literature, pedagogy, and epistemology while contextualizing the experiences of others in education.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 800 Educational Leadership & Change 3.0 Credits**

Covers leadership characteristics, styles, and profiles along with the dynamics of the change process. Students develop an action plan for a school-based project, keep a log, and do reflective analysis. Students will interview a leader about their experiences in change and develop a leadership portfolio.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 801 Creative Strategies For Educational Leaders 3.0 Credits**

Examines the theoretical and research issues pertaining to creativity and the development of the creative thought process. Emphasizes how role playing and drama techniques can become a powerful tool to promote creative thinking, innovation, and change for educational leaders.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 803 Educational Research Design I 3.0 Credits**

Introduces students to research design paradigms and the assumptions behind them, use of the literature, developing research questions, qualitative and quantitative procedures, and research study formats.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 804 Program Evaluation in Organizations 3.0 Credits**

This course provides an experience in designing effective program evaluations for many purposes. Increasingly, evaluation and assessment are required for education research, research grants, school and organizational reform, and public policy. Students will study the foundations of program evaluation, examine underlying assumptions about the purposes and models of evaluation, and explore the various roles of the evaluator. In studying examples, students will vicariously experience various program evaluations from start to finish and understand the complexities of decision-making that evaluators face.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 805 Doctoral Seminar for Proposal Writing 3.0 Credits**

In this course, PhD students will learn the fundamentals of proposal writing. The focus will be on writing the dissertation proposal, and on writing grant proposals.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 10 times for 33 credits

**EDUC 806 Linking Educational Theory to Research 3.0 Credits**

Course designed to acquaint students with educational theories and perspectives that have shaped the education discipline. A range of educational theories developed throughout 19th, 20th and 21st centuries will be discussed and explored toward guiding students on how these theories and viewpoints apply to research and educational practice today.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 807 Multi- & Cross-Cultural Perspectives in Leadership 3.0 Credits**

Course will assist administrators, researchers and scholars to transform schools to address persistent inequities present in US educational systems and serve the needs of disadvantaged and disenfranchised groups. Course will deepen students' knowledge of multicultural education and advance their skills and talents as educational leaders.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 810 Educational Research Design II 3.0 Credits**

The course builds upon Educational Research Design I and focuses on five main themes: research design, sampling design, data collection, data analysis, and reporting research results using educational applications.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 812 Staff Development & Team Building 3.0 Credits**

Helps educational leaders explore effective models for professional development in schools and school districts. Covers the development of effective strategies and practices based upon current research, adult learning theory, and successful local and national models. Also provides in-depth training in the area of effective meeting design, involvement, and decision-making.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 814 Designing Educational Organizations 3.0 Credits**

Examines innovation in rostering, scheduling, and defining the instructional program. Emphasizes middle school education and design of small learning communities such as the cluster concept and public charter schools.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 815 Writing for Research, Publication and Funding in Education 3.0 Credits**

Guides students in the writing for research, publication, and funding in education by studying examples of effective writing formats written by successful practitioners and by using an active writing process approach: writing drafts, and giving feedback in small peer groups. Students produce a final document for each type of writing that employs authentic tasks and assessments.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 816 Inclusion Issues 3.0 Credits**

Examines the various inclusion models whereby children with special needs become part of the teaching and learning community in which everyone-teacher and all students-can benefit by an inclusive program. Addresses such topics as how administrators may take leadership in implementing inclusion and designing an inclusive school.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 818 Applied Research Study 3.0 Credits**

Offers students the opportunity to design and implement a research study that will be presented and defended. Steps include framing the question and methodological approach, collecting and analyzing data, interpreting the results, and writing a report. Research approaches can include action research, case studies, experimental designs, etc.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 810 [Min Grade: B] (Can be taken Concurrently)

**EDUC 835 Quantitative Research Methods and Data Analysis 4.0 Credits**

Use of statistical methods using real-world problems and real-world data to gain experience with following topics: analysis of variance and covariance, simple and multiple linear regression, multivariate techniques of factor analysis, cluster analysis and multi-level and structural equation modeling. Course includes a lab for practice-based learning using SPSS.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 836 Qualitative Research Methods and Data Analysis 4.0****Credits**

Use of qualitative methods using real-world problems and real-world data to gain experience with following research techniques such as ethnography and case studies to gain skills in participant observation, interviewing, archival research and historical analysis. Other theoretical frameworks and methodological approaches for qualitative research will be discussed. Course includes a lab for practice-based learning to use computer software for data collection/analysis.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 837 Advanced Qualitative Methods and Data Analysis 3.0****Credits**

Course introduces students to advanced qualitative research methods used in educational research. Students will become literate in the range qualitative research designs and analyses used in qualitative research geared towards the social science research in the field of education. The course will focus on a) producing transcripts of data collected in EDUC 836, e.g., interviews, focus groups and observation, and b) apply data collection and analysis methods. Formal research methods will complement individual, student-driven project goals. Students ultimately gain proficiency in core research skills required for an action-oriented doctoral dissertation that will help prepare them for future research collaborations.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 836 [Min Grade: B] (Can be taken Concurrently)

**EDUC 838 Doctoral Qualitative Research Methods and Data Analysis****4.0 Credits**

Use of qualitative methods using real-world problems and real-world data to gain experience with following research techniques such as ethnography and case studies to gain skills in participant observation, interviewing, archival research and historical analysis. Other theoretical frameworks and methodological approaches for qualitative research will be discussed. Course includes a lab for practice-based learning to use computer software for data collection/analysis.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 840 Theories of Individual Cognition in STEM Education 3.0****Credits**

Course foci is on the knowing and learning of STEM education from a social perspective from an individual cognitive perspective and will include emphasis on both recent research and seminal literature. The course will be an introduction to the psychological foundations of STEM education.

This course is the first in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ELLT.

**EDUC 841 Foundations of Educational Theory: Contextualizing Leadership and Policy I 3.0 Credits**

Course is first of two-term course sequence (EDUC 841 and EDUC 843) designed to introduce graduate students to foundational and learning theories relevant to the field of educational leadership, policy and social change. Course offers interdisciplinary and often critical approach to understanding educational change from social, political, historical, economic and cultural perspectives. Each week, students examine a theoretical piece that informs how the field is studied, or an empirical piece of research that extends theory, or applies it in new contexts. Students creatively explore personal research interests toward developing independent research projects for use in the second course in the two-term sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 842 Social Foundation and Group Cognition in STEM Education 3.0 Credits**

Course foci is on the knowing and learning of STEM education from a social perspective and will include emphasis on both recent and seminal literature. The course will include an introduction to the sociocultural research and foundations of STEM education. This course is the second in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is ELLT.

**EDUC 843 Foundations of Educational Theory: Contextualizing Leadership and Policy II 3.0 Credits**

Course is second of two-term course sequence (EDUC 841 and EDUC 843) designed to introduce graduate students to foundational and learning theories relevant to the field of educational leadership, policy and social change. Course offers interdisciplinary and often critical approach to understanding educational change from social, political, historical, economic and cultural perspectives. Each week, students examine a theoretical piece that informs how the field is studied, or an empirical piece of research that extends theory, or applies it in new contexts. Students implement independent research project developed in the first course in the two-term sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 844 Creativity and Innovation in STEM Education 3.0 Credits**

This course will provide a foundation of creativity, innovation theory, awareness of research and seminal literature in the context of STEM education. Theories of creativity and creative thinking, the methods for studying creativity and the biological basis of creativity. The course is the third in a three-course STEM (Science, Engineering, Technology and Mathematics) education content specialization sequence.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 845 Transformative Leadership: Finding One's Source 3.0 Credits**

Employing Otto Scharmer's Theory U theoretical framework, the course provides students with knowledge and skills to develop and support their professional development towards becoming effective leaders. Teaching and learning activities in the course include readings, videos, written assignments, E-learning, self-assessments, and individual and team opportunities. Opportunities are provided for students to better understand trends in organizations, enhance their self-awareness, develop leadership skills, and apply these skills and perspectives in real-world contexts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 846 Doctoral Advanced Qualitative Research and Data Analysis 3.0 Credits**

Designed to provide an advanced examination of qualitative research methods with a focus on research in education, although others from different fields are equally welcome. In particular, students will continue conducting qualitative research based on work completed in EDUC 838 and data analysis I by reading about and executing a basic qualitative study that uses qualitative analysis in one of the five major designs. Careful attention will be placed to the subjectivity of the researcher, ethics of research, and the trustworthiness of a qualitative study. This course seeks to also spur the student to begin to consider their own research stances, objectives, and their voice as a researcher. It is essential that students are familiar with the various ontological, epistemological, and methodological assumptions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 838 [Min Grade: B]

**EDUC 847 Doctoral Advanced Quantitative Methods: Applied Regression Analysis 3.0 Credits**

This course reviews and extends knowledge and application of regression models. The course explores the ways in which multiple regression techniques allow for the analysis of the relationship between outcome and predictor variables while controlling for other variables. In doing so, students learn to build and evaluate multiple regression models using continuous outcome variables as well as logistic regression models using categorical outcome variables. Students gain applied experience fitting, visualizing, and interpreting regression models. The course also covers important topics in regression analysis including non-linear relationships, analysis of residuals, variable transformations, missing data, and multinomial logistic regression.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 835 [Min Grade: B]

**EDUC 848 Learning & Cognition in Education 3.0 Credits**

The course will be an introduction to the psychological/individual and social foundations of learning and cognition. This includes an emphasis on both recent research and seminal literature and applicable research methods.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 849 Design, Mind, Media and Learning 3.0 Credits**

This course is about design and the process of design involved in the development of technologies (in the broadest sense) for learning. The design, mind, media, and learning seminar is an advanced course in media design for learning and communicating. In this course, multimedia design is a dynamic combination of learning pedagogy, design-based research, digital media, virtual learning technologies, art, story, interface design, and information architecture. The purpose of the course is to introduce students to design and the process of design in facilitating transformation of cognitive and non-cognitive experiences.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 850 Foundations of Research in Education 3.0 Credits**

Introduces students to the process of educational research. Although all the components of the process of designing and conducting research will be introduced in this course, the focus will be on understanding the difference between the paradigms underlying quantitative and qualitative educational research, the respective underlying assumptions and worldviews. The course (a) emphasizes qualitative and quantitative methodological approaches and paradigms underlying those approaches; (b) introduces students to ethical implications of research; (c) enables students to become more effective consumers of research; (d) prepares students for subsequent and related courses; (e) proves a foundation for students to be able to conduct original research that may lead to the doctoral dissertation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 851 Research Designs and Methods in Education 3.0 Credits**

The course facilitates students' understanding of the process of educational research providing a broad overview of the different research designs and methods (i.e., quantitative, qualitative, mixed-methods) available, as well as equips them with the knowledge needed to determine best fit between research designs and methods and research questions.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 852 Survey Research Methods 3.0 Credits**

This course focuses on the design of questions and questionnaires used in survey research. The course will explore the theoretical and experimental literature related to question and questionnaire design as well as focusing on practical issues in the design, critique, and interpretation of survey questions. There will be exercises both in and outside of class to reinforce both theory and practice, including the construction and testing of a questionnaire.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit



**EDUC 854 Mixed Method Research 3.0 Credits**

The purpose of this advanced research methods course is threefold:

(a) Study predominant models of mixed methods research (MMR) as described by seminal scholars, (b) Learn about notable features of successful MMR studies through critically analyzing published work and (c) Gain direct data collection and analysis experience by composing and interpreting results of a small MMR project using both quantitative and qualitative data sets. The course will also focus on developing well-crafted discussion and implications sections required in standard research reports (e.g., dissertations, articles, and grant reports). As a result of this course, students will gain core research skills for completing a mixed methods doctoral dissertation as well engaging in future MMR and interdisciplinary research.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**Prerequisites:** EDUC 835 [Min Grade: B] and EDUC 836 [Min Grade: B] and EDUC 838 [Min Grade: B]

**EDUC 855 Identity Exploration and Learning 3.0 Credits**

The purpose of this course is to introduce ideas about how to stimulate and build on the initial interests of students to support longer term identities as learners and professionals by exploring psychoeducational theories about the self and learning with possible selves that could be achieved from their current states. Life in the 21st century will require the orientation and skills to repeatedly explore and reconstruct one's identity in reflexively and intentionally as people move from one career to another and so on.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 856 Gender and Education in Global Contexts 3.0 Credits**

The course explores and highlights different international perspectives on gender in education including how gender relations, structures and identities are constructed and reproduced in various cultural contexts.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 857 Advance Research in Mixed Methods and Survey Research 3.0 Credits**

This course focuses on two commonly used research approaches in the social sciences: mixed methods research (MMR) and survey research.

Fundamentals of designing and implementing both research approaches are covered with applied research skills developed in each area.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 858 Conceptualizing PK-20+ Education 3.0 Credits**

This course will examine issues faced by schools and postsecondary education leaders associated with the preparation of students for educational advancement in a democratic society. This course was developed in response to growing educational concerns across the PK-16+ pipeline. The course is developed around three assumptions: 1) student academic progress is critical in optimizing individual talent in an increasingly knowledge-based society; 2) an important goal of the 21st century educational reform is to facilitate student preparedness for future academic and occupational success; and, 3) a more intentional alignment of the goals and emphases of K-12 education with postsecondary education should be considered a possible solution for educational reform.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 859 Power and Politics in Education 3.0 Credits**

Power and Politics in Education course provides an overview of the theoretical approaches to the connection between power and politics as applied to k-16 education at both the macro and micro levels. Through readings and discussions, we will explore the ways in which power, politics, and policy influence key issues in the k-12 and higher education contexts at the federal, state, and local levels. Course Purpose: A major purpose of this course will be the intersection of race, class and gender with power and politics in educational leadership, teaching, and scholarship. In addition, the course will examine policies in PK-16+ education, the elements of the policy-making process, and strategies for policy analysis.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 860 Educational Policy and Advanced Critical Theories 3.0 Credits**

This course is designed as an intensive introduction to PK-20 educational policy (formal and informal at all federal, state, local, and institutional levels) through a critical lens. This course is designed to move students through the foundations of and variations of policy making in educational systems in the United States. Additionally, will examine critical theories and their application in policy analysis, policy formation, and policy implementation.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 880 Doctoral Seminar 1.5 Credit**

Seminar to prepare students who have completed the core doctoral courses and residency requirement to work with their Dissertation Advisor in the development of their dissertation research proposal.

**College/Department:** School of Education

**Repeat Status:** Not repeatable for credit

**EDUC 881 Doctoral Seminar (EdD) 1.5 Credit**

The course is the final research course before an EdD student begins formal Dissertation work in the EdD program. Each student participates in a seminar and works directly with their Dissertation Advisor in the development of the student's dissertation research proposal.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 4 times for 25 credits

**Prerequisites:** EDUC 810 [Min Grade: B]

**EDUC 899 Proposal Writing Seminar 4.5 Credits**

This course is designed to support students in completing a defensible dissertation proposal.

**College/Department:** School of Education

**Repeat Status:** Can be repeated 2 times for 15 credits

**EDUC 997 Doctoral Dissertation 4.5 Credits**

Allows candidates to conduct an original research study that will comprise the dissertation.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**Restrictions:** Can enroll if major is ELMG.

**EDUC 998 PhD Dissertation 1.0-12.0 Credit**

Allows candidates to conduct an original research study that will comprise the dissertation.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC I599 Independent Study in EDUC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC I699 Independent Study in EDUC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC I799 Independent Study in EDUC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC I899 Independent Study in EDUC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC I999 Independent Study in EDUC 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T580 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T680 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T775 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T780 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T880 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

**EDUC T980 Special topics in EDUC 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** School of Education

**Repeat Status:** Can be repeated multiple times for credit

## Telecommunications

### Courses

**ECET 501 Fundamentals of Communications Engineering 3.0 Credits**

Fundamentals of Communications Engineering. This course introduces basic modulation, deletion and coding techniques in modern telecommunications systems, including PAM and FSK, spread-spectrum and OFDM, ML receiver, ISI and equalization, compression code and coded modulation. May be repeated once for credit.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECES 521 [Min Grade: C] and ECES 522 [Min Grade: C]

**ECET 511 Physical Foundations of Telecommunications Networks 3.0 Credits**

Physical Foundations of Telecommunications Networks. Introduction to wired and wireless telecommunication systems. Review of wave propagation. Review of wireline transmission media. Modeling wireline and wireless point-to-point communication links. N-port linear networks and network analysis/parameters. Review of passive RF components, semiconductor devices. Optical communication devices: optical switches, couplers, isolators, sources, modulators, detectors, amplifiers. Overview of active circuits.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECET 512 Wireless Systems 3.0 Credits**

Fundamentals of modern wireless systems. Fundamentals of radio propagation and link performance. Cellular concept: interference, base stations and cell sites, handoffs, system capacity. Fading environments: multipath propagation, delay spread, Doppler Spread, statistically fading channel models. Multiple-access schemes: FDMA, TDMA, CDMA, SDMA. Emerging methodologies: phases/adaptive antenna array, multi-array (MIMO) communication systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECET 513 Wireless Networks 3.0 Credits**

Introduction to Wireless Networks, Evolution: 1G, 2G, 3G, Next-G. Wireless Networks Operation: Mobility and Resource Management, Security. Wireless WANs: GSM, CDMA, IS-95, and IMT-2000, Mobil Data Networks, Wireless LANs: 802.11, HIPERLAN, Ad Hoc Networks, Mobil IP. Next Generation Wireless Systems.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**ECET 602 Information Theory and Coding 3.0 Credits**

This course introduces fundamental information theory and source and channel coding technology. Major topics include: entropy and mutual information, source coding theorem, Huffman code, rate-distortion function and vector quantization, channel capacity, channel coding theorem, linear block code, cyclic code, convolution code, Turbo code, LDPC code, trellis coded modulation, space-time code. May be repeated once for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 1 times for 3 credits

**Prerequisites:** ECES 521 [Min Grade: C]

**Corequisite:** ECES 522

**ECET 603 Optical Communications and Networks 3.0 Credits**

This course introduces fiber-optic based transmission and networking technology. Major topics include: Loss and dispersion characters of fiber, shot noise, modulation, line code, direct receiver, coherent receiver, link budget, optical layer, SONET, WDM, photonic packet switch, Hybrid systems (CATV).

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated 1 times for 3 credits

**Prerequisites:** ECET 501 [Min Grade: C] and ECET 511 [Min Grade: C]

**ECET 604 Internet Laboratory 3.0 Credits**

This course aims to prepare the next generation of Internet engineers for the challenges of understanding, maintaining, and participating in an ever-evolving Internet through hands-on experiments on real networking equipment. The long term objective of the internet Laboratory course is to graduate students who can maintain, update, improve, and even redesign the Internet.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** ECEC 631 [Min Grade: C] or ECEC 531 [Min Grade: C]

**ECET 697 Research in Telecommunications 1.0-12.0 Credit**

Research credits in telecommunications. May be repeated for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET 699 Supervised Study in Telecommunications 3.0 Credits**

Supervised Study in Telecommunications Engineering. May be repeated for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET 890 Advanced Special Topics in Telecommunications 1.0-9.0 Credit**

Covers advanced special topics of interest to students and faculty.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET 898 Master's Thesis in Telecommunications 1.0-12.0 Credit**

Master's thesis in telecommunications. May be repeated for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET 997 Dissertation Research in Telecommunications 1.0-12.0 Credit**

Graded Ph.D. dissertation in telecommunications engineering.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET 998 Ph.D. Dissertation in Telecommunications 1.0-12.0 Credit**

Ph.D. Dissertation in Telecommunications. May be repeated for credit.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET I599 Independent Study in ECET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET I699 Independent Study in ECET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET I799 Independent Study in ECET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET I899 Independent Study in ECET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET I999 Independent Study in ECET 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET T580 Special Topics in ECET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET T680 Special Topics in ECET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET T780 Special Topics in ECET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET T880 Special Topics in ECET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

**ECET T980 Special Topics in ECET 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** College of Engineering

**Repeat Status:** Can be repeated multiple times for credit

## Television Management

### Courses

**TVMN 606 The Field of Television Management 3.0 Credits**

This course is designed as an introduction to the history, discipline, scope, research methods, strategies and analytics associated with the field of television management.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 610 Media Law for Television Management 3.0 Credits**

Media Law for Television and Media Management focuses on the regulatory frameworks of traditional and new media. Content includes the function of contracts, releases, negotiations, standards, and unions in collective bargaining as related to converged television and media leadership. The role of in-house and the function of external legal counsel is reviewed.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 615 Diversity in Media Management 3.0 Credits**

Inclusion must not become a buzzword or a box to check. It must be a practice television and media management professionals exercise intentionally, not only through the voices shared on the screen, but also in the voices heard throughout the content creation process. This class examines how television management professionals can make decisions in a thoughtfully inclusive way. The course examines historical context and current initiatives within the media industry to help television and media management leaders develop creative and practical solutions to promote greater diversity, equity, and inclusivity.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 621 Audience Data and Analytics 3.0 Credits**

This course examines the various ways in which television audiences are measured and monetized. You will become familiar with the organizations that measure audiences; their histories, methodologies, their strengths/weaknesses, and their output. Also examined will be how media organizations utilize this data. You will understand the various terminology used in audience analysis; Ratings, Impressions, HUT/PUT, Shares, Cume, Reach and Frequency. Additionally, examples of actual industry research.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 625 Media Sales 3.0 Credits**

Commercial media today are almost solely dependent on advertising revenue for their profitability and ultimate survival in a multichannel marketplace. This course will examine the process of revenue generation by local stations, cable operators, broadcast and cable networks; the structure of sales departments, interaction with other departments (news, programming, engineering, finance, promotion, public affairs) and will look at the customer base from the viewpoint of the media seller and media buyer. We will also look at the human side of the equation; how sales teams are hired, motivated, coached, compensated, and evaluated. Additionally, we will examine the role of sports, websites, programming decisions and Nielsen ratings and their effects on sales.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 630 Television Production 3.0 Credits**

Television Production. Television production techniques in common use at local television stations are taught including multi-camera (studio) production, single camera (film style) production, and basic editing techniques. Throughout the term, the course also examines production issues from a manager's point-of-view.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 631 TV Production Laboratory 3.0 Credits**

This course will explore television production management techniques at the network, cable, local and industrial company levels. Throughout the term, the course will examine production issues from a manager's point-of-view. However, in an effort to fully understand the challenges production personnel face on a daily basis, management students will learn very simple and basic production skills. Class participants will use these tools to write, produce, direct, shoot and edit their own productions.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 640 Media Ethics of Television Management 3.0 Credits**

Media Ethics for TVMN explores issues central to the decision-making process in which media managers engage. Case studies in television and evolving media, investigation of contemporary events that reflect ethical dilemmas, and research into the intersection of financial, regulatory, and career considerations with ethical choice are closely examined.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 651 Media Systems and Dynamics 3.0 Credits**

This course is intended as a survey of the organizational structures and functions that form the working context in which television managers operate. It is concerned as well with exploring the specific tasks managers confront and the analytic and decision-making theories and tools they apply to the operation of television systems.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit



**TVMN 655 Multi-Platform Strategy 3.0 Credits**

TV content reaches its audiences through legacy and newly converged channels. This course concentrates on the delivery of television content across multiple platforms and illuminates ways in which television content is disaggregated and re-aggregated to create new services on multiple devices. It examines closely the business models, regulatory questions and intellectual property issues that underlie the dynamics of the streaming TV industry.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 671 Media Deal-Making 3.0 Credits**

TV managers must be skilled deal-makers. This course provides the fundamentals of deal-making skills including such topics as re-transmission consent deals, script optioning, the "green lighting" process, FCC representations and license renewals, Guild union deals, interest-based exchanges, balancing good will, integrity and on-going business relationships, forms of leverage, the use of best practices research and information-gathering; it provides a brief overview of arbitration and mediation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 675 Global Television - London 3.0 Credits**

This is a blended "study abroad" course taught online with a one-week London residency. The course examines the roots of the TV industry in the UK and the symbiotic relationship between US and UK TV entities.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 680 Management of News and Sports Programming 3.0 Credits**

Management of News and Sports Programming. Through lectures, case studies, and individual and project work, this course explores management issues in news and sports programming. Students learn about news and sports journalism, sales/marketing/sponsorship of news and sports programming, legal and ethical issues, personnel issues, market research, technology, and how to critique new sports programming.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 685 Producing for Television 3.0 Credits**

This course introduces students to the art and craft of producing for television. It focuses on the role of the TV producer who is central to the creation, maintenance and ultimate success of television series, movies or specials.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 700 Television Practicum 3.0 Credits**

This course offers hands-on management experience at Drexel's television station or (with Program Director's approval) at other television stations, cable companies, or related media. The assumption is that the student will work a minimum of ten hours per week for ten weeks to receive three credits for the term.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN 710 Television Programming 3.0 Credits**

Through lectures, case studies and individual and team projects, this course explores the role of programming in television. Students learn about development, financial and legal issues, programming distribution, the role of ratings and advertising support in program scheduling, and career opportunities in the field.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 731 TV Technology and Innovation 3.0 Credits**

This is a course for present and future television professionals who want to know what television technology is today, and how will change it tomorrow. The course will introduce, explore and question legacy and innovative television technologies. It will convey not just a new vocabulary of technical terms, but also an understanding of the intersecting concepts and challenges posed by new technological and organizational developments. It will enable students to become conversant with and agile in the application of technology assessment. Students will understand the evolutionary history of legacy media technology and their impact on current and emerging media technology. They will analyze, deconstruct and reconstruct the systems of interrelated technologies that constitute the media ecosystem.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 740 Money and the Media 3.0 Credits**

This course will apply the students' required coursework in the LeBow College of Business in areas such as economics and accounting with the specific challenge of managing the finance function within television and new media industries.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 780 Media Research Laboratory 3.0 Credits**

Content of the course will include: development of research proposals, hypothesis formulation and testing, research question structuring, methods for analyzing institutional dynamics, content analysis, regulatory and legal research, case study, and data mining linked with big data analytics tools. It will also include an introduction to descriptive and inferential statistics. Laboratories will provide hands-on experience in the research process.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 795 Capstone Project Seminar 3.0 Credits**

This course is designed to lead students through the final stages of the thesis process in order to produce and deliver a draft of the required capstone project by the end of the quarter. This will require weekly analysis and writing and project development and will also require your full attention. Attendance is mandatory. Half of your grade for the capstone project will be determined by how well you perform this quarter.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**TVMN 796 Capstone Project Completion 0.5 Credits**

This course is designed to provide faculty advising and library resources as students complete their capstone projects.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN I599 Independent Study in Television Management 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN I699 Independent Study in Television Management 1.0-6.0 Credit**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN I799 Independent Study in Television Management 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN I899 Independent Study in Television Management 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN I999 Independent Study in Television Management 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN T580 Special Topics in Television Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN T680 Special Topics in Television Management 3.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN T780 Special Topics in Television Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN T880 Special Topics in Television Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**TVMN T980 Special Topics in Television Management 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## Transdisciplinary Science, Computing, and Engineering Design (TranSCEND)

### Courses

**SCED 500 Graduate Proseminar 3.0 Credits**

The Graduate Proseminar introduces students to faculty research projects and laboratory activities, exploring the intellectual foundations of transdisciplinary collaboration, themes connecting research areas, and collaborative working practices. Program faculty and their students present examples of their ongoing work at an approachable level for in-depth discussion.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**SCED 501 Collaborative Laboratory I 3.0 Credits**

Collaborative Laboratory (Co-Lab) I engages students in the TranSCEND MS program in novel small group projects requiring contributions from a range of disciplines, under faculty direction. In this first term, small teams of 3-4 students will be provided with project topics determined by program faculty. These projects will require a strong technical focus in engineering, computing, or the sciences. In addition to working within project teams, class time is dedicated for each group to share their pursuits, challenges, and successes across the program cohort to learn from their diverse experiences.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**SCED 502 Collaborative Laboratory II 3.0 Credits**

In Collaborative Laboratory (Co-Lab) II, first-year TranSCEND MS students develop a new, sustained group project, under faculty direction. In this term, new student teams will be formed around project topics determined by program faculty, and successful project outcomes will depend upon collaborative efforts across a range of disciplines. These projects will require a strong technical focus in engineering, computing, or the sciences. In addition to sustained project research and development, class time is dedicated for each group to present and share their project experiences with the cohort.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCED 501 [Min Grade: C]

**SCED 503 Collaborative Laboratory III 3.0 Credits**

Collaborative Laboratory (Co-Lab) III is the concluding term of a sustained, 6-month group project for students in the TranSCEND MS program. In Spring Quarter, student teams continue to develop their Winter Term projects and work towards a final project deliverable, report, and presentation, under faculty supervision. These projects will require a strong technical focus in engineering, computing, or the sciences. The final term emphasize dissemination and showcase opportunities for the projects and each group's learnings from the process.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCED 502 [Min Grade: C]

**SCED 510 Industry Collaborative 3.0 Credits**

This online course provides a unique opportunity for students to share and learn from one another's graduate co-op experiences. Facilitated by a faculty member, students will present tasks, problems, and challenges (with employer approval) from their co-op to the full cohort "workgroup" to discuss potential solutions and opportunities from a wide range of disciplinary perspectives.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCED 503 [Min Grade: C]

**SCED 521 Entertainment Technologies 3.0 Credits**

This course introduces the technology of prevailing media systems and platforms used in modern audio and visual presentation, performance, and dissemination of entertainment. The course explores in depth the technologies used to capture, display, and manipulate such content and the history, current technical standards, and future trajectories of digital representations used to encode these media. The goal of this course is to provide students with a fundamental understanding of entertainment technologies allowing them to be not just users, but creators of new technology.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**SCED 600 Masters Thesis Preparation 3.0 Credits**

This course introduces students to research methods, tools, and resources for pursuing a transdisciplinary Masters thesis, leading to the development of an individual thesis project proposal and the establishment of a 3-faculty member Thesis Committee. It is generally given online and taken concurrently with the second term (Fall, second year) of Graduate Co-op.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCED 503 [Min Grade: C]

**SCED 690 Masters Thesis Research 3.0-6.0 Credits**

Second-year students pursue the development of their individual thesis projects over the final year of the TranSCEND MS program. This work should involve research leading to the development and demonstration of new technology. In addition to the written thesis, an oral defense presentation is required for graduation from the program. The course is variable credit depending on the student's plan of study.

**College/Department:** Close School of Entrepreneurship-3145

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SCED 600 [Min Grade: C]

# Urban Strategy

## Courses

**URBS 510 History of Urban Space 3.0 Credits**

Provides critical understanding of the history and theory of urbanism through discussions of spatial stratification, theories of urban change and urban social movements, poverty and inequality. Also explores theories of urban political economy and ecology.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 520 What is a City 3.0 Credits**

Provides critical understanding of what cities are and how they function through discussions of the political structure of cities and the relationship to counties, states and federal governments. Also explores the relationship between governments, nongovernmental organizations, public-private partnerships, and market forces.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 530 Quantitative Methods & Reasoning for Urban Strategists 3.0 Credits**

Develops critical knowledge about data collection, analysis, and forecasting skills for professional workflows, particularly as they relate to social and economic datasets available through public repositories such as the United States Census Bureau and the Bureau of Labor Statistics.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 610 Civic Engagement & Participatory Methods 3.0 Credits**

Explores and examines how communities accomplish planned change through a number of models including community development, social planning, social action and public advocacy.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 620 City of Systems 3.0 Credits**

Develops critical knowledge about the nature of cities and how they work through exploration of the urban physical systems that undergird cities and make them livable.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 630 Spatial Reasoning for Urbanists, Architects & Designers 3.0 Credits**

Provides understanding of the theoretical concepts and practical applications of spatial reasoning and the visual display of quantitative data, focusing on the creation and critical interpretation of spatial data relevant to urban-focused problem solving. Assessing, importing and managing data from diverse sources, producing graphic representations, and moving data interpretation to presentation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 640 Sanctuary Cities 3.0 Credits**

Historically associated with privately held enclosures within urban space (churches, homes, gardens), "sanctuary" is increasingly understood as a public practice that shapes public policy. This course explores the role of so-called "sanctuary cities"—municipalities that limit their collaboration with (and sometimes openly defy) state and federal agencies—within the bitter struggle to reform the US immigration system. We examine the historical records, interviews, legal statutes, executive orders, artistic projects, and literature that have shaped this contested issue, with particular focus on how cities at once activate and restrict the revolutionary potential of sanctuary.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 650 Urbanism, Health & the Built Environment 3.0 Credits**

Provides an understanding of a wide survey of various urban design principles, theories, regulatory controls, and contemporary urban-centric issues which govern the built environment. Areas of investigation will include urban form and structure, mental mapping and spatial awareness, local and regional transportation, land use issues, walkability and the public realm, urban sustainability issues, and tactical urbanism strategies.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 670 Thesis I: Research Inquiry & Design 3.0 Credits**

First quarter of a three quarter thesis investigation. Understanding and development of the research inquiry process and design through the application of mixed methods research, articulation of thesis investigation and a research strategy that will continue into the next two quarters.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**URBS 675 Thesis Seminar I 1.5 Credit**

First of two Thesis recitation seminars. Engagement in discourse and evaluation of self and peer investigations. Intended to foster healthy competition, accountability and peer evaluation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** URBS 670

**URBS 680 Thesis II: Fieldwork 3.0 Credits**

Second quarter of a three quarter thesis investigation. Designed to apply, facilitate and integrate research and analytical skill in pursuit of identifying and problem solving of urban issues facing cities of today and in the future. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** URBS 670

**URBS 685 Thesis Seminar II 1.5 Credit**

Second of two Thesis recitation seminars. Engagement in discourse and evaluation of self and peer investigations. Intended to foster healthy competition, accountability and peer evaluation.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** URBS 680

**URBS 690 Thesis III: Documentation 3.0 Credits**

Third quarter of a three quarter thesis investigation. Application, documentation and presentation of research, analysis and proposed resolution of an attributable urban issue facing cities of today and in the future. Professionally juried.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** URBS 680

**URBS 695 Thesis Completion 0.5 Credits**

This course allows the student to work with a thesis advisor to complete the thesis. This optional course will be taken only by students needing more than two terms to complete the thesis.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 1 times for 10 credits

**Prerequisites:** URBS 690

**URBS I599 Independent Study in Urban Strategy 0.5-12.0 Credits**

This course provides an opportunity for graduate students to conduct independent research, either applied or scholarly, under the supervision of a faculty member. ELECTIVE.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 48 credits

**URBS I699 Independent Study in Urban Strategy 0.5-12.0 Credits**

This course provides an opportunity for graduate students to conduct independent research, either applied or scholarly, under the supervision of a faculty member.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 48 credits

**URBS T580 Special Topics in Urban Strategy 0.5-12.0 Credits**

This course focuses on topics of current interest to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 48 credits

**URBS T680 Special Topic in Urban Strategy 0.5-12.0 Credits**

This course focuses on topics of current interest to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated 3 times for 48 credits

## Visual Studies

### Courses

**VSST 501 Contemporary Art Issues 0.0-3.0 Credits**

Examines critical and topical problems of the art world. Includes comprehensive readings, discussions, and field trips. Requires written analysis of materials.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit



**VSST 502 Space/Time I 3.0 Credits**

Applies contemporary ideas of art making. Explores concepts and how they can be processed within the art genre. Requires continual-process art, idea art, or conceptual art.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**VSST 509 Sculpture: CNC Fabrication 4.0 Credits**

This course approaches sculpture through the use of computerized (CNC) routers, using these digital fabrication tools to create three-dimensional objects in a variety of materials. Course projects are designed to give students familiarity with a variety of processes, materials, and ideas pertinent to making art in three dimensions. Additionally, the course will give students hands-on experience designing for, programming, setting up, and operating Westphal's CNC routers.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**VSST 511 Drawing Fundamentals 3.0 Credits**

Drawing Fundamentals is a graduate studio course that deals with the skills and concepts utilized in sketching from both observation and imagination. For this course, sketching from observation is defined as making work directly from a three-dimensional source, primarily using still life or architecture as subject matter. Honing observational skills, exploring a variety of drawing techniques and materials including imagination-based sketching, encouraging conceptual development and using the principles of design for creative expression will be emphasized.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**VSST 1599 Independent Study in Visual Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST 1699 Independent Study in Visual Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST 1799 Independent Study in Visual Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST 1899 Independent Study in Visual Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST 1999 Independent Study in Visual Studies 0.0-12.0 Credits**

Self-directed within the area of study requiring intermittent consultation with a designated instructor.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST T580 Special Topics in Visual Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST T680 Special Topics in Visual Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST T780 Special Topics in Visual Studies 0.5-9.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST T880 Special Topics in Visual Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

**VSST T980 Special Topics in Visual Studies 0.0-12.0 Credits**

Topics decided upon by faculty will vary within the area of study.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

## VR and Immersive Media Design

### Courses

**VRIM 538 Motion Capture I 3.0 Credits**

Students learn to use motion capture systems for full-body, human performance capture, as well as the processing and use of the resulting data in character animation and real-time/game engine applications. This class further incorporates the use of these principles and tools in live, real-time interaction and performance settings.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**VRIM 539 Motion Capture II 3.0 Credits**

Students learn to use advanced motion capture systems and the data output from these systems. This course combines the use of full-body capture along with facial performance capture as well as the processing and use of the resulting data in character animation and real-time/game engine applications. This class further incorporates the use of these principles and tools in live, real-time interaction and performance settings.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

**Prerequisites:** VRIM 538 [Min Grade: B]

# Westphal Studies

## Courses

### **WEST 500 Introduction to Digital Design Tools 3.0 Credits**

This introductory level course will provide the technical background for creative and professional digital communication on several platforms. Students will examine basic elements of design through the use of print and web based programs including Illustrator, Photoshop, InDesign, Acrobat, Powerpoint, Word Press and Constant Contact. Students will explore the current potentials, limitations, and issues related to the use of computer software for design application.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

### **WEST T580 Special Topics in WEST Studies 0.5-12.0 Credits**

This course focuses on topics of current interest to faculty and students; specific topics for each term will be announced prior to registration.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Can be repeated multiple times for credit

### **WEST T680 Special Topics in WEST Studies 0.5-12.0 Credits**

This course focuses on topics of current interest to faculty and students; specific topics for each term will be announced prior to registration.

**College/Department:** Antoinette Westphal College of Media Arts Design

**Repeat Status:** Not repeatable for credit

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