Contents
College of Arts and Sciences
Graduate Course Descriptions

Bioscience & Biotechnology Courses

BIO 500 - Biochemistry I
Covers fundamentals underlying the dynamic chemistry of living systems, including enzymes (structure, catalysis, kinetics, and inhibition), genetics (nature of the nucleic acids, coding, and biochemical control), metabolic pathways (biosynthesis of the major classes of biological materials, and their interrelationships and catabolism), and energetics (the origin and handling of energy, including photosynthesis, ATP, and glucose metabolism).
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Co-Requisites: BIO 501

BIO 501 - Biochemistry Laboratory I
Accompanies BIO 500.
Credits: 2.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C or BMES 501 Minimum Grade: C

BIO 520 - Cell Physiology
Covers the chemical composition and cellular function of organelles and other cell structures, including intra-and intercellular regulatory processes, intercellular communication, genetic mechanisms, and analytical techniques. Emphasizes analysis of recent research findings.
Credits: 5.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C

BIO 530 - Microbial Genetics
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.
Credits: 5.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C

BIO 531 - Evolutionary Ecology
Study of the food web, natural selection, the ecological niche and ecological succession. Effects of human activities on ecosystems. Simple modeling of competition and predator-prey interactions. Humans viewed as a species.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

BIO 532 - Advanced Cell Biology
This course covers the essentials of cell biology and discusses the life and behavior of cells in the context of the molecules that underlie and drive these processes. In particular, the course focuses on regulation and how integration and coordination is required for normal cell behavior.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C

BIO 540 - Readings in Mol/Cellular Bio
A reading course for first year graduate students based on current manuscripts from the primary literature. The goals of this course are from students to be exposed to the most current findings using primary literature, become skilled in critically reading the primary literature, and to gain experience in making presentation based on a set of papers.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Co-Requisites: BIO 532
Pre-Requisites: BIO 500 Minimum Grade: C and BIO 535 Minimum Grade: C

BIO 550 - AIDS 101
Studies the AIDS epidemic from biological, epidemiological, and sociological viewpoints.
Credits: 2.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

BIO 555 - Physio Growth & Develop
Covers the biochemical aspects of growth and hormone action, controls in protein synthesis, and coupling of growth and respiration; the biophysical aspects of growth; biometric aspects of growth studies, experimental methods, and data processing; and feedback control models and the basis for biorhythms.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

BIO 566 - Endocrinology
Describes the classical hormones, their regulation and major clinical abnormalities. New directions in endocrinology, such as cellular regulation and cellular mediators of hormonal action are also considered. The major focus of the course will be on mammals, although some examples involving other vertebrates will be included.
Credits: 4.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

BIO 610 - Biochemistry II
Continues BIO 500.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C

BIO 611 - Biochemistry Laboratory II
Accompanies BIO 610.
Credits: 2.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Co-Requisites: BIO 610

BIO 615 - Proteins
Discusses protein structure, function, and isolation. Emphasizes biochemical, biophysical, and molecular biological techniques.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 500 Minimum Grade: C and BIO 501 Minimum Grade: C

BIO 618 - Experimental Biochemistry II
Covers spectroscopy, magnetic resonance (NMR and PMR), mass spectra, and electromagnetic spectra.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

BIO 620 - Biomembranes
Covers biochemical properties of membranes and membrane components, including phase properties, structure, organization, permeability, transport, and biosynthesis of membrane components.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):

Chemistry Courses

CHEM 521 - Inorganic Chemistry I
Covers the principal models of inorganic chemistry: structure and bonding, interactions in the solid state, coordination compounds, complexation equilibria, and acid-base models.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 522 - Inorganic Chemistry II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 521 Minimum Grade: C

CHEM 523 - Inorganic Chemistry III
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 522 Minimum Grade: C

CHEM 530 - Analytical Chemistry I
Covers principles and techniques of optical methods of analysis.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 531 - Analytical Chemistry II
Covers physical and chemical methods of separation, including distillation, solvent extraction, and chromatographic and ion-exchange techniques.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 532 - Analytical Chemistry III
Covers electroanalytical principles and techniques of potentiometry, voltametry, and coulometry.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 541 - Organic Chemistry I
Covers spectroscopic methods for the determination of the structure of organic molecules.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 542 - Organic Chemistry II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 543 - Organic Chemistry III
Covers mechanisms of organic reactions and the techniques of studying them.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 551 - Radiochemistry
Covers radioactivity; interaction of radiation with matter; radiation detectors; nuclear reactors; hot atom chemistry; carbon-14 dating; and neutron activation analysis and its applications to pottery dating, environment, lunar studies, and forensics.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 554 - Chemical Kinetics
Focuses on experimental and theoretical consideration of chemical reaction rates.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 555 - Quant Chem Of Molecules I
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.

Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 557 - Physical Chemistry I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 558 - Physical Chemistry II
Covers statistical mechanics of distinguishable and indistinguishable particle systems, and thermodynamic functions for both systems and chemical equilibrium.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 557 Minimum Grade: C

CHEM 561 - Polymer Chemistry I

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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 562 - Polymer Chemistry II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 563 - Polymer Chemistry III
Covers polymer characterization and analysis; morphology; molecular weight determination, including end group analysis, and colligative properties (vapor pressure lowering, elbullometry, cryoscopy, osmometry); light scattering; viscosity; gel permeation chromatography; sedimentation; diffusion and permeation; polymer identification; plasticizers; x-ray diffraction; thermal behavior; and spectroscopic techniques.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 561 Minimum Grade: C

CHEM 656 - Quant Chem Molecules II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 555 Minimum Grade: C

CHEM 657 - Quant Chem Molecules III
Continues CHEM 656. Covers the theory of chemical bonding, scattering theory, and detailed Hartree-Fock calculations.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 656 Minimum Grade: C

CHEM 659 - Physical Chemistry III
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 558 Minimum Grade: C

CHEM 680 - Special Topics
Provides extended study of topics of particular interest to the class. Taught by various members of the faculty as appropriate for the given topic. Covers topics including computers in chemistry, magnetic resonance, organic synthesis, electrochemistry, mass spectrometry, electronic materials, molecular modeling, atmospheric chemistry, metallobiochemistry, radiochemistry, heterocycles, and photochemistry of small molecules.
Credits: 9.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 751 - Magnetic Reson In Chem
Covers basic principles of electron spin resonance and nuclear magnetic resonance; interpretation of chemical shifts, spin-spin couplings, and spin relaxation; and two-dimensional nuclear magnetic resonance.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 752 - Biophysical Chemistry
Thermodynamics and kinetics to aqueous biological systems. Properties and behavior of biological macromolecules.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 753 - Chemical Instrumentation
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.
Credits: 5.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Undergraduate Quarter
May not have the following Classification(s):
Freshman
Junior
Pre-Junior
Sophomore

CHEM 755 - Mass Spectrometry
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 767 - Chemical Information Retrieval
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.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 771 - Organometallic Chemistry
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 521 Minimum Grade: C

CHEM 772 - Inorganic Biochemistry
Covers chemistry of metal ions in biological systems and biomimetic ligands and complexes. Includes metal ion chemistry in aqueous environments and structure and behavior of metalloproteins.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 521 Minimum Grade: C

CHEM 773 - The Solid State
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 774 - Electrochemistry for Chemists
Covers potentiometric, coulometric, voltammetric, and potential-step methods for eliciting electron-transfer thermodynamic and kinetic information from chemical and biological systems.
Credits: 4.50
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 780 - Nuclear Magnetic Res Lab
This course provides theory and technical applications of Nuclear Magnetic Resonance to the solution of structural problems in Chemistry.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry

CHEM 782 - Electronics for Chemical Instr
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.
Credits: 4.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
Undergraduate Quarter

CHEM 783 - Electronics for Chemi Instr II
Analog electronics for chemical instrumentation. Basic circuit analysis including discussions of Kirchhoff's laws, transient circuit analysis and

the phasor method. Introduction to solid state device theory and applications.
Credits: 4.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education

CHEM 788 - Atmospheric Radioactivity
Covers naturally occurring and anthropogenic radionuclides of significance in the earth's atmosphere, including their application as tracers of air mass movement, atmospheric dynamics, and other characteristics. Discusses important methods and techniques of measurement. Requires a term paper from students receiving 5 hours of credit.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 789 - Exper Desgn & Stat Chem
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 792 - Adv Organic Synthesis I
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.
Credits: 3.00 to 5.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education

CHEM 793 - Adv Organic Synth II
Covers carbon-carbon bond forming reactions, organometallic reagents, cycloaddition reactions, and multistep synthesis of complex organic molecules including natural products.
Credits: 3.00 or 5.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education

CHEM 794 - Topics Organic React Mech
Covers current topics in organic reaction mechanisms, with emphasis on understanding the fundamental rules that govern the course and reactivity of chemical reactions.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 541 Minimum Grade: C and CHEM 542 Minimum Grade: C

CHEM 796 - Heterocyclic Chemistry
Explores general trends in the synthesis, reactions, and properties of oxygen, nitrogen, and sulfur heterocycles, with emphasis on their applications to the synthesis of bioactive materials.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 541 Minimum Grade: C

CHEM 797 - Organic Chem Sulfur & Sel
Covers fundamentals of organosulfur and organoselenium chemistry, with emphasis on the application of these elements to asymmetric synthesis and the synthesis of natural products.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: CHEM 541 Minimum Grade: C and CHEM 542 Minimum Grade: C

CHEM 862 - Topics in Inorganic Chemistry
Covers specialized principles of inorganic chemistry plus contemporary advances in the field. May be repeated for credit when topics vary.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 865 - Chemistry Research Seminar
Provides presentation and discussion of current research topics in chemistry.
Credits: 9.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 866 - Topics Polymer Chemistry
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 868 - Topics in Analytical Chemistry
Surveys new or developing instrumental or chemical analysis techniques. Covers spectroscopic, chromatographic, and/or electrochemical techniques for analysis of solutions or surfaces.
Credits: 5.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 898 - Master's Thesis
M.S. thesis.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 997 - Research
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.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

CHEM 998 - Ph.D. Dissertation
Ph.D. dissertation.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Chemistry
Restrictions:
Must be enrolled in one of the following Program(s):
PHD-A&S Science
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Chemistry

Communication Courses

COM 500 - Reading & Res Communication
Introduces graduate study in the communication program. Presents issues and concepts for this course and other graduate courses. Focuses on issues such as reading complex texts, both theoretical and research-oriented. Also introduces the range of fields in professional communication.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 510 - Technical Writing
An intensive workshop course in writing technical abstracts, proposals, manuals and reports. Focuses on developing reader-centered documents for a variety of audiences and purposes through the use of a number of styles. Aids students in developing greater awareness of the varieties of rhetorical situations and styles found in their careers.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 520 - Science Writing
An intensive workshop course in communicating scientific information to the public, including reading and discussion of science journalism. Focus is placed on how to translate and reinterpret technical and scientific information for a general readership.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 530 - Tech & Science Photo
Introduces the techniques of photography. Enhances students understanding of photography to better enable them to use photographs and services of photographers as communicative media.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 540 - Technical and Science Graphics
Covers the design and production of graphic materials for technical and scientific purposes. Allows students to begin to understand the visual aspects of communication. Focuses on the use of type, art, and photographs to reinforce the written message
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 550 - Video Prod for Sci & Tech
Introduce the techniques of studio and field video production for technical and science subjects. Teaches students to produce their own video for training purposes or information access.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 570 - Technical and Science Editing
Covers techniques of formal editing, including project and copy editing. Requires students to read, discuss and edit numerous types of documents from professional, government and industry sources.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 605 - Sports Journalism
This course enables students to gain a deeper understanding of the meaning-making power of sports journalism. In it, we explore the changing role of the sports journalist, from the mythmaking and hero-worship seen during the field's infancy, to the detachment and devotion to the craft of journalism that marked sports reporting beginning in the mid-20th Century.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 610 - Theories Comm & Persuasn
Examines the application of theories and models of communication and persuasion. Introduces theories underlying technical communication and issues informing the discipline. Draws readings from a number of disciplines, such as rhetoric, cognitive psychology, discourse analysis, linguistics, and communication.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 615 - Environmental Communication
This reading and writing intensive course will explore communication about environmental issues. Topics can include advocacy campaigns, social marketing, environmental journalism, media coverage of environmental issues, green marketing, the environment in popular culture, risk communication, and public participation.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 616 - Environmental Info Campaigns
This reading and writing intensive, seminar-style course 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 620 - Message Design and Evaluation
Examines research and theory on the design of messages. Introduces research methodologies appropriate for the evaluation of scientific and technical communications. Examines research in document design and usability, testing and other strategies for collecting, analyzing and presenting data.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 625 - Cultural Significance of Fame
This course explores our fascination with fame and celebrity, and the desire of so many people to achieve fame ? from Alexander the Great to American Idol. Key issues include: the mass media’s role in creating the cultural significance of fame, psychological characteristics of fame seekers, and changes in what it means to be a fan of the famous.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 630 - Software Documentation
Teaches the principles and goals involved in writing, revising, and testing computer documentation, both paper and on-line. The focus will be on the end user documentation, although the principles involved may also apply to systems documentation.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 635 - Electronic Publishing
Electronic Publishing gives students applied and theoretical knowledge of professional electronic publishing. Students will focus on issues relating to writing and integrating text and graphics to create websites and on-line publications. Students will also consider how issues in document design and usability analysis can be used to evaluate websites.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
May not have the following Classification(s):
Freshman
Junior
Pre-Junior
Sophomore

COM 640 - Desktop Publishing
This course focuses on designing and developing publications using Desk Top publishing software. Students develop a publication plan for a specific organizational situation and learn basic design principles. Classes deal with planning, designing, writing and budgeting publications. Students concentrate on two major kinds of publications, brochures and newsletters, and will also learn about smaller publications.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 650 - Telecomm Polcy Info Age
The historical, governmental, social, economic and political structures of telecommunications policies are examined. Special emphasis is placed on how assumptions concerning living in an information age affect policies, philosophies, structures and outcomes, especially at a global level.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 660 - Investigative Journalism
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 665 - Journalists, Courts & the Law
Students explore and apply techniques for covering the court system, and explore case law and recent key legal developments that have reshaped how journalists do their jobs.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: COM 500 Minimum Grade: C and COM 660 Minimum Grade: C

COM 670 - Medical Writing
Students learn about the major branches of medical writing and editing, for both medical and pharmaceutical contexts. The course includes the following topics: writing for professional, commercial and popular audiences, preparing FDA submissions, reading and researching medical literature, using medical statistics, interviewing subjects and writing ethically.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 675 - Grant Writing: Arts/Humanities
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: COM 500 Minimum Grade: C

COM 680 - PR Writing & Strategies
An intensive, advanced public relations course covering public relations theory, strategies and writing. Students will apply theory and tactics in the development of crisis communication plans and issue management strategies.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 685 - International Public Relations
This course is a comprehensive overview of international issues in PR including history and evolution of the field, image-formation and image-change processes, PR in war and conflict, effects of different

political and legal systems on PR, actual PR practices in different countries and regions of the world.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 686 - International Communication
This course is taught within the paradigm of media ecology. Such issues as the historical context, theoretical concepts, economic and structural aspects of international communication is considered. The effects of culture, language, religion, history, politics, and tradition on the process of international communication are also examined.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 690 - Special Topics
Covers selected topics in technical and science communication. May be repeated for credit.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 799 - Indep Proj Tech/Sci Comm
Provides advanced independent study in technical or science communication. May be repeated for credit.
Credits: 12.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 865 - Interconn: Sci & Tech/Lit
Examines issues concerning relations among science, technology, literature, and the arts, and leads students to learn something if the nature of science and technology and explore the contribution of literature, the arts, and aesthetic theory to effective science and the technical communication.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 875 - Ethics in Tech & Sci Comm
Studies principles and concepts of ethics for technical and scientific writers, editors and publishers. Examines moral presuppositions of the profession as they pertain to technical and scientific communications, to the effects of computer technologies on ethical practices in the workplace, and to the responsibilities of editors for preventing fraud.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

COM 880 - Sem; Ethics for Public Comm
This course is a seminar in journalism and public relations ethics. Topics discussed include: professional responsibilities of journalists with respect to truth-telling and objectivity in reporting the news; ethical issues surrounding morally offensive radio and television content; ethical issues concerning what is and is not covered by the news and manipulative advertising.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Environmental Engineering and Science Courses

ENVR 501 - Chemistry of the Environment
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).
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 506 - Biostatistics
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 511 - Evolutionary Ecology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 516 - Sanitary Microbiology
Covers microscopic life forms of sanitary significance, with emphasis on bacteria, viruses, algae, fungi, and protozoa. Includes a thorough coverage of water and wastewater microbiology, especially transmission of waterborne diseases, bacterial indicators of pollution, and the microbiology of wastewater treatment.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 520 - Field Methods in Paleoecology
This course is based around student participation in an ongoing excavation of a Cretaceous vertebrate fossil locality. Students learn excavation techniques and principles of paleoecology through analyses of collected data. This meets for one full day per week. Transportation provided. May be repeated twice for credit.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 521 - Environmental Health
Discusses health effects of environmental (biological, physical, and chemical) hazards and the design of environmental controls and regulations for the health and well-being of humans.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 522 - Environmental Law
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 523 - Environmental Regulations
Reviews the development and implementation of environmental regulations. Acquaints students with the federal regulatory process. Focuses on the process of regulation proposal and examines the intent and coverage of the major environmental regulations, with emphasis on Section 40 of the Code of Federal Regulations.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 531 - Industrial Hygiene I
Covers general principles of industrial hygiene, including historical background and development as an interdisciplinary profession. Includes identification, evaluation, and control methods of occupational exposures to biological and chemical agents in the form of aerosols, gases, vapors, liquids, and solids, and examines the implications of toxicity and health effects from the workplace and relation to the total environment.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 532 - Industrial Hygiene II
Covers occupational exposure to physical agents including noise, heat, cold, humidity, and ionizing and non-ionizing radiations. Includes related aspects of safety, ergonomics, legal requirements, formation of government health agencies, and contemporary problems in occupational health.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 531 Minimum Grade: C

ENVR 533 - Industrial Hygiene Laboratory
Includes laboratory exercises involving the more common and current procedures in industrial hygiene sampling, including air sampling and calibrations, dust and particle counting, noise measurement, ventilation, heat and comfort indices, illumination, and evaluation of controls.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C or ENVE 501 Minimum Grade: C

ENVR 534 - Industrial Ventilation
Covers principles of air movement related to ventilation and air-conditioning facilities for the main tenance 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 538 - Biodiversity and Conservation
The ongoing reduction of biodiversity of the planet is one of the most basic issues of our time. This course presents a detailed treatment of this problem and provides insight into modern theories and practice of conservation that are essential to the preservation of our planet.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 511 Minimum Grade: C

ENVR 541 - Air Pollution Meteorology
Considers meteorological processes important to transport and diffusion of atmospheric pollutants on all scales, from microscale to global.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 551 - Radiological Health
Covers application of health physics, radiation fundamentals, biological effects of ionizing radiations, federal and state regulations, laboratory and field instrumentation, and disposal of radioactive waste.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 552 - Radiobiology
Covers the physiological and biological effects of ionizing and non-ionizing radiation, including genetic effects.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 561 - Introduction to Hydrology
This course offers the introduction to climate and weather, precipitation, evaporation and transpiration, drainage basins and hydrographs.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 582 - Field Botany: NJ Pine Barrens
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. May be repeated once for credit.
Credits: 5.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 511 Minimum Grade: C

ENVR 583 - Ecology of the NJ Pine Barrens
Course focusing 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.
Credits: 5.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 511 Minimum Grade: C

ENVR 588 - Marine Field Methods
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 Drexel's 25? research vessel Peter Kilham.
Credits: 5.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 511 Minimum Grade: C

ENVR 601 - Adv Environmental Chem
Covers thermodynamic and kinetic principles and their application to the study of chemical changes and reactions in the water or air environments.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C

ENVR 605 - Atmospheric Chemistry

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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C or ENVE 501 Minimum Grade: C

ENVR 608 - Fate Of Poll Air & Water
Theoretically delineates the physical and chemical mechanisms that define the fate of a pollutant and applies them to models and environmental systems.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C or ENVE 501 Minimum Grade: C

ENVR 611 - Aquatic Ecology
Reviews the basics of chemistry, physics, and biology of freshwater systems, including the effects of pollution.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 616 - Environmental Microbiology
Covers applications of microbial ecology, physiology, and growth kinetics to the resolution of various environmental problems. Includes microbial corrosion and acid mine drainage, biodegradation of hazardous and toxic organic wastes, remediation of groundwater contamination, and microbiological hazards of water supply.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 516 Minimum Grade: C

ENVR 621 - Epidemiology
Covers the principles, purposes, and methods of epidemiology and the application of methods for the investigation of problems in the field of human diseases-infectious and non-infectious-emphasizing the relationship and equilibrium of host and environmental factors.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 516 Minimum Grade: C and ENVR 636 Minimum Grade: C

ENVR 636 - Principles of Toxicology I
This course reviews general human physiology and the acute and chronic effects of toxicants on physiological mechanisms. Basic principles of dose-response relationships, target organ toxicity, and exposure characterization are incorporated.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C or ENVE 501 Minimum Grade: C

ENVR 637 - Principles of Toxicology II
This course expands upon knowledge gained in Principles of Toxicology I by focusing in the absorption, distribution, biotransformation and excretion of toxic substances. Current advances in the study of carcinogenesis and mutagenesis are also discussed as well as toxicological research methods, animal and plant toxins, food toxicology, and pesticides.
Credits: 3.00
College: College of Arts and Sciences
Department: Bioscience & Biotechnology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 636 Minimum Grade: C

ENVR 641 - Community Air Pollution
A general course designed for engineers, chemists, planners, and physicians. Discusses measurement and control of air pollution; legal enforcement aspects of air pollution control to attain air quality standards; and the nature and quantity of atmospheric emissions from transportation vehicles, power plants, and specific industries.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Co-Requisites: ENVR 501
Pre-Requisites: ENVR 501 Minimum Grade: C

ENVR 650 - Resource & ENVR Economics
This course is a graduate level introduction to the application of economics to resource and environmental issues. Beginning with an introduction to the nexus between resources, environment and the economy, we then consider the applicability of conventional rules for economic efficiency and highlight the theoretical foundations for resolving complications due to the unique features of natural resources and the environment. We use empirical issues in the broad area of resource and environmental economics to illustrate these concepts.

Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 670 - Microbial Ecology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 516 Minimum Grade: C

ENVR 690 - Marine Ecology
Studies major processes in the marine environment, especially relationships between organisms and the factors that influence their abundance.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 700 - Evolution
Covers historical evidence for and principal mechanism of organic evolution, including the origin of life and new groups of organisms in the past and present, and the genetic basis for evolution. Discusses current research in evolutionary biology and ecology.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 710 - Physiological Ecology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 711 - Aquatic Toxicology
Applies the principles of toxicology to fish and aquatic invertebrates. Includes applications of laboratory and field tests to evaluate aquatic effects, and methods of data analysis.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 712 - Biophysical Ecology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 720 - ENVR CBA
This course deals with cost-benefit analysis in the environmental content. We examine the theoretical basis for welfare measurement and then proceed to examine various methods for monetary valuation of environmental goods, with an emphasis on empirical implementation.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 650 Minimum Grade: D

ENVR 722 - Tropical Ecology
Covers the ecology of tropical forests, including biogeography, history, current processes, and effects of economic development of rain forest and dry forest of the Old and New World tropics.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 726 - Environmental Assessment
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 736 - Toxicology

Surveys toxic chemicals and physical agents and the acute and chronic effects of these toxic substances and residues. Includes analysis of exposure and controls.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 636 Minimum Grade: C

ENVR 741 - Toxic & Hazard Air Pollut
Examines the health effects of a variety of air pollutants. Covers damage to animals, plants, property, and people.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 641 Minimum Grade: C

ENVR 742 - Atmospheric Aerosols
Covers the statistics of size distributions of fine particle systems, the physical laws that explain the properties of aerosols, their relationship to the environment, and aspects of control. Includes motion due to gravitational, inertial, thermal, and electrostatic forces. Discusses the phenomena of diffusion and impaction as they relate to aerosol sampling and analysis.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C or ENVE 501 Minimum Grade: C

ENVR 751 - Stream Analy Poll Control
Covers the ecological response of natural waters to organic and inorganic pollution. Includes mathematical models for the analysis of the water quality of lakes and streams.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 501 Minimum Grade: C and ENVR 516 Minimum Grade: C

ENVR 757 - Bioremediation
Examines the development of microorganisms and engineering technologies for the remediation of industrial and hazardous wastes. Includes government regulations and use of novel microorganisms.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: BIO 665 Minimum Grade: C and ENVR 616 Minimum Grade: C

ENVR 760 - Envr Movements In America
Introduces the processes of social change and the key collective actors and institutions involved in the creation of U.S. environmental policies. Provides an understanding of the historical and social processes by which environmental policy is created and changed through a political process among a number of different coalitions.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 771 - Thry/Prac Envr Pol Analys
Examines the theoretical models of policy analysis and their practical applications. Develops an understanding of the theoretical, social, political, and ethical context of policy research, and translates this understanding into an applied practice of policy analysis.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 772 - Mthds Env Pol Analysis
Focuses on the methods used in carrying out policy analyses. Develops the student's capacity to conceptualize, design, and conduct policy research. Focuses on the qualitative and quantitative methods used in carrying out policy research. Specific methods covered include secondary data analysis, survey research, content analysis, unobtrusive measures, and case studies.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 773 - Practicum Envr Pol Analys
Involves the application of research skills to conduct policy research. Provides students with the opportunity to conduct policy research in a specific topic of interest under faculty guidance.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 772 Minimum Grade: C

ENVR 774 - ENVR ECON ANAL

This course presents theories and applications in the design of economic instruments for controlling environmental problems. We also examine briefly, economy-wide factors driving how firms and households react to these policies.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 650 Minimum Grade: D

ENVR 797 - Research
Requires actual formulation and investigation of a research problem and a written report. M.S. degree candidates electing the thesis option are required to take between 3 and 6 credits of this course.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 799 - Independent Study
Credits: 9.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 865 - Special Topics
Covers 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.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 880 - Environment and Society
Examines the relationships between human society, including economic and political institutions, cultural beliefs, and individual behaviors, and the natural environment. Examines, through a historical perspective, the role that social organizations play in either fostering an ecologically sustainable society or in accelerating ecological destruction.
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 890 - Ecology Seminar
Addresses current topics in ecology and organismal biology. Involves discussion and critical evaluation of recent papers/books. Covers a different topic each term.
Credits: 1.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 891 - Research Methods I
Introduces research methods and literature, procedures for the collection and analysis of data, and preparation of technical papers
Credits: 3.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 898 - Master's Thesis
Requires each student working on a thesis to file a written report each term with his or her supervisory committee and the program graduate student adviser.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 899 - Independent Study
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVR 998 - Ph.D. Dissertation
Requires each student working on a dissertation to file a written report each term with his or her supervisory committee and the program graduate student adviser.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Environmental Science & Policy
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Environmental Policy Courses

ENVP 570 - International Environmental Policy
Examines the prospects for effective environmental policymaking in the contemporary nation-state system. Reviews international environmental issues, agreements and institutions. Studies theories of international relations in order to develop a conceptual framework for analyzing the strengths and weakness of the nation-state system.

Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 650 - Resource & Environmental Economics
This course is an introduction to the application of economics to resource and environmental issues. The cause highlights the theoretical foundations for resolving complications due to the unique features of natural resources and the environment. We us empirical issues in the broad area of resource and environmental economics to illustrate these concepts.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 720 - Environmental Cost-Benefit Analysis
This course deals with cost-benefit analysis in the environmental content. We examine the theoretical basis for welfare measurement and then proceed to examine various methods for monetary valuation of environmental goods, with an emphasis on empirical implementation.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 650 Minimum Grade: C

ENVP 760 - Social Change & Environment
Introduces the processes of social change and the key collective actors and institutions involved in the creation of U.S. environmental policies. Provides an understanding of the historical and social processes by which environmental policy is created and changed through a political process among a number of different coalitions.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 772 - Methods of Environmental Policy Analysis
Focuses on the methods used in carrying out policy analyses. Develops the student's capacity to conceptualize, design, and conduct policy research. Focuses on the qualitative and quantitative methods used in carrying out policy research. Specific methods covered include secondary data analysis, survey research, content analysis, unobtrusive measures, and case studies.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 773 - Environmental Policy Analysis Practicum
Involves the application of research skills to conduct policy research. Provides students with the opportunity to conduct policy research in a specific topic of interest under faculty guidance.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 774 - Environmental Policy Economic Analysis
This course presents theories and applications in the design of economic instruments for controlling environmental problems. We also examine briefly economy-wide factors driving how firms and households react to these policies.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: ENVR 650 Minimum Grade: C

ENVP 865 - Special Topics
Covers topics of current interests to faculty and students; specific topics for each term will be announced prior to registration. May be repeated for credit if topics vary.
Credits: .50 to 5.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 875 - Environmental Justice
Seminar course focusing on the concept of environmental justice/injustice; empirical evidence of inequalities; theories of environmental injustice; politics of environmental health and illness; legal remedies at local and international level; and the environmental justice movement.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

ENVP 880 - Environment and Society
Examines the relationships among human society, including economic and political institutions, cultural beliefs, and individual behaviors, and the natural environment. Examines, through a historical perspective, the role that social organizations play in either fostering an ecologically sustainable society or in accelerating ecological destruction.
Credits: 3.00

College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

History Courses

HIST 501 - Intro to Sci, Tech & Society
Introduces the study of science, technology, and society. Samples different approaches to the study of STS, including methods of problem selection and research methods.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education

HIST 550 - History of Comparative Industrialization
While the specific topics vary by instructor, this reading seminar considers the development of industrial nations though time: the earliest industrial nations; the political, economic, military, and social causes and consequences of industrialization; and the processes of industrialization and technology transfer. Undergraduate seniors may be allowed to take the course with permission of the instructor.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

HIST 583 - History of Medicine and Diseas
Focuses on the ways sickness and medical treatment touch larger political, social, and cultural questions in the modern period, with special attention to epidemic disease. Takes a comparative approach, devoting considerable attention to both Western and non-Western contexts.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

HIST 585 - Technolgy in Historical Persp.
Surveys the history of technology in the modern, industrial Western world. Uses humanities techniques to analyze various factors that have shaped the development of technology.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

HIST 586 - Explorations in Tech and Gende
Explores the interconnections of technological change and conceptions of gender.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

HIST 590 - Themes in the History of Sci.
Examines a particular theme in the history of science.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

HIST 591 - Themes in the Hist of Tech
Examines a particular theme in the history of technology.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

HIST 696 - Seminar in Sci, Tech, and Soc.
Provides an in-depth research seminar in science, technology, and society, organized around a particular theme selected by the instructor.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

HIST 697 - Practicum: Sci and Tech in Act

Provides a practicum in science, technology, and society. Focuses on practice in a science or engineering discipline through study of a recent invention or scientific project.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSCI 501 Minimum Grade: C

HIST 698 - Master's Thesis
Independent research supervised by an STS faculty member toward completion of a required Master's Thesis.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

HIST 699 - Independent Study in History
Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.
Credits: .50 to 12.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Mathematics Courses

MATH 504 - Linear Algebra and Analysis
Course topics include vector and matrix algebra, LU, and QR decompositions, the Least Squares Problem, Singular Value Decomposition, and matrix factorization. The course emphasizes matrix computations useful in numerical analysis, differential equations, statistics, and other application areas.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 505 - Principles of Analysis I
Metric spaces, compactness, connectedness, completeness. Set theory and cardinality, Continuity, differentiation, Riemann integral.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 504 Minimum Grade: C

MATH 506 - Principles of Analysis II
A continuation of MATH 505. Uniform convergence, Fourier series, Lebesque integral in Euclidean spaces, differential calculus in Euclidean spaces, inverse and implicit functions theorems, change of variable in multiple integrals.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 505 Minimum Grade: C

MATH 507 - Applied Mathematics I
Covers matrix theory, linear transformations, canonical forms, matrix decompositions, and factorizations, including the singular value decomposition, quadratic forms, matrix least squares problems, and fast unitary transforms. Introduces computational linear algebra.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 508 - Applied Mathematics II
Covers the techniques of mathematical modeling in the physical and biological sciences using discrete and combinatorial mathematics, probabilistic methods, variational principles, Fourier series and integrals, integral equations, calculus of variations, asymptotic series and expansions, and eigenvalue problems associated with Sturm-Liouville boundary value problems. Topics vary from year to year.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 507 Minimum Grade: C

MATH 509 - Applied Mathematics III
Continues the theme of MATH 508. Topics vary from year to year.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 508 Minimum Grade: C

MATH 510 - Applied Prob.& Statistics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 511 - Applied Prob & Statistics II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 510 Minimum Grade: C

MATH 512 - Applied Prob & Statistics III
Covers hypothesis testing, analysis of variance, multiple regression, and special topics. Introduces linear models.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 511 Minimum Grade: C

MATH 520 - Numerical Analysis I
Covers linear systems and matrix computations, iterative methods, matrices with special structure, and the eigenvalue problem.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 521 - Numerical Analysis II
Covers nonlinear systems, unconstrained minimization, nonlinear least squares, acceleration methods, function approximation, interpolation, and splines.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 520 Minimum Grade: C

MATH 522 - Numerical Analysis III
Covers numerical integration and numerical solution of ordinary and partial differential equations.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 521 Minimum Grade: C

MATH 523 - Computer Simulation I
Covers computer simulation of pseudo-random variables, including Monte Carlo methods.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 510 Minimum Grade: C

MATH 524 - Computer Simulation II
Covers discrete and continuous event simulation models and techniques.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 523 Minimum Grade: C

MATH 525 - Topics in Computer Simulation
Covers statistical analysis of simulation data, variance reduction techniques, and advanced topics in simulation.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 524 Minimum Grade: C

MATH 530 - Combinatorial Mathematics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 531 - Combinatorial Mathematics II
Covers mathematical tools for the analysis of algorithms, including combinatorics, recurrence relations and generating functions, elementary asymptotics, and probabilistic methods.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:

Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 530 Minimum Grade: C

MATH 532 - Topics in Combinatorial Math
Covers topics in discrete mathematics, including asymptotic enumeration, number theory, probabilistic combinatorics, and combinatoric algorithms.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 531 Minimum Grade: C

MATH 533 - Abstract Algebra I
Covers groups, transformation groups and group actions, isomorphism and homomorphism theorems, Sylow theorems, symmetric groups, rings, and fields.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 534 - Abstract Algebra II
Covers factorization domains, Euclidean domains, and polynomial rings, and modules, vector spaces, and linear transformations.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 533 Minimum Grade: C

MATH 535 - Topics in Abstract Algebra
Covers fields, Galois theory, and classical applications, including coding theory.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 534 Minimum Grade: C

MATH 536 - Topology I
Covers general topological spaces, metric spaces, and function spaces; open sets, limit points, limits of sequences, convergence, separation axioms, compactness, connectedness, continuity, homeomorphism, and product of N-spaces; and specialized applications to the real line, Euclidean N-space, and well-known function spaces.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 537 - Topology II
Continues MATH 536.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 538 - Manifolds
Topics will be selected from the following: Differential structures, immersion theorems, tangent bundle, vector fields and distributions, integral manifolds, integration on manifolds, differential forms, general Stokes Theorem, applications to physics and engineering.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 540 - Numerical Computing
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 544 - Adv Engr Mathematics I
Covers solution techniques for ordinary differential equations, including series techniques, Legendre and Bessel functions, Sturm-Liouville theory, and Laplace and Fourier techniques. Introduces symbolic computation as time permits.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 545 - Adv Engr Mathematics II
Covers partial differential equations, including separation of variables and its applications to standard equations. Introduces Green's functions for differential equations.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):

Graduate Quarter
Pre-Requisites: MATH 544 Minimum Grade: C

MATH 546 - Adv Engr Mathematics III
Covers complex analysis, including complex differentiation and integration, Cauchy's theorems and residue theory, and their applications; conformal maps; and applications to fluid flow.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 545 Minimum Grade: C

MATH 553 - Sci Comp & Visualization I
Covers scientific computing, with an emphasis on numerical computing and visualization techniques. Includes techniques of computational geometry, including an introduction to methods used to describe the shapes of free-form curves, surfaces, and volumes, and applications to computer-aided design and other areas of scientific computing.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 540 Minimum Grade: C

MATH 554 - Sci Comp & Visualization II
Covers scientific visualization, using a computational environment that includes high-performance workstations and supercomputers, and application in science and engineering. Includes applications to finite element and difference methods.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 553 Minimum Grade: C

MATH 555 - Topics in Sci Comp & Visualiz
Covers special topics chosen from contemporary problem areas in scientific computing and visualization, including digital image processing, wavelet transforms and their numerical treatment, numerical conformal mapping, and contemporary problem areas in scientific computing and visualization.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 554 Minimum Grade: C

MATH 610 - Advanced Probability & Stat I
Covers generalized inverse matrices, distributions of quadratic forms, full-rank models and regression, models not of full rank, and specific examples.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 511 Minimum Grade: C and MATH 512 Minimum Grade: C

MATH 611 - Advanced Probability & Stat II
Covers theoretical development of probability theory, including measure theory, random variables, distribution functions, and expectations; convergence concepts; law of large numbers; random series; characteristic functions; and central limit theorem and ramifications.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 510 Minimum Grade: C

MATH 612 - Topics In Adv Prob & Stat
Covers topics including distribution theory, large sample theory, multivariate analysis, sequential analysis, decision theory, non-parametric inference, survival analysis, experimental design, and statistical computation.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 511 Minimum Grade: C and MATH 512 Minimum Grade: C

MATH 613 - Stochastic Processes I
Covers conditional probabilities, expectations, Markov chains, classification of states, recurrence and absorption probabilities, asymptotic behavior, random walk, birth and death processes, and ruin problems.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 510 Minimum Grade: C and MATH 611 Minimum Grade: C

MATH 614 - Stochastic Processes II
Covers queuing theory, waiting line models, embedded Markov chain method, and optimization problems. Includes applications and simulation.
Credits: 3.00

College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 613 Minimum Grade: C

MATH 615 - Topics in Stochastic Processes
Covers topics including branching processes, Brownian motion, renewal processes, compounding stochastic processes, martingales, and decision-making under uncertainty.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 613 Minimum Grade: C

MATH 620 - Partial Diff Equations I
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 variation and numerical methods.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 621 - Partial Diff Equations II
Continues MATH 620.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 622 - Partial Diff Equation III
Continues MATH 621.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 623 - Ordinary Diff Equations I
Covers existence and uniqueness theorems, properties of solutions, adjoint equation, 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 624 - Ordinary Diff Equations II
Continues MATH 625.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 625 - Ordinary Diff Equations III
Continues MATH 626.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 630 - Complex Variables I
Covers Cauchy's theorem, Morera's theorem, infinite series, Taylor and Laurent explanations, residues, conformal mapping and applications, analytic continuation, and Riemann mapping theorem.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 631 - Complex Variables II
Covers entire functions, Picard's theorem, series and product developments, Riemann Zeta function, and elliptic functions.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 630 Minimum Grade: C

MATH 632 - Topics in Complex Variables
Covers topics including global analytic functions, algebraic functions, and linear differential equations in the complex plane.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 631 Minimum Grade: C

MATH 633 - Real Variables I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 634 - Real Variables II
Covers Fubini 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 633 Minimum Grade: C

MATH 635 - Real Variables III
Covers topics including differentiation theory, Fourier series and transforms, and singular integrals.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 634 Minimum Grade: C

MATH 640 - Functional Analysis I
Covers Hilbert spaces, linear operators, and applications; bounded linear operators, including basic spectral theory and functional calculus with applications to finite and infinite matrices and integral operators; unbounded operators with applications.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 641 - Functional Analysis II
Covers harmonic analysis, including modern techniques and applications including Fourier series, Fourier transforms, and the classical theorem of Wiener.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 642 - Functional Analysis III
Studies abstract linear spaces, operators, and functionals; normed linear spaces, Banach spaces, and their duals; and distribution theory. Involves applications including a study of differential and integral equations.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 643 - Integral Equations I
Covers theory and application of linear integral equations, including the Hilbert-Schmidt theory. Introduces non-linear and singular integral equations and numerical methods.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 645 - Transform Theory I
Covers selected topics from wavelet transforms, including properties; asymptotic analyses; and applications of the integral transforms of Laplace, Fourier, Mellin, and Radon.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 640 Minimum Grade: C

MATH 646 - Transform Theory II
Covers selected topics from wavelet transforms and applications, convolution equations, and the calculus of distributions.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 640 Minimum Grade: C and MATH 645 Minimum Grade: C

MATH 660 - Lie Groups and Lie Algebras I
Covers matrix groups, topological groups, locally isomorphic groups, universal covering groups, analytic manifold, 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 661 - Lie Groups and Lie Algebras II
Continues MATH 660.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 662 - Lie Groups/Algebras III
Continues MATH 661.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 670 - Methods of Optimization I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 671 - Methods of Optimization II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 672 - Topcs Methd Of Optimizatn
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: MATH 670 Minimum Grade: C and MATH 671 Minimum Grade: C

MATH 680 - Special Topics
Covers special topics of interest to students and faculty.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 699 - Independent Study in Math
Credits: .50 to 6.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education

MATH 723 - Mathematical Neuroscience
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 799 - Independent Study in Math
Credits: 6.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 898 - Master's Thesis
Master's thesis.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 997 - Research
Research.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

MATH 998 - Ph.D. Dissertation
Ph.D. dissertation.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Mathematics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Physics Courses

PHYS 501 - Mathematical Physics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 502 - Mathematical Physics II
Continues PHYS 501.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 503 - Mathematical Physics III
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; integral equations; group theory; nonlinear dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 506 - Dynamics I
Covers Lagrangian-Hamiltonian formulations, variational principles, particle kinematics and dynamics, and small oscillations and normal modes.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 507 - Dynamics II
Lagrangian-Hamiltonian formulations; variational principles; particle kinematics and dynamics; small oscillations and normal modes; Navier-Stokes equations; statistical description of turbulent flows; thermodynamics and energetics of ideal gases; computational fluid dynamics; viscous and compressible flows; boundary-layer flows; hydrodynamic perturbation and stability theory; nonlinear dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 508 - Dynamics III
Lagrangian-Hamiltonian formulations; variational principles; particle kinematics and dynamics; small oscillations and normal modes; Navier-Stokes equations; statistical description of turbulent flows; thermodynamics and energetics of ideal gases; computational fluid dynamics; viscous and compressible flows; boundary-layer flows; hydrodynamic perturbation and stability theory; nonlinear dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 511 - Electromagnetic Theory I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 512 - Electromagnetic Theory II
Continues PHYS 511.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:

Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 513 - Electro Magnetic Theory III
Electrostatics; magnetostatics; electromagnetic waves; boundary value problems of electromagnetic theory; theory of Fresnel and Fraunhofer diffraction; classical electrodynamics; special relativity; waveguides; radiation theory; plasmas.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 516 - Quantum Mechanics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 517 - Quantum Mechanics II
Continues PHYS 516.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 518 - Quantum Mechanics III
Continues PHYS 517.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 521 - Statistical Mechanics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 522 - Statistical Mechanics II
Continues PHYS 521.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 523 - Statistical Mechanics III
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; phase transitions
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 541 - Atmospheric Physics I
Chemical composition, transformation and evolution; radiation spectra, absorption, scattering and heat transfer; thermodynamics and cloud and precipitation microphysics; surface fluxes, thermal structure and energy balance; optics and acoustics: observational methods and remote-sensing techniques
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 542 - Atmospheric Physics II
Chemical composition, transformation and evolution; radiation spectra, absorption, scattering and heat transfer; thermodynamics and cloud and precipitation microphysics; surface fluxes, thermal structure and energy balance; optics and acoustics: observational methods and remote-sensing techniques
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 543 - Atmospheric Physics III
Chemical composition, transformation and evolution; radiation spectra, absorption, scattering and heat transfer; thermodynamics and cloud and precipitation microphysics; surface fluxes, thermal structure and energy balance; optics and acoustics: observational methods and remote-sensing techniques
Credits: 3.00
College: College of Arts and Sciences

Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 544 - Large Scale Atmos Dyn I
Theoretical thermodynamics and atmospheric energetics; flow on a rotating sphere; general circulation; barotropic and baroclinic instability; cyclonic circulations
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 545 - Large Scale Atmos Dyn II
Theoretical thermodynamics and atmospheric energetics; flow on a rotating sphere; general circulation; barotropic and baroclinic instability; cyclonic circulations
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 546 - Large Scale Atmos Dyn III
Theoretical thermodynamics and atmospheric energetics; flow on a rotating sphere; general circulation; barotropic and baroclinic instability; cyclonic circulations
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 547 - Small Scale Atmos Dyn I
Theory of turbulent flows and perturbation analysis of waves; boundary-layer processes, including diffusion; storm microphysics and dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 548 - Small Scale Atmos Dyn II
Theory of turbulent flows and perturbation analysis of waves; boundary-layer processes, including diffusion; storm microphysics and dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 549 - Small Scale Atmos Dyn III
Theory of turbulent flows and perturbation analysis of waves; boundary-layer processes, including diffusion; storm microphysics and dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 601 - Advanced Quantum Mechanics I
Relativistic one-particle quantum mechanics; Dirac theory radiation theory; free fields; interactions; quantum electrodynamics; introduction to elementary particle theory; quantum chromodynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 602 - Advanced Quantum Mechanics II
Relativistic one-particle quantum mechanics; Dirac theory radiation theory; free fields; interactions; quantum electrodynamics; introduction to elementary particle theory; quantum chromodynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 603 - Advanced Quantum Mechanics III
Relativistic one-particle quantum mechanics; Dirac theory radiation theory; free fields; interactions; quantum electrodynamics; introduction to elementary particle theory; quantum chromodynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 626 - Solid State Physics I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:

Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 627 - Solid State Physics II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 628 - Solid State Physics III
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 631 - Relativity Theory I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 632 - Relativity Theory II
Continues PHYS 631.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 633 - Relativity Theory III
Continues PHYS 632.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 643 - Physics Upper Atmosphere
Structure of the methods of probing the upper atmosphere; solar radiation; aurorae; cosmic rays, the ionosphere; geomagnetism, meteors.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 644 - Atmos Numerical Pred Tech
Application of modern numerical methods to the prediction of atmospheric motions; initialization and assimilation methods; filtering, verification, and testing
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 645 - Atmospheric Analysis Tech
Covers analysis and interpretation of meteorological data, including statistical and objective techniques. Uses data sources including satellites, radars, and special observational networks. Includes evaluation of analysis techniques, and initialization and assimilation in numerical models.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 646 - Atmos Turbulence & Diff
Introduction to mechanics of turbulence, structure of atmospheric turbulence and its role in diffusion of contaminants.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 676 - Nuclear Physics I
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.

Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 677 - Nuclear Physics II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 678 - Nuclear Physics III
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 750 - Special Topics
Assignment of readings and study in current topics of experimental and theoretical interest.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 865 - Overview of Graduate Physics I
Methodology for efficient solution of Ph.D. candidacy exam-type problems; main quantitative theoretical relations and selected problems reviewed in mathematical physics, classical mechanics, electromagnetism, optics, quantum mechanics, thermodynamics, statistical physics, and atomic physics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 898 - Master's Thesis
Master's thesis.
Credits: .50 to 20.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 997 - Research
Research.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHYS 998 - Ph.D. Dissertation
Ph.D. dissertation.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Physics-Environmental Science Courses

PHEV 541 - Atmospheric Physics I
Covers chemical composition, transformation, and evolution; radiation spectra, absorption, scattering, and heat transfer; thermodynamics and cloud and precipitation microphysics; surface fluxes, thermal structure, and energy balance; and optics and acoustics, including observational methods and remote-sensing techniques.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHEV 544 - Lg-Sc Atmos Dynamics I
Covers theoretical thermodynamics and atmospheric energetics, including flow on a rotating sphere, general circulation, barotropic and baroclinic instability, and cyclonic circulations.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHEV 545 - Lg-Sc Atmos Dynamics II
Continues PHEV 544.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHEV 547 - Sm-Sc Atmos Dynamics I
Covers theory of turbulent flows and perturbation analysis of waves; boundary-layer processes, including diffusion, and storm microphysics and dynamics.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHEV 548 - Sm-Sc Atmos Dynamics II
Continues PHEV 547.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PHEV 644 - Atmos Numer Predict Techn
Applies modern numerical methods to the prediction of atmospheric motions, including initialization and assimilation methods, filtering, verification, and testing.
Credits: 3.00
College: College of Arts and Sciences
Department: Physics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Political Science Courses

PSCI 541 - Technology in Dev Nations
Examines the nature of access to technology in developing nations, causes of the North-South technology gap, and possibilities for change in today's global economy.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 555 - International Pol Econ and Tec
Enables students to comprehend the ever-changing technology-driven global political economy.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
Undergraduate Quarter

PSCI 557 - Globalization and Transition
Covers the impact of globalization on the politics and economies of states and populations and the changing dynamics of interactions among them.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 570 - Int'l Environmental Policy
Examines the prospects for effective environmental policymaking in the contemporary nation-state system. Reviews international environmental issues, agreements, and institutions. Studies theories of international relations in order to develop a conceptual framework for analyzing the strengths and weaknesses of the nation-state system.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
Undergraduate Quarter

PSCI 571 - Science and Technology Policy
Examines science and technology policy as a challenge for democracy. Addresses competing social-scientific models of the relationship between politics and technology, focusing on science policy (research and development), communications, and biotechnology.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 573 - Gender, Race and Science
Examines the role of gender stratification in scientific professions, with emphasis on barriers to marginalized groups.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):

Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 574 - Alternative Policy Perspective
Provides students with a nontraditional foundation for the analysis of public policy. Covers topics such as postmodernism, feminism, and critical theory, and examines these critiques and their implications for policy analysis as a tool for achieving progressive social and policy change.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 575 - Appropriate Technology for Dev
Studies technological solutions that meet the needs of developing countries. Involves project exercises in technologies appropriate to specific countries and regions.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
May not be enrolled in one of the following Program Level(s):
Continuing Education
May not have the following Classification(s):
Freshman
Pre-Junior
Sophomore

PSCI 696 - Sem. in Sci., Tech., and Soc.
Provides an in-depth research seminar in science, technology, and society, organized around a particular theme selected by the instructor.
Credits: 3.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSCI 698 - STS Thesis
Independent research supervised by an STS faculty member toward completion of a required master's thesis.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSCI 699 - Independent Study in Pol Scie
Independent study on a topic selected by the student. Independent study is supervised by a faculty member and guided by a plan of study.
Credits: 12.00
College: College of Arts and Sciences
Department: History & Politics
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Psychology Courses

PSY 510 - Research Methods I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 511 - Research Methods II
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).
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 510 Minimum Grade: C

PSY 512 - Cognitive Psychology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 514 - Behavioral Assessment I
Reviews the major principles of learning developed by major theorists in psychology.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 515 - Behavioral Assessment II
This course will provide a review of the theoretic principles and assumptions underlying behavioral assessment.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 514 Minimum Grade: C

PSY 516 - Developmental Psychology
Studies the nature of developmental processes across the life - perceptual, intellectual, emotional, social, and neuropsychological-and the factors influencing or limiting them.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 517 - Social Cognition
This course will examine the broad domain of social cognition, with special emphasis on its relevance for clinical psychology. The purpose of the course is to present current evidence regarding the influence of social cognitive variables on normal and abnormal behavior.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 518 - Social Psychology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 520 - Psychopathology
Familiarizes the student with existing categories of mental disorders, their diagnosis, and their treatment.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 522 - Psych & Intellect Assess
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 524 - Professional Issues and Ethics
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 530 - Principles of Neuroscience
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, and brain structure.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 540 - Principles of Neuropsychology
Introduces the current state of the field and well-recognized and commonly used approaches in the clinical understanding of human brain-behavior relationships.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 542 - Neuropsychological Assessment
Covers the theory and practical use of major neuropsychological assessment devices, including the Halstead-Reitan and other tests used in contemporary neuropsychology.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 543 - Neuropsychological Assess II
This course covers principles and practices of neuropsychological testing. Students are taught to administer and interpret major neuropsychological tests and batteries. The focus of the course is on

practical knowledge, report writing and neuropsychological clinical practice.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 542 Minimum Grade: C

PSY 550 - Multicultural Perspectives in Psychology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 562 - Consciousness
A survey of the philosophical, behavioral, and biological basis for conscious thought. Particular attention will be paid to the neural correlates of consciousness and the evolution, development and neuropsychology of the self.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program(s):
MS-A&S Humanities
Must be enrolled in one of the following Major(s):
Psychology
Pre-Requisites: PSY 212 Minimum Grade: C and PSY 260 Minimum Grade: C and PSY 360 Minimum Grade: C

PSY 610 - Data Analysis in Psychology
Deals 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 612 - Psych Hum-Comp Inactn Design
Explores the psychological aspects of human interaction with computing technology, focusing on the design, evaluation, and redesign of usable and useful human-computer interactions.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 614 - Problem Solving & Creativity
Introduces current research on problem-solving and creativity. Includes lectures, classroom demonstrations, and exercises.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 616 - Motivation and Emotion
Considers the behavioral consequences of psychological levels of motivation and emotion.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 617 - Empirical Unconscious Process
This course is designed to review empirical evidence concerning the assessments and nature of unconscious processes and to consider the relevance of this information for traditional conceptions of the unconscious and for psychotherapy.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 618 - Psyc Loss & Bereavement
Covers the study of human attachment and loss, such as death, separation, job loss, and retirement.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 620 - Personality Assessment
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 621 - Theories of Personality

Reviews different theories of personality, including behavioral, psychoanalytic, cognitive, and medical, as they apply to normal human functioning and abnormal behavior.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 624 - Behavior Analysis
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program(s):
MS-A&S Humanities
Must be enrolled in one of the following Major(s):
Psychology
Pre-Requisites: PSY 230 Minimum Grade: C and PSY 260 Minimum Grade: C and PSY 360 Minimum Grade: C

PSY 630 - Psychopharmacology
Presents a theoretical and practical study of major categories of psychoactive drugs. Emphasizes the effects on behavior as supported by recent clinical studies.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 632 - Sensory and Motor Systems
Examines the physiological function of the sensory and motor systems, from the level of the central nervous system through receptor functions.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 642 - Neuropsyc Case Anly & Int
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 646 - Neuropsych Asses Child/Ad
Covers instruments and issues related to the assessment of children and adolescents. Involves both didactic and practical training in psychological and behavioral assessment, test interpretation, and report writing for children with various neurological and psychiatric disorders.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 648 - Forensic Assessment I
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 649 - Forensic Assessment II
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 648 Minimum Grade: C

PSY 690 - MS Research I
Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part one of the 3-part sequence course.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program(s):
MS-A&S Humanities
Must be enrolled in one of the following Major(s):

Psychology
Pre-Requisites: PSY 490 Minimum Grade: C and PSY 491 Minimum Grade: C and PSY 492 Minimum Grade: C

PSY 691 - MS Research II
Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part two of the 3-part sequence course.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program(s):
MS-A&S Humanities
Must be enrolled in one of the following Major(s):
Psychology
Pre-Requisites: PSY 490 Minimum Grade: C and PSY 491 Minimum Grade: C and PSY 492 Minimum Grade: C and PSY 690 Minimum Grade: C

PSY 692 - MS Research III
Students will enroll in a three-term Master's Thesis course under the direct supervision of their mentor. The goal is to foster the development of an independent research project under the supervision of their designated research mentor. This is Part three of the 3-part sequence course.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program(s):
MS-A&S Humanities
Must be enrolled in one of the following Major(s):
Psychology
Pre-Requisites: PSY 490 Minimum Grade: C and PSY 491 Minimum Grade: C and PSY 492 Minimum Grade: C and PSY 690 Minimum Grade: C and PSY 691 Minimum Grade: C

PSY 710 - Data Analysis II
The purpose of this course is to acquaint students with the advances 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 610 Minimum Grade: C

PSY 711 - Data Analysis III: Adv Topics
The purpose of this course is to acquaint students with advanced statistical tools most frequently used in clinical psychology 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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 610 Minimum Grade: C and PSY 710 Minimum Grade: C

PSY 712 - History and Systems
Covers the history and various systematic theories of psychology. Explores the conceptual foundations of psychology from its inception to the present day.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 720 - Health Psychology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 721 - Psychotherapy and Counseling
Introduces fundamental clinical interviewing skills.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 722 - Psychotherapy Theories
Introduces common psychotherapeutic theories (e.g., psychodynamic, behavioral, and cognitive) used with patients with primarily emotional and neuropsychological problems.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PSY 721 Minimum Grade: C

PSY 730 - Criminal Law and Psychology
This advanced seminar focuses on the criminal justice system's treatment of mental disordered offenders. Students will learn about

the major mental disorders and the ways in which our criminal law accounts for the impact of those illnesses on a defendant's criminal responsibility.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 734 - Social Science Apps to the Law
This seminar is designed to inform doctoral students in psychology about the usefulness of social science information in the practice and scholarship of law, at the same time indicating the problems and pitfalls of using such information, particularly at the appellate level. Thus, the seminar explores the interplay and conflict between law and psychology and the many ways in which social science research can or should have an influence on legal decision making.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 740 - Neuropsych Eval & Interp
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
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 746 - Neuropsyc Eval Child/Adol
Covers the neuropsychological assessment of younger patients with brain injuries, learning disabilities, or developmental disorders.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 812 - Cognitive Neuroscience
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 .
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Clinical Psychology
Law-Psychology
Psychology
Pre-Requisites: PSY 530 Minimum Grade: C

PSY 820 - Cognitive-Behavioral Therapy
This course is designed to provide an introduction to cognitive behavior theory and therapy.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 821 - Family Therapy
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Clinical Psychology
Law-Psychology
Psychology
Must have the following Classification(s):
Masters Program
PhD Program

PSY 822 - Pediatric Psychology
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Clinical Psychology
Law-Psychology
Psychology
Must have the following Classification(s):
Masters Program
PhD Program

PSY 823 - Substance Abuse

This Substance Abuse is multidimensional. The purpose is to become familiarized with the different substances of abuse and their involvement in the brain, as well as symptoms of intoxication and withdrawal; increase awareness of the psychological impact that substance abuse has on individuals, couples, and families; and teach assessment and intervention skills.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 824 - Psychotherapy w/ Young Childrn
Reviews the different approaches of intervening with clinical issues in children and families.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 825 - Seminar in Mind/Body Studies
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 826 - Soc Prob Solv and Child Psycho
This elective course presents an overview of interpersonal cognitive problem solving (ICPS) and their prerequisite skills in normal and diagnostically disturbed populations beginning at age four, and is divided into three sections: Correlation Research; Preventive/Treatment Interventions; and the I Can Problem Solve (ICPS) prevention program.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 827 - Behavioral Stress Management
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 828 - Weight and Eating Disorders
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 829 - Psychopathy
This course focuses on the historical concepts/definitions of psychopathy and the use of various assessment methodologies in clinical and forensic populations; review of comorbidity of psychopathy with other Axis I and Axis II disorders. Students will gain experience in the assessment of psychopathy.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Clinical Psychology
Law-Psychology
Psychology

PSY 843 - Neuropsyc Eval/Head Traum
Covers the neuropsychological assessment of patients with head trauma and the subsequent design of reports and rehabilitation programs.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 845 - Neuropsych Eval & Intvtn/Elder
Covers the neuropsychological assessment of elderly patients with brain injury, such as primary degenerative conditions (e.g., dementia and Alzheimer's disease).
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 850 - Psychology of Disability

Reviews disability determination and discusses issues of disability.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 852 - Neuropsych Serv Deliv Sys
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 854 - Psychology of Rehabilitation
Discusses issues of psychological assessment and intervention as they apply to rehabilitation.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 865 - Special Topics in Psychology
Covers special topics of relevance and significance to the discipline of psychology. May be repeated for credit when topics vary.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 897 - Clinical Psychology Practicum Seminar
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.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 898 - Master's Thesis Psych
Requires supervised research at the master's level.
Credits: 3.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 899 - Practicum
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.
Credits: 1.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 998 - PhD Dissertation Psych
Requires supervised research, including literature research, data collection, and writing of doctoral thesis.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PSY 999 - Internship
Provides advanced, one-year full-time placement in a clinical setting determined by the clinical director and the student.
Credits: 1.00 to 12.00
College: College of Arts and Sciences
Department: Psychology
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

Publication Management Courses

PMGT 630 - The Publishing Environment
Provides an overview of publishing from inception to current time. Covers publishing fundamentals (creation to print), describes publishing formats and genres, and begins development of networking contacts. Discusses future trends and employment opportunities.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 631 - Page Design and Production
Analyzes methods of production and make-ready for digital and offset printing. Includes art, halftones, and line art. Includes hands-on experience in book and magazine page design and production.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 635 - Periodicals Publishing

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.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PMGT 631 Minimum Grade: C

PMGT 730 - Book Publishing
Analyzes managerial decisions including acquisitions, design and development, marketing, financial, and copyright implications of books publishing. Includes books of all genres: fiction, non-fiction, scientific, children's and others.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PMGT 631 Minimum Grade: C

PMGT 731 - Comp Image Gen & Telecomm
Surveys computer applications in the field of publishing, including text and graphic image creation and manipulation, data management, fundamentals of telecommunications and data, electronic page makeup, and CD-ROM and Web publishing.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PMGT 630 Minimum Grade: C and PMGT 631 Minimum Grade: C

PMGT 735 - Publ Budgeting & Estimat
Analyzes the interrelationship between budgeting, estimating, acquisitions, and marketing; approaches and methods for product estimating; approaches to decision-making for service subcontracting; and the implications of service subcontracting decisions on budgeting, estimating, and marketing.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Pre-Requisites: PMGT 630 Minimum Grade: C and PMGT 631 Minimum Grade: C

PMGT 740 - Publications Marketing
Analyzes and provides case studies and examples of marketing methods specifically related to publishing books, periodicals, and electronic products. Includes print and online campaigns and strategies. Reviews state-of-the-art approaches.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 745 - Electronic Publishing
Electronic Publishing gives students applied and theoretical knowledge of professional electronic publishing. Students will focus on issues relating to writing and integrating text and graphics to create websites and on-line publications. Students will also consider how issues in document design and usability analysis can be used to evaluate websites.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 799 - Special Topics
Covers special advanced topics in publication management. May be repeated for credit if topic varies.
Credits: 3.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 800 - Independent Study
Involves individual investigation in special areas of publishing not regularly covered in the courses offered. Topics for study must be approved in advance of registration by the graduate adviser and the instructor involved. May be repeated for credit if topic varies.
Credits: 9.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter

PMGT 801 - Independent Project
Requires a project related to the printing and publishing industries to be designed, under faculty advisement, to meet individual student interests and career goals. Credits in excess of 2 may satisfy elective requirements.
Credits: .50 to 9.00
College: College of Arts and Sciences
Department: Culture and Communication
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter