



DREXEL UNIVERSITY  
The iSchool  
College of Information Science  
and Technology

# CATALOG

2012-2013

UNDERGRADUATE & GRADUATE



[catalog.drexel.edu](http://catalog.drexel.edu)

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# About The iSchool: Undergraduate

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The *iSchool* at Drexel offers educational and research programs that integrate information technology, information content, organizational forces, and business strategy to advance 21st Century enterprises of all kinds. Five-year programs include three six-month periods of employment through the University's co-operative education program. Four-year programs include one six-month period of co-op employment.

## Majors

- Informatics (p. 3)
- Information Systems (p. 4)
- Information Technology (p. 8)
- Software Engineering (p. 12)

## Minors

- Informatics (p. 3)
- Information Systems (p. 7)
- Software Engineering (p. 14)

## About the College

The College of Information Science and Technology is also known as the *iSchool* at Drexel. This identity highlights the College's participation in the iSchools Caucus, and its status as a founding member of the organization. The iSchools Caucus is an international alliance of library, information science and information system schools, the purpose of which is to raise awareness and understanding of the information sciences as a cutting-edge and progressive field of study. The *iSchool* at Drexel educates interdisciplinary professionals to provide information services and systems to meet a wide range of needs. The *iSchool* complements its educational programs with research that increases the benefits of information science and technology for all sectors of society.

The College offers the majors in Information Systems and Information Technology both as four and five-year programs, and offers the Software Engineering major as a five-year program. The degree programs are open to freshmen and transfers from other departments at Drexel and other universities. Students have access to the *iSchool's* iCommons and the computing facilities available to all Drexel students.

Transfer admission occurs in the fall and winter terms only due to the sequence of required courses. Internal transfer students can be admitted any term. Please contact an *iSchool* advisor for more information.

## Co-operative Education

Co-operative education at the *iSchool* emphasizes career management through experiential learning as an integral part of the education process. The *iSchool* co-op is based on employment in practical, major-related positions consistent with the interests, abilities, and aptitudes of the students.

For more general information on Drexel University's co-op opportunities, visit the Drexel Steinbright Career Development Center.

## About Computer-Related Disciplines

Drexel offers real choices among majors that are genuinely distinct. By learning more about computer-related disciplines, students can decide which discipline is best suited to their interests:

### Information Systems

*The iSchool at Drexel, College of Information Science and Technology*

Information systems analysts and designers spend most of their time learning how to elicit system requirements from users, modeling these requirements, building and testing prototypes, developing software specifications, designing and developing graphical user interfaces, and evaluating the organizational effectiveness of information systems.

Students who are interested in designing requirements-driven information systems should consider a major in Information Systems.

### Information Technology

*he iSchool at Drexel, College of Information Science and Technology*

The bachelor of science in Information Technology integrates closely with Drexel's bachelor of science in information systems (BSIS). The two degrees share a common freshman year and the same set of major courses, but they have different requirements. The difference is in the nature of specialization in upper-level courses.

The BSIT is aimed at students who want a degree focused on applied information technology — but with an emphasis on IT infrastructure rather than applications in business.

Students who are interested in analyzing IT problems and design, as well as implementing and evaluating effective and usable IT solutions should consider a major in Information Technology.

### Software Engineering

*he iSchool at Drexel, College of Information Science and Technology and the College of Engineering*

Drexel's software engineering program focuses on the application of processes, methods, and tools to building and maintaining quality computer software, at a predictable cost, on a predictable schedule.

Students in this major learn to appropriately apply discrete mathematics, probability, statistics, and relevant topics in computer science and supporting disciplines to complex software systems, and to work in one or more significant application domains designing software.

Students interested in analyzing, designing, verifying, validating, implementing, applying and maintaining software systems should consider a major in Software Engineering.

### Computer Science

*College of Engineering*

Computer science majors spend most of their time studying and designing algorithms, implementing them into software systems, and improving their performance. Study of theories and techniques are covered in such courses as Object-Oriented Programming, Analysis of Algorithms, Software Engineering, and Programming Language Concepts. Areas of application range from operating systems to artificial intelligence, scientific

computing to computer networks, and expert systems to computer graphics.

Students interested in enhancing the performance of computers via software and related technology should consider a major in Computer Science.

## Computer Engineering

*College of Engineering*

Computer engineers work for computer and microprocessor manufacturers; manufacturers of digital devices for telecommunications, peripherals, electronics, control, and robotics; software engineering; the computer network industry; and related fields. A degree in Computer Engineering can also serve as an excellent foundation to pursue graduate professional careers in medicine, law, business, and government.

## Digital Media

*Antoinette Westphal College of Media Arts and Design*

Drexel's major in Digital Media is designed to educate creative innovators and visual problem solvers in areas of theory and practice in traditional and new media. The freshman year includes foundation courses in basic design, art history, drawing, and liberal arts. In subsequent years, courses in several disciplines—including graphic design, photography, film and video, computer programming, and human-computer interaction—are required to broaden students perspective about digital media. These courses are taken concurrently with professional studio workshop courses in 3D modeling, animation, multimedia interactivity, and visual effects.

## Management Information Systems (MIS)

*Lebow College of Business*

Combining the science, technology, and theory of information systems with an advanced knowledge of business functionality is the aim of management information specialists. The Management Information Systems concentration emphasizes human-computer interaction and the practical applications of computer systems in business, including effective data management and efficient systems of information relay. Career opportunities exist in a wide range of business settings.

## Facilities

### W. W. Hagerty Library

The Hagerty Library (<http://www.library.drexel.edu>) supports research supports research in the College of Information Science and Technology through provision of books, periodical literature, and related materials in all fields of inquiry in library and information science, computer science, systems engineering, information systems, and technology. With over 450 online literature databases, more than 21,500 full-text electronic journal titles and more than 110,000 electronic books, the majority of the Library's resources are now available online. On-site amenities include close to one hundred laptop and desktop PCs for walk-in use by students and hundreds of seating options for quiet work or group projects, including over a dozen group study rooms and the 24/7 cafe area. The staff of ten reference librarians includes an IST subject specialist who is available for individual research consultations.

### iCommons

Located in Room 106 of the Rush Building, the College's iCommons features desktop computers, a wireless/laptop area, free black and

white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with Plasma display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking *iSchool* courses.

The computers for general use are Microsoft Windows and Apple OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the Hagerty Library. The *iSchool* is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and *iSchool* classrooms.

*iSchool* students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

### Other Facilities

The College maintains 7 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, VCR, ceiling mounted projectors, and other equipment for presentations and demonstrations. Two of these classrooms are fully equipped to function as computing labs for networking, programming and database-related projects.

### Information Technology Lab

In 2005, the *iSchool* designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the laboratory supports. In addition a special system has been built into the classroom to allow real time control of all classroom workstations.

### Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden may be reserved for Drexel events.

## Informatics

### About the Program

*Bachelor of Science Degree in Informatics (BSI)*

A new major in informatics, available for enrollment this coming fall, has been specifically designed to meet the growing needs for individuals who can solve problems issues related to big data.

Informatics majors learn to define information needs of individuals and organizations; select and transform data to increase usefulness for solving particular problems; analyze and synthesize big, unstructured data to create actionable information; create information visualizations for big data exploration and presentation; manage very large volume

data sources from acquisition through disposal, and secure, preserve, and control access to data in a manner consistent with legal and organizational considerations.

Graduates of the program will become key members of organizational data science teams who will create novel information products with an emphasis on solving problems that can be addressed using very large and disparate data sources. This forward-looking program for undergraduates offers a solid background in liberal arts and sciences, including courses in international studies and options for foreign language to embrace a global perspective.

This program will go into effect academic year 2013-2014.

## Minor in Informatics

Informatics is the science of information, the practice of information processing, and the engineering of information systems. The *iSchool's* minor in informatics combines basic courses in information systems and technology with courses that address the cognitive issues and social contexts in which information systems and technologies are embedded.

Any student in any major can benefit from a minor in informatics. Graduates with such background knowledge are prepared to actively participate in the application of information technology within their major area of study.

The minor is available to all University students in good standing, with the exception of students majoring in Information Systems, Information Technology or Software Engineering.

### Requirements

INFO 101	Introduction to Information Technology	3.0
INFO 102	Introduction to Information Systems	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 210	Database Management Systems	3.0
Select one of the following pairs:		6.0

### Informatics on the Internet

INFO 151	Web Systems and Services I
INFO 152	Web Systems and Services II

### Informatics in Society

INFO 205 [WI]	Strategic Uses of Information Systems
INFO 215	Social Aspects of Information Systems

### Informatics in the Organization

INFO 205 [WI]	Strategic Uses of Information Systems
INFO 435	Information Services

### Planning and Delivery of IT Services

INFO 410	Information Technology Infrastructure
INFO 415	Information Technology Services

Total Credits	24.0
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# Information Systems

## About the Program

*Bachelor of Science Degree in Information Systems (BSIS): 188.0 quarter credits*

The Bachelor of Science in Information Systems meets the demand for individuals skilled in the development and management of information systems. Students learn how to determine information needs, design appropriate information systems, manage those systems, and measure the systems' performance.

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The *iSchool* at Drexel offers a Bachelor of Science Degree in Information Systems (BSIS) to meet the growing demand for individuals skilled in the development and management of information systems. This forward-looking program for undergraduates offers a solid background in liberal arts and sciences as well as the skills and knowledge needed to design, create, manage, and effectively use modern information systems.

The Information Systems curriculum has no single application focus. It is directed to the art and science of managing information in all application environments. Students learn how to determine information needs, design appropriate information systems, manage those systems, and measure the systems' performance. The emphasis is on the users of computers, and on building professional-level information systems skills. To further emphasize the business aspect of the degree, the BSIS curriculum includes a built in business minor.

The BSIS is accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET).

### BS in Information Systems Program Outcomes

The program enables students to achieve, by the time of graduation:

1. An ability to apply knowledge of computing and mathematics appropriate to the discipline
2. An ability to analyze a problem, identify and define the computing requirements appropriate to its solution
3. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
4. An ability to function effectively on teams to accomplish a common goal
5. An understanding of professional, ethical, legal, security and social issues and responsibilities
6. An ability to communicate effectively with a range of audiences
7. An ability to analyze the local and global impact of computing on individuals, organizations, and society
8. Recognition of the need for and an ability to engage in continuing professional development
9. An ability to use current techniques, skills, and tools necessary for computing practice.

10. An understanding of processes that support the delivery and management of information systems within a specific application environment.

## Degree Requirements

### University and College Requirements

COOP 101	Career Management and Professional Development	0.0
UNIV 1101	The Drexel Experience	2.0
or INFO 120	IST Seminar for Transfer Students	

### Information Systems Requirements

INFO 101	Introduction to Information Technology	3.0
INFO 102	Introduction to Information Systems	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 151	Web Systems and Services I	3.0
INFO 152	Web Systems and Services II	3.0
INFO 153	Applied Data Management	3.0
INFO 154	Software System Construction	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 215	Social Aspects of Information Systems	3.0
INFO 324	Team Process and Product	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 333	Introduction to Information Security	3.0
INFO 355	Systems Analysis II	3.0
INFO 420 [WI]	Software Project Management	3.0
INFO 424	Team Project Practicum	3.0
INFO 425 [WI]	Design Problem I	3.0
INFO 426 [WI]	Design Problem II	3.0
Information Systems Electives *		16.0

### Natural Science Sequence 8.0-9.0

Select one of the following sequences:

CHEM 101 & CHEM 102	General Chemistry I and General Chemistry II
CHEM 111 & CHEM 112	General Chemistry I and General Chemistry II
PHYS 103 & PHYS 104	General Physics I and General Physics II
PHYS 101 & PHYS 102	Fundamentals of Physics I and Fundamentals of Physics II
BIO 107 & BIO 108 & BIO 109 & BIO 110	Cells, Genetics & Physiology and Cells, Genetics and Physiology Laboratory and Biological Diversity, Ecology & Evolution and Biological Diversity, Ecology and Evolution Laboratory
BIO 122 & BIO 124 & BIO 126	Cells and Genetics and Evolution & Organismal Diversity and Physiology and Ecology
PHEV 145 & PHEV 146	Weather I: Climate and Global Change and Weather II: Analysis and Forecasting

BIO 100 & CHEM 151 & PHYS 151	Applied Cells, Genetics & Physiology and Applied Chemistry and Applied Physics **
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### Mathematics Requirements

Select one of the following sequences:		8.0
MATH 101 & MATH 102 & MATH 180	Introduction to Analysis I and Introduction to Analysis II and Discrete Computational Structures	
MATH 121 & MATH 122 & MATH 180	Calculus I and Calculus II and Discrete Computational Structures	

### Arts/Humanities Requirements

ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 111	Propositional (zero-order) Logic	3.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
Arts/Humanities elective **		3.0

### Behavioral Science Requirements †

PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0
SOC 101	Introduction to Sociology	3.0
or ANTH 101	Introduction to Cultural Diversity	
SOC 250	Research Methods I	3.0
SOC 350	Research Methods II	3.0
Behavioral Science Electives		6.0

### Business Minor Requirements (See Minor Requirements below) 12.0-32.0

Students not selecting a business minor are still required to take STAT 201.

Free Electives	9.0-20.0
Total Credits	188.0

\* Any non-required INFO course

\*\* Any non-required course in COM, HIST, ENGL, GREC, PHIL, PSCI, ARTH, FMVD, VSST, and WRIT or any foreign language course.

† Any non-required course offered by the AFAS, ANTH, PSY, SOC or WMST departments.

## Business Minor Requirements

Students select one of the following business minors and, in addition to STAT 201 Introduction to Business Statistics, complete all the required courses:

Accounting (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/accounting/#minorinaccountingtext>)

Business (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/businessadministration/#minorinbusinessadministrationtext>)

Entrepreneurship (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/entrepreneurship/#minorinentrepreneurshiptext>)

Finance (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/finance/#minorinfinancetext>)

Legal Studies (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/legalstudies/#degreerequirementstext>)

Marketing (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/marketing/#minorinmarketingtext>)

Operations Management (<http://catalog.drexel.edu/undergraduate/collegeofbusiness/operationandsupplychainmanagement/#minorinoperationsmanagementtext>)

## Sample Plan of Study

### 5 YR UG Co-op Concentration

#### Term 1

ENGL 101	Expository Writing and Reading	3.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0
UNIV 1101	The Drexel Experience	1.0

**Term Credits 14.0**

#### Term 2

ENGL 102	Persuasive Writing and Reading	3.0
INFO 102	Introduction to Information Systems	3.0
INFO 151	Web Systems and Services I	3.0
MATH 122 or 102	Calculus II Introduction to Analysis II	4.0

**Term Credits 13.0**

#### Term 3

ENGL 103	Analytical Writing and Reading	3.0
INFO 105	Introduction to Informatics	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
UNIV 1101	The Drexel Experience	1.0

**Term Credits 17.0**

#### Term 4

INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 333	Introduction to Information Security	3.0
PHIL 105	Critical Reasoning	3.0
SOC 250	Research Methods I	3.0
SOC 101 or ANTH 101	Introduction to Sociology Introduction to Cultural Diversity	3.0

**Term Credits 18.0**

#### Term 5

INFO 154	Software System Construction	3.0
INFO 210	Database Management Systems	3.0
PSY 101	General Psychology I	3.0
SOC 350	Research Methods II	3.0
Information Systems (INFO) Elective		3.0

**Term Credits 15.0**

#### Term 6

COM 230	Techniques of Speaking	3.0
INFO 324	Team Process and Product	3.0
INFO 355	Systems Analysis II	3.0
PHIL 111	Propositional (zero-order) Logic	3.0

Business Elective 4.0

**Term Credits 16.0**

#### Term 7

INFO 215	Social Aspects of Information Systems	3.0
INFO 330	Computer Networking Technology I	4.0
PSY 330	Cognitive Psychology	3.0
Information Systems (INFO) Elective		3.0
Business Elective		4.0

**Term Credits 17.0**

#### Term 8

COM 310	Technical Communication [WI]	3.0
STAT 201	Introduction to Business Statistics	4.0
Free Elective		3.0
Information Systems (INFO) Elective		3.0
Science Sequence Course 1*		4.0

**Term Credits 17.0**

#### Term 9

Science Sequence Course 2*		4.0
Business Electives		8.0
Information Systems (INFO) Elective		4.0

**Term Credits 16.0**

#### Term 10

INFO 420	Software Project Management [WI]	3.0
INFO 424	Team Project Practicum	3.0
Business Elective		4.0
Behavioral Science Elective		3.0
Information Systems (INFO) Elective		3.0

**Term Credits 16.0**

#### Term 11

INFO 425	Design Problem I [WI]	3.0
Free Elective		4.0
Behavioral Science Elective		3.0
Business Elective		4.0

**Term Credits 14.0**

#### Term 12

INFO 426	Design Problem II [WI]	3.0
Free Electives		9.0
Arts and Humanities Elective		3.0

**Term Credits 15.0**

Total Credit: 188.0

\* See degree requirements (p. 5).

## Co-op/Career Opportunities

The demand for information systems professionals continues to be strong. Graduates find careers in a number of areas, including designing information systems, leading project teams, planning, developing, and marketing information systems.

Most information systems students enter the professional world right after graduation, but some continue their studies in advanced information technology programs.

## Co-Op Experiences

The following list is a sample of recent co-op job titles and employers:

- *Applications Architect*, Aetna
- *e-Communications Intern*, Airgas
- *PC Network Support*, Aramark
- *Information Systems Intern*, Campbell's Soup
- *Distributed WAN Support Co-op*, Cigna
- *Network Services*, GlaxoSmithKline
- *Programmer/Analyst*, Independence Blue Cross
- *Information Management Co-op*, Johnson & Johnson
- *Database Developer*, Princeton Plasma Physics
- *Website Developer*, QVC
- *Shared Services Co-op*, Wyeth

Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

## Dual/Accelerated Degrees

The College of Information Science and Technology offers a BS/MS Accelerated Degree Program designed to allow students to complete both a bachelor's degree and a master's degree along with a cooperative educational experience within the traditional five years.

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Students accepted in this program can combine any of the Information Science and Technology BS and MS degree programs as well as other options:

- BS/MS Accelerated Degree (<http://www.ischool.drexel.edu/PS/UndergraduatePrograms/AcademicPrograms/BSMS>) (BS & MS in five years, including 2 Co-ops)
- BS in Information Technology/MBA Accelerated Degree (<http://www.ischool.drexel.edu/CS/UndergraduatePrograms/Academics/BSITMBA>) (BSIT/MBA)
- BS in Information Systems/MBA Accelerated Degree (<http://www.ischool.drexel.edu/CS/UndergraduatePrograms/Academics/BSISMBA>) (BSIS/MBA)

For more information on the criteria for entering this program, as well as a sample plan of study, visit the BS/MS Accelerated Degree (<http://www.ischool.drexel.edu/PS/UndergraduatePrograms/AcademicPrograms/BSMS>) page on the College's website.

## Minor in Information Systems

The information systems minor is available to all University students in good standing, with the exception of students already majoring in Information Systems.

### Required Courses

INFO 102	Introduction to Information Systems	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 355	Systems Analysis II	3.0
Two information system electives *		6.0
Total Credits		25.0

\* An additional 6 credits or more are to be chosen from other course offerings in information systems pertinent to the student's overall program of study. Guidance in selecting these electives will be provided by staff and faculty of the College of Information Science and Technology.

## Facilities

### Available Facilities

#### W. W. Hagerty Library

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## Information Technology

### About the Program

*Bachelor of Science Degree in Information Systems (BSIT): 188.0 quarter credits*

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The Bachelor of Science Degree in Information Technology (BSIT) is offered by Drexel's College of Information Science and Technology as both a five-year and a four-year co-op program. In addition to the core coursework in information systems and information technology, the major includes 12 credits towards a minor in business. Only 12 additional credits would be required to complete a minor in business.

Students graduating with a Bachelor of Science Degree in Information Technology will:

- Understand and be able to apply core information technologies.
- Approach the application of information technology from a user-centered perspective aimed at meeting the needs of users and organizations in a societal and global context.
- Apply sound methods and approaches to identify and analyze IT problems and design, implement, and evaluate effective and usable IT solutions.
- Display personal and interpersonal IT career skills, including the ability to work on a team, to communicate with technical and nontechnical people, and to pursue lifelong learning.

### BSIT Program Outcomes

The program enables students to achieve, by the time of graduation:

- An ability to apply knowledge of computing and mathematics appropriate to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to function effectively on teams to accomplish a common goal
- An understanding of professional, ethical, legal, security and social issues and responsibilities
- An ability to communicate effectively with a range of audiences
- An ability to analyze the local and global impact of computing on individuals, organizations, and society
- Recognition of the need for and an ability to engage in continuing professional development
- An ability to use current techniques, skills, and tools necessary for computing practice.
- An ability to use and apply current technical concepts and practices in the core information technologies.
- An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems
- An ability to effectively integrate IT-based solutions into the user environment.
- An understanding of best practices and standards and their application.
- An ability to assist in the creation of an effective project plan.
- An ability to identify and manage information assurance and security risks, and integrate appropriate mitigation strategies in the administration and management of computing, communication, and organizational systems.
- An ability to identify and evaluate current and emerging technologies and assess their applicability to address the user's needs.

### Integration with BS in Information Systems

The major in Information Technology integrates closely with Drexel's major in Information Systems, and each enriches the other. The two degrees share a common freshman year and the same set of major courses, but they have different requirements. The difference is in the nature of specialization in upper-level courses. The BS in Information Technology is aimed at students who want a degree focused on applied information technology but with an emphasis on IT infrastructure rather than applications in business.

The structure of the freshman year allows students to embark on IT or IS without having to choose between them until later.

## Degree Requirements

### University and College Requirements

COOP 101	Career Management and Professional Development	0.0
UNIV 1101	The Drexel Experience	1.0

### Technology Requirements

INFO 101	Introduction to Information Technology	3.0
INFO 102	Introduction to Information Systems	3.0
INFO 105	Introduction to Informatics	3.0
INFO 108	Foundations of Software	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 151	Web Systems and Services I	3.0
INFO 152	Web Systems and Services II	3.0
INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 215	Social Aspects of Information Systems	3.0
INFO 320	Server Technology I	4.0
INFO 324	Team Process and Product	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 333	Introduction to Information Security	3.0
INFO 410	Information Technology Infrastructure	3.0
INFO 415	Information Technology Services	3.0
INFO 420 [WI]	Software Project Management	3.0
INFO 424	Team Project Practicum	3.0
INFO 425 [WI]	Design Problem I	3.0
INFO 426 [WI]	Design Problem II	3.0
INFO electives (Technology electives)		9.0-12.0

### Concentration Requirements

Select one of the following sequences: 9.0-12.0

#### Database Management

INFO 300	Information Retrieval Systems
INFO 365	Database Administration I
INFO 366	Database Administration II

#### Server and Network Technology

INFO 321	Server Technology II
INFO 322	Server Technology III
INFO 331	Computer Networking Technology II

### Natural Science Sequence 8.0-9.0

Select one of the following sequences:		
CHEM 101 & CHEM 102	General Chemistry I and General Chemistry II	
CHEM 111 & CHEM 112	General Chemistry I and General Chemistry II	
PHYS 103 & PHYS 104	General Physics I and General Physics II	
PHYS 101 & PHYS 102	Fundamentals of Physics I and Fundamentals of Physics II	

BIO 107 & BIO 108 & BIO 109 & BIO 110	Cells, Genetics & Physiology and Cells, Genetics and Physiology Laboratory and Biological Diversity, Ecology & Evolution and Biological Diversity, Ecology and Evolution Laboratory	
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PHEV 145 & PHEV 146	Weather I: Climate and Global Change and Weather II: Analysis and Forecasting	
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BIO 100 & CHEM 151 & PHYS 151	Applied Cells, Genetics & Physiology and Applied Chemistry and Applied Physics *	
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BIO 122 & BIO 124 & BIO 126	Cells and Genetics and Evolution & Organismal Diversity and Physiology and Ecology	
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### Mathematics Requirements 12.0

Select one of the following sequences:

MATH 101 & MATH 102 & MATH 180	Introduction to Analysis I and Introduction to Analysis II and Discrete Computational Structures	
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MATH 121 & MATH 122 & MATH 180	Calculus I and Calculus II and Discrete Computational Structures	
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### Arts/Humanities Requirements

ENGL 101	Expository Writing and Reading	3.0
ENGL 102	Persuasive Writing and Reading	3.0
ENGL 103	Analytical Writing and Reading	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 111	Propositional (zero-order) Logic	3.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0

Arts/Humanities Elective \*\* 3.0

### Behavioral Science Requirements

PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0

Behavioral science electives \*\*\* 6.0

### Business Requirements

STAT 201	Introduction to Business Statistics	4.0
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Select two of the following courses: 8.0

ACCT 115	Financial Accounting Foundations
ECON 201	Principles of Microeconomics
ORGB 300 [WI]	Organizational Behavior

### Free Electives 36.0

Total Credits 188.0-195.0

\* BIO 101 Applied Biological Diversity, Ecology & Evolution can be substituted for this course in this sequence.  
 \*\* Any non-required course in COM, HIST, ENGL, GREC, PHIL, PSCI, ARTH, FMVD, VSST, and WRIT or any foreign language course.  
 \*\*\* Any non-required course offered by the AFAS, ANTH, PSY, SOC or WMST departments.

## Sample Plan of Study

### BS Information Technology

#### 5 YR UG Co-op Concentration

##### Term 1

ENGL 101	Expository Writing and Reading	3.0
INFO 101	Introduction to Information Technology	3.0
INFO 108	Foundations of Software	3.0
UNIV 101	The Drexel Experience	1.0
MATH 121 or 101	Calculus I Introduction to Analysis I	4.0

##### Term Credits

14.0

##### Term 2

ENGL 102	Persuasive Writing and Reading	3.0
INFO 102	Introduction to Information Systems	3.0
INFO 151	Web Systems and Services I	3.0
MATH 122 or 102	Calculus II Introduction to Analysis II	4.0
Free elective		3.0

##### Term Credits

16.0

##### Term 3

ENGL 103	Analytical Writing and Reading	3.0
INFO 105	Introduction to Informatics	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
UNIV 1101	The Drexel Experience	1.0

##### Term Credits

17.0

##### Term 4

COM 230	Techniques of Speaking	3.0
INFO 153	Applied Data Management	3.0
INFO 200	Systems Analysis I	3.0
INFO 320	Server Technology I	4.0
PSY 101	General Psychology I	3.0

##### Term Credits

16.0

##### Term 5

INFO 210	Database Management Systems	3.0
PHIL 105	Critical Reasoning	3.0
PSY 330	Cognitive Psychology	3.0
Information Technology (IT) elective		3.0
Free elective		3.0

##### Term Credits

15.0

##### Term 6

INFO 333	Introduction to Information Security	3.0
PHIL 111	Propositional (zero-order) Logic	3.0
Natural Science Sequence course		4.0
IT Advanced Topic course		3.0
Free elective		3.0

##### Term Credits

16.0

##### Term 7

INFO 215	Social Aspects of Information Systems	3.0
INFO 324	Team Process and Product	3.0

INFO 330	Computer Networking Technology I	4.0
IT Advanced Topic course		3.0
Natural Science Sequence course		4.0

##### Term Credits

17.0

##### Term 8

COM 310	Technical Communication [WI]	3.0
INFO 410	Information Technology Infrastructure	3.0
STAT 201	Introduction to Business Statistics	4.0
Information Technology (IT) elective		3.0
Free elective		3.0

##### Term Credits

16.0

##### Term 9

INFO 415	Information Technology Services	3.0
Select one of the following:		4.0
ACCT 115	Financial Accounting Foundations	
ECON 201	Principles of Microeconomics	
ORGB 300	Organizational Behavior [WI]	
IT Advanced Topic course		3.0
Information Technology (IT) elective		3.0
Free elective		3.0

##### Term Credits

16.0

##### Term 10

INFO 420	Software Project Management [WI]	3.0
INFO 424	Team Project Practicum	3.0
Select one of the following:		4.0
ORGB 300	Organizational Behavior [WI]	
ECON 201	Principles of Microeconomics	
ACCT 115	Financial Accounting Foundations	
Information Technology (IT) elective		3.0
Free elective		2.0

##### Term Credits

15.0

##### Term 11

INFO 425	Design Problem I [WI]	3.0
Behavioral Science elective		3.0
Arts and Humanities elective		3.0
Free electives		6.0

##### Term Credits

15.0

##### Term 12

INFO 426	Design Problem II [WI]	3.0
Behavioral Science elective		3.0
Free electives		9.0

##### Term Credits

15.0

Total Credit: 188.0

## Dual/Accelerated Degrees

The College of Information Science and Technology offers a BS/MS Accelerated Degree Program designed to allow students to complete both a bachelor's degree and a master's degree along with a cooperative educational experience within the traditional five years.

The College of Information Science and Technology offers a BS/MS Accelerated Degree Program designed to allow students to complete both a bachelor's degree and a master's degree along with a cooperative educational experience within the traditional five years.

Students accepted in this program can combine any of the Information Science and Technology BS and MS degree programs as well as other options:

- BS/MS Accelerated Degree (BS & MS in five years, including 2 Co-ops)
- BS in Information Technology/MBA Accelerated Degree (BSIT/MBA)
- BS in Information Systems/MBA Accelerated Degree (BSIS/MBA)

For more information on the criteria for entering this program, as well as a sample plan of study, visit the College of Information Science and Technology's website.

## Co-op/Career Opportunities

The BSIT major is offered as both a five-year program, involving three six-month periods of employment through the University's co-operative education program, and a four-year program, involving one six-month period of co-op employment.

The following list is a sample of recent co-op job titles and employers:

- Collaborative Services Analyst, GlaxoSmithKline
- Information Technology & Computer Support Consultant, University of Pennsylvania
- Network Operations/Security Solutions Co-Op, Susquehanna International Group
- Operations Development, PJM Interconnection
- Portal Operations Analyst, SAP America
- PECO Technical Services, Exelon Corporation

## Career Opportunities

The demand for information systems and technology professionals continues to be strong. Graduates find careers in a number of areas, including designing information technology systems, leading project teams, planning and developing information systems, and marketing information technology. Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

## Facilities

### W. W. Hagerty Library

The Hagerty Library (<http://www.library.drexel.edu>) supports research supports research in the College of Information Science and Technology

through provision of books, periodical literature, and related materials in all fields of inquiry in library and information science, computer science, systems engineering, information systems, and technology. With over 450 online literature databases, more than 21,500 full-text electronic journal titles and more than 110,000 electronic books, the majority of the Library's resources are now available online via its homepage (<http://www.library.drexel.edu/>). On-site amenities include close to one hundred laptop and desktop PCs for walk-in use by students and hundreds of seating options for quiet work or group projects, including over a dozen group study rooms and the 24/7 cafe area. The staff of ten reference librarians includes an IST subject specialist who is available for individual research consultations.

### iCommons

Located in Room 106 of the Rush Building, the College's iCommons features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with Plasma display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking *iSchool* courses.

The computers for general use are Microsoft Windows and Apple OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the Hagerty Library. The *iSchool* is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and *iSchool* classrooms.

*iSchool* students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

### Other Facilities

The College maintains 7 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, VCR, ceiling mounted projectors, and other equipment for presentations and demonstrations. Two of these classrooms are fully equipped to function as computing labs for networking, programming and database-related projects.

### Information Technology Lab

In 2005, the *iSchool* designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the laboratory supports. In addition a special system has been built into to the classroom to allow real time control of all classroom workstations.

### Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni

Garden (<http://www.ischool.drexel.edu/content/documents/pdf/GardenReservationForm.pdf>) may be reserved for Drexel events.

## Software Engineering

### About the Program

*Bachelor of Science in Software Engineering (BSSE): 188.0 quarter credits*

The major in software engineering is a multidisciplinary University degree sponsored by the College of Engineering and The *iSchool* at Drexel. The program, drawing on the strengths of existing Drexel programs in computer science and information systems, provides a curriculum that encompasses behavioral, managerial and technical aspects of software engineering and attempts to synthesize disciplinary paradigms and themes.

Advances in information technology have captured the public imagination and had tremendous economic and social impact over the last 50 years. These advances offer great benefit, but have also created a great need for highly dependable systems developed at predictable cost. Unfortunately, it has become increasingly clear that our ability to produce the software for these systems in a way that meets cost and quality requirements is quite limited.

For example:

- Studies conclude that cost and schedule overruns on commercial software projects commonly average at least 100%. Some studies report averages as high as 300 - 400%.
- Studies of large projects indicate that about 25% of them are abandoned and never completed.
- There is a growing list of incidents in which software failures have caused injury and death.

Software engineering is an attempt to solve this problem. The notion can be traced to a conference sponsored by NATO in 1967. The conference was organized to discuss the problems in creating software systems reliably. In the years since, there has been some progress, but the problems that motivated the original conference are still very much in evidence. There is good reason to believe that the creation of software will never be easy. But there is tremendous incentive to make the process as efficient and reliable as possible.

In summary, software engineering can be defined as the application of processes, methods, and tools to the problem of building and maintaining computer software with a defined level of quality, at a predictable cost, on a predictable schedule.

### Degree Requirements

#### University and College Requirements

COOP 101	Career Management and Professional Development	0.0
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#### Software Engineering Requirements

UNIV I101	The Drexel Experience	2.0
or UNIV E101	The Drexel Experience	
SE 101	Foundations of Software Engineering I	3.0
SE 102	Foundations of Software Engineering II	3.0

SE 103	Foundations of Software Engineering III	3.0
SE 210	Software Specification and Design I	3.0
SE 211	Software Specification and Design II	3.0
SE 310	Software Architecture I	3.0
SE 311	Software Architecture II	3.0
SE 320	Software Verification and Validation	3.0
SE 410	Software Evolution	3.0
SE 491 [WI]	Design Project I	3.0
SE 492 [WI]	Design Project II	3.0
SE 493 [WI]	Design Project III	3.0

#### Computer Science Requirements

CS 260	Data Structures	3.0
CS 265	Advanced Programming Tools and Techniques	3.0
CS 281	Systems Architecture	4.0
CS 283	Systems Programming	3.0

#### Networking Elective

CS 472	Computer Networks: Theory, Applications and Programming	3.0-4.0
or INFO 330	Computer Networking Technology I	

#### Information Systems Requirements

INFO 210	Database Management Systems	3.0
INFO 310	Human-Computer Interaction II	3.0
INFO 420 [WI]	Software Project Management	3.0

#### Computing Electives

Any non-required INFO, CS or SE course at the 300+ level	18.0
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#### Mathematics/Statistics Requirements

CS 270	Mathematical Foundations of Computer Science	3.0
MATH 121	Calculus I	4.0
MATH 122	Calculus II	4.0
MATH 123	Calculus III	4.0
MATH 221	Discrete Mathematics	3.0
STAT 201	Introduction to Business Statistics	4.0
STAT 202	Business Statistics II	4.0

#### Science Sequence Requirements

21.0
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Select one of the following sequences:

#### Chemistry

CHEM 101	General Chemistry I
CHEM 102	General Chemistry II
CHEM 103	General Chemistry III

#### Physics

PHYS 101	Fundamentals of Physics I
PHYS 102	Fundamentals of Physics II
PHYS 201	Fundamentals of Physics III

#### Biology

BIO 122	Cells and Genetics
BIO 124	Evolution & Organismal Diversity
BIO 126	Physiology and Ecology

#### Science Electives

Students select 7.5 - 9.0 additional credits from any natural science courses

#### Liberal Studies Requirements

ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
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ENGL 102	Composition and Rhetoric II: The Craft of Persuasion	3.0
ENGL 103	Composition and Rhetoric III: Thematic Analysis Across Genres	3.0
PHIL 105	Critical Reasoning	3.0
PHIL 311	Computer Ethics	3.0
COM 230	Techniques of Speaking	3.0
COM 310 [WI]	Technical Communication	3.0
PSY 101	General Psychology I	3.0
PSY 330	Cognitive Psychology	3.0
Liberal Studies Electives *		6.0
Select two of the following:		8.0
ACCT 115	Financial Accounting Foundations	
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
<b>Free Electives</b>		18.0-19.0
<b>Total Credits</b>		188.0

\* Any non-required course in ENGL, PHIL, COM, PSY, SOC, ANTH, WMST, AFAM, PSCI.

## Sample Plan of Study

### 5 YR UG Co-op Concentration

		<b>Credits</b>
<b>Term 1</b>		
COOP 101	Career Management and Professional Development	0.0
ENGL 101	Composition and Rhetoric I: Inquiry and Exploratory Research	3.0
MATH 121	Calculus I	4.0
SE 101	Foundations of Software Engineering I	3.0
UNIV I101	The Drexel Experience	1.0
First Course in a 3-part Laboratory Science Sequence		4.0-4.5
	<b>Term Credits</b>	<b>15.0-15.5</b>
<b>Term 2</b>		
ENGL 102	Composition and Rhetoric II: The Craft of Persuasion	3.0
MATH 122	Calculus II	4.0
Second Course in a 3-part Laboratory Science Sequence		4.0-4.5
SE 102	Foundations of Software Engineering II	3.0
	<b>Term Credits</b>	<b>14.0-14.5</b>
<b>Term 3</b>		
ENGL 103	Composition and Rhetoric III: Thematic Analysis Across Genres	3.0
MATH 123	Calculus III	4.0
SE 103	Foundations of Software Engineering III	3.0
UNIV I101	The Drexel Experience	2.0
Third Course in a 3-part Laboratory Science Sequence		4.0-4.5
Liberal Studies Elective		3.0
	<b>Term Credits</b>	<b>19.0-19.5</b>
<b>Term 4</b>		
COM 230	Techniques of Speaking	3.0
SE 210	Software Specification and Design I	3.0

CS 265	Advanced Programming Tools and Techniques	3.0
CS 270	Mathematical Foundations of Computer Science	3.0
Natural Science Elective		3.0
	<b>Term Credits</b>	<b>15.0</b>
<b>Term 5</b>		
CS 260	Data Structures	3.0
INFO 210	Database Management Systems	3.0
MATH 221	Discrete Mathematics	3.0
SE 211	Software Specification and Design II	3.0
Natural Science Elective		3.0
	<b>Term Credits</b>	<b>15.0</b>
<b>Term 6</b>		
COM 310 [WI]	Technical Communication	3.0
CS 281	Systems Architecture	4.0
PSY 101	General Psychology I	3.0
SE 310	Software Architecture I	3.0
STAT 201	Introduction to Business Statistics	4.0
	<b>Term Credits</b>	<b>17.0</b>
<b>Term 7</b>		
SE 311	Software Architecture II	3.0
STAT 202	Business Statistics II	4.0
Computing Elective (300-level or higher INFO, SE, CS)		3.0
Natural Science Elective		3.0
Free Elective		3.0
	<b>Term Credits</b>	<b>16.0</b>
<b>Term 8</b>		
CS 283	Systems Programming	3.0
INFO 420 [WI]	Software Project Management	3.0
PHIL 105	Critical Reasoning	3.0
SE 320	Software Verification and Validation	3.0
Free Elective		3.0
	<b>Term Credits</b>	<b>15.0</b>
<b>Term 9</b>		
INFO 310	Human-Computer Interaction II	3.0
PHIL 311	Computer Ethics	3.0
SE 410	Software Evolution	3.0
Free Elective		3.0
Computing Electives (300-level or higher INFO, SE, CS)		3.0
	<b>Term Credits</b>	<b>15.0</b>
<b>Term 10</b>		
SE 491 [WI]	Design Project I	3.0
INFO 330 or CS 472	Computer Networking Technology I or Computer Networks: Theory, Applications and Programming	4.0
Select one of the following:		4.0
ECON 201	Principles of Microeconomics	
ECON 202	Principles of Macroeconomics	
ACCT 115	Financial Accounting Foundations	
Computing Elective (300-level or higher INFO, SE, CS)		3.0
Free Elective		3.0
	<b>Term Credits</b>	<b>17.0</b>

**Term 11**

PSY 330	Cognitive Psychology	3.0
SE 492 [WI]	Design Project II	3.0

Select one of the following: 4.0

ACCT 115 Financial Accounting Foundations

ECON 202 Principles of Macroeconomics

ECON 201 Principles of Microeconomics

Computing Electives (300-level or higher INFO, SE, CS) 6.0

**Term Credits 16.0**

**Term 12**

SE 493 [WI] Design Project III 3.0

Liberal Studies Elective 3.0

Computing Elective (300-level or higher INFO, SE, CS) 3.0

Free Electives 6.0

**Term Credits 15.0**

Total Credit: 189.0-190.5

## Co-op/Career Opportunities

The demand for software engineering professionals is quite strong. Graduates can expect career opportunities in software design and development in a variety of application areas. Software engineering graduates are particularly well suited to work as members or leaders of software project teams. They have knowledge and skills to help them develop quality software within schedule and cost constraints.

According to the Bureau of Labor Statistics, computer systems software engineering is among the 30 fastest growing US careers requiring at least a bachelor's degree, with an estimated 120,000 new jobs by 2018. Although they have jobs in most industries, many computer software engineers work in computer systems design and related services. Employers range from startups to well-known industry leaders. A growing number of these workers get jobs on a temporary basis, or work as consultants.

Computer systems software engineers are among the projected fastest growth occupations, which means good opportunities for college graduates, especially those with co-op experience. According to the Bureau of Labor Statistics, employers are seeking software engineers with strong backgrounds in programming and systems analysis, along with business and people skills.

Most software engineering students enter the professional world right after graduation, but some continue their studies in advanced software engineering programs. Visit the Drexel Steinbright Career Development Center (<http://www.drexel.edu/scdc>) page for more detailed information on co-op and post-graduate opportunities.

## Dual/Accelerated Degree

Accelerated degree programs combine the practical work experience of a Drexel undergraduate education with the credentials of a graduate degree. Some programs offer the co-operative education option. Students may earn both degrees in the same major or, in some programs, complete a master's degree in a different field. Each dual degree program has specific requirements and students should work closely with advisors to map out a clear plan of study.

According to University regulations, students can only apply to participate in accelerated/dual degree programs after the completion of 90 credits and before the completion of 120 credits.

## Requirements for the Bachelor's/Master's Dual Degree in Software Engineering

Applicants to the program must have an overall cumulative Grade Point Average of 3.25 or higher. Letters of recommendation from faculty members from either the Department of Computer Science or The *iSchool* at Drexel are required. Students must submit a plan of study and consult their undergraduate advisor and course schedules for guidance.

Acceptance to the program will be based on a combination of the student's GPA and letters of recommendation. Acceptance may be denied if the plan of study is not feasible. For more information, contact the Department of Computer Science (<http://www.cs.drexel.edu>) or The *iSchool* at Drexel. (<http://www.ischool.drexel.edu>)

Applicants must have completed the following core Software Engineering courses with a minimum GPA of 3.25:

SE 101	Foundations of Software Engineering I	3.0
SE 102	Foundations of Software Engineering II	3.0
SE 103	Foundations of Software Engineering III	3.0
SE 210	Software Specification and Design I	3.0
SE 211	Software Specification and Design II	3.0
SE 310	Software Architecture I	3.0

## Minor in Software Engineering

The software engineering minor is available to all University students in good standing, with the exception of software engineering majors.

### Prerequisites

Computer programming competence may be established by completing one of the following course sequences:

**Prerequisites**

CS 171	Computer Programming I	3.0
CS 172	Computer Programming II	3.0
CS 132	Computer Programming B	3.0
CS 133	Computer Programming C	3.0
SE 101	Foundations of Software Engineering I	3.0
SE 102	Foundations of Software Engineering II	3.0
SE 103	Foundations of Software Engineering III	3.0
CS/ECE 203	Programming for Engineers	3.0
INFO 151	Web Systems and Services I	3.0
INFO 152	Web Systems and Services II	3.0
INFO 153	Applied Data Management	3.0
INFO 154	Software System Construction	3.0

Additional computer programming competence may be established by completing both CS 265 Advanced Programming Tools and Techniques and CS 260 Data Structures.

## Required Courses

### Requirements for the Minor in Software Engineering

SE 210	Software Specification and Design I	3.0
SE 211	Software Specification and Design II	3.0
SE 310	Software Architecture I	3.0
SE 311	Software Architecture II	3.0
SE 320	Software Verification and Validation	3.0
SE 410	Software Evolution	3.0
Two Computing/Software Engineering Electives		6.0
Total Credits		24.0



# About The iSchool: Graduate

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The *iSchool* at Drexel, College of Information, Science and Technology, educates interdisciplinary professionals to provide information services and systems to meet a wide range of needs. The *iSchool* complements its educational programs with research that increases the benefits of information science and technology for all sectors of society.

## Majors

- Health Informatics (MS) (p. 19)
- Information Systems (MS) (p. 21)
- Library and Information Science (MS) (p. 24)
- Software Engineering (MS) (<http://catalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/softwareengineering>)
- Information Studies (PhD) (<http://catalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/informationstudies>)

## Certificates

- Advanced Certificate in Information Studies and Technology (p. 29)
- Archives Specialist (p. 29)
- Competitive Intelligence/Knowledge Management Specialist (p. 29)
- Cybersecurity, Law and Policy (p. 29)
- Digital Libraries Specialist (p. 30)
- Healthcare Informatics (p. 20)
- Youth Services Specialist (p. 30)

## About the College

Founded in 1892, the College offers programs leading to a Master of Science (Library and Information Science), a Master of Science in Information Systems, and a PhD in Information Studies. The newly offered MS in Health Informatics is a collaborative effort with the College of Medicine and the College of Nursing and Health Professions.

All three master's degree programs are offered online or on campus. The College also administers the information science and technology track of the University's multidisciplinary Master of Science in Software Engineering (MSSE) degree. Additionally, the College offers advanced certificate opportunities for librarians and information specialists, and terminal experts in related fields to update their education or develop new specialties.

The College of Information Science and Technology is also known as The *iSchool* at Drexel. This identity highlights the College's participation in the iSchools Caucus and its status as a founding member of the organization. The iSchools Caucus is an international alliance of library, information science and information system schools, the purpose of which is to raise awareness and understanding of the information sciences as a cutting-edge and progressive field of study.

For more information about the College, visit The (<http://www.cis.drexel.edu>) *iSchool* at Drexel website.

## About the Goals of the College

### Education

- To provide the student with a foundation for understanding, developing, and operating information systems, services, and products — including information creation, organization, communication, processing, and storage, as well as the technical, social, and human context in which information professionals operate
- To relate fundamental concepts to practical applications, and to provide the student with the necessary skills to function as a responsive professional in a variety of specialized roles
- To ground the student in state-of-the-art information technologies

### Research

- To encourage a spirit of inquiry and criticism, and to advance the theory and practice of the information professions through research and publication

### Service

- To contribute to the growth and development of the information professions

The general learning objectives of the College are to prepare graduates of the degree programs to:

- Take positions of professional leadership
- Balance and integrate human and technical aspects of information systems, services, and products
- Exhibit a strong client orientation in delivering information systems, services, and products, including an understanding of the implications of a culturally diverse society
- Use a variety of information technologies and readily adopt appropriate new technologies
- Analyze people's information requirements and match them with available technologies
- Analyze the flow, structure, and use of information among people and within organizations
- Develop and defend positions on relevant social, political, and ethical issues
- Communicate effectively with others
- Develop critical thinking skills

Programs for professional development include an Advanced Certificate in Information Studies and Technology, the Certificate in Healthcare Informatics, as well as additional opportunities for post-master's study.

## Placement of Graduates

The *iSchool* maintains a Career Services Office (<http://www.ischool.drexel.edu/APF/JobPlacement>) with job listings from international, national and local sources on their website.

## Honor Society

Graduates with outstanding academic records and faculty recommendation are eligible for membership in Beta Phi Mu, an international honor society for information science and technology graduates, which has established its Sigma Chapter at Drexel, and Upsilon Pi Epsilon, international honor society for the computing and

information disciplines. Outstanding students are also eligible for membership in Phi Kappa Phi, a national scholastic honor society.

## Admission Requirements

Deadlines for applications to The *iSchool* at Drexel differ from those of the University. Applicants to degree programs must take the Graduate Record Examination and have the scores sent to Drexel University. See the *iSchool* (<http://www.cis.drexel.edu/PS/GraduatePrograms/Admissions>) at Drexel's Admission (<http://www.cis.drexel.edu/PS/GraduatePrograms/Admissions>) web page for specific deadlines.

Although enrollment in the full-time programs is recommended whenever possible, part-time study is common. Courses are typically offered in the evening, online, and occasionally on Saturdays.

Scores for the GRE General Test are required for all master's and PhD applicants. Master's applicants will be automatically reviewed for a GRE waiver at the College's discretion based on a previous degree GPA. Generally the GPA threshold needed to receive a waiver is an overall 3.2 cum GPA or a half cum of a 3.2 on a 4.0 scale. Exceptions may apply. Doctoral students must enroll as full-time students for at least three consecutive terms. Students may be admitted to the program for part-time study. All applicants to the PhD program are required to take the General (Aptitude) Test of the GRE. PhD applicants are not eligible for a waiver of the GRE requirement.

The standard requirement for the MS or MSIS degree is 45 credits. Students should allow approximately five to eight terms to complete the program.

In addition to the above-mentioned requirements, prospective MS, MSIS, and MSHI students must also complete the Credit for Work Experience Form. This form can be found in the Admissions Requirements section of each program on the *iSchool* website. (This form must be completed and returned for an application to be considered complete regardless of whether or not the student is requesting Credit for Work Experience.)

All entering MS students must have a demonstrated competency in the use of basic desktop software.

MSIS and MSSE applicants should have a strong technical background either through education or work experience.

Although the time limit set by the University for completion of any degree is seven years, the *iSchool* strongly recommends that part-time students complete the master's degree in no more than four years, for a meaningful and cohesive educational experience. On average, most part-time students complete the program in two to three years.

For additional information on how to apply to graduate programs at the *iSchool*, visit Drexel University's Admissions (<http://www.drexel.edu/grad/programs/ischool>) page.

## Financial Assistance

The *iSchool* offers many different types of aid including research assistantships (PhD only), endowed scholarships, dean's and doctoral fellowships. All eligible students and applicants can apply for any available aid incentives provided that they meet the stated criteria and submit the required documentation. All information, including criteria and

application procedures, is located on the College's Scholarships (<http://www.ischool.drexel.edu/Home/Fin/Scholarships>) web page.

## Facilities

### W. W. Hagerty Library

The Hagerty Library (<http://www.library.drexel.edu>) supports research in the College of Information Science and Technology through provision of books, periodical literature, and related materials in all fields of inquiry in library and information science, computer science, systems engineering, information systems, and technology. With over 450 online literature databases, more than 21,500 full-text electronic journal titles and more than 110,000 electronic books, the majority of the Library's resources are now available online. On-site amenities include close to one hundred laptop and desktop PCs for walk-in use by students and hundreds of seating options for quiet work or group projects, including over a dozen group study rooms and the 24/7 cafe area. The staff of ten reference librarians includes an IST subject specialist who is available for individual research consultations.

### iCommons

Located in Room 106 of the Rush Building, the College's iCommons features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with Plasma display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking *iSchool* courses.

The computers for general use are Microsoft Windows and Apple OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the Hagerty Library. The *iSchool* is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and *iSchool* classrooms.

*iSchool* students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

### Other Facilities

The College maintains 7 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, VCR, ceiling mounted projectors, and other equipment for presentations and demonstrations. Two of these classrooms are fully equipped to function as computing labs for networking, programming and database-related projects.

### Information Technology Lab

In 2005, the *iSchool* designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the

laboratory supports. In addition a special system has been built into to the classroom to allow real time control of all classroom workstations.

#### **Alumni Garden**

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden may be reserved for Drexel events.

## **Professional Development Programs**

The *iSchool* at Drexel offers opportunities for librarians and information specialists in related fields to update their education or develop new specialties.

#### **Advanced Certificate in Information Studies and Technology (ACIST)**

This non-degree program provides specialized training beyond the master's degree so that practitioners can update and extend their skills and knowledge by adding position-relevant coursework in order to meet their current employment requirements. It is not intended to provide coursework that can be applied to the *iSchool* master's or doctoral degrees. The program leads to an Advanced Certificate in Information Studies and Technology awarded through the *iSchool*.

#### **Admission Requirements**

Applicants must have completed a master's degree in areas such as library science, computer or information science, information systems, instructional technology, software engineering, or other appropriate degrees from a suitable accredited program that has prepared them for advanced study in the area chosen for specialization. Applicants must meet all the general requirements for admission to graduate studies and the *iSchool*. Admissions requirements include: completed graduate application form, photocopies of transcripts from all colleges and/or universities attended, essay, resume and Graduate Record Examination (or equivalent), if required.

#### **Program Requirements**

The Advanced Certificate in Information Studies and Technology consists of a minimum of eight courses that must be completed within three calendar years. Students must take four INFO courses as well as complete the final independent study within the *iSchool*. The three remaining courses may be taken from offerings within the *iSchool* or from other programs in the University, based on consultation with the student's advisor and agreement of the faculty mentor. [More courses, including a practicum in place of the independent study, may be required for students holding a master's in library science who are seeking certification as School Library/Media specialists in Pennsylvania.]

Students design a program of study in consultation with a faculty mentor, and must complete the required courses within three calendar years. Such individualized plans often require coursework found in other Drexel departments or other universities, but at least 4 courses must be chosen from *iSchool* courses. Students also complete an independent study project, which integrates studies, field experiences, individual reading, and work experience. Successful completion of the certification program requires a cumulative grade point average of 3.0.

#### **Post-Master's Study for *iSchool* Alumni**

Applicants who hold a master's degree from the *iSchool* may request readmission by contacting the *iSchool*.

#### **Special Associate Study**

Students who are currently enrolled in a Library Science or Information Systems graduate program at another university may take a graduate class from the College by applying for Special Associate status. Applications for Special Associate students are accepted every quarter. Admissions requirements include: completed graduate application form and a letter from your graduate advisor or department head indicating which classes you have permission to take and that you are in good academic standing.

For additional information, view the College of Information Science and Technology's Professional Development (<http://www.ischool.drexel.edu/PS/SpecialPrograms/ProfessionalDevelopment>) page.

#### **Certificate in Healthcare Informatics**

This three-course (9 credits), comprehensive certificate program is designed for information professionals, clinical personnel and healthcare support personnel who want to increase their knowledge of health information technology and management of the complex social and organizational issues surrounding this major change in healthcare. This online certificate program will provide an intensive introduction to the evolving field of Medical/Health Informatics.

The goal of the Certificate in Healthcare Informatics is to provide knowledge and skills in the application of information technology (IT) in the provision of healthcare. The curriculum for the Certificate in Healthcare Informatics includes courses on organizational and sociological issues and clinical information technology as well as an introductory class.

Visit the Drexel Online site for additional information about the Certificate in Healthcare Informatics (<http://www.drexel.com/online-degrees/information-sciences-degrees/cert-hci>).

#### **Specialist Certificate Programs**

Continuing education opportunities to update or enhance initial skills and knowledge are an important part of many professions. The *iSchool's* five-course Specialist Certificate Programs allow students to expand their skills and specializations beyond the master's degrees. Like the Advanced Certificate in Information Studies and Technology (ACIST), these certificate programs require a master's degree, must be completed within three years, and will be recorded on a student's transcript. Applicants must have a master's degree from an ALA-accredited program or a graduate degree closely to the chosen specialization (e.g. history for the Archives Specialist certificate program) as well as pre-requisites for individual courses. Students with unrelated master's degrees or those who lack the pre-requisites are eligible to apply to the Advanced Certificate in Information Studies and Technology program.

These certificate programs are available in the following subject areas:

- Archives Specialist (p. 29)
- Competitive Intelligence and Knowledge Management (p. 29)
- Digital Libraries
- Youth Services

#### **Required Courses**

INFO 530	Foundations of Information Systems	3.0
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#### **MS(LIS) Required Courses**

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0

INFO 522	Information Access & Resources	3.0
INFO 521	Information Users and Services	3.0
INFO 640	Managing Information Organizations	3.0

**MSIS Required Courses**

INFO 532	Software Development	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 630	Evaluation of Information Systems	3.0
INFO 638	Software Project Management	3.0
INFO 646	Information Systems Management	3.0

**Distribution Requirements**

Completion of at least four of the following courses is required for the 12.0 degree. Additional courses from this list may be taken as electives.

INFO 540	Perspectives on Information Systems
INFO 606	Advanced Database Management
INFO 607	Applied Database Technologies
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 612	Knowledge Base Systems
INFO 613	XML and Databases
INFO 616	Social and Collaborative Computing
INFO 622	Content Representation
INFO 624	Information Retrieval Systems
INFO 625	Cognition and Information Retrieval
INFO 627	Requirements Engineering and Management
INFO 628	Information Systems Implementation
INFO 631	Information Technology Integration
INFO 633	Information Visualization
INFO 634	Data Mining
INFO 636	Software Engineering Process I
INFO 637	Software Engineering Process II
INFO 648	Healthcare Informatics
INFO 653	Digital Libraries
INFO 655	Intro to Web Programming
INFO 657	Digital Library Technologies
INFO 658	Information Architecture
INFO 710	Information Forensics
INFO 712	Information Assurance
INFO 714	Information Systems Auditing
INFO 731	Organization & Social Issues in Healthcare Informatics
INFO 755	Electronic Records Management
INFO 782	Issues in Informatics

**Free Electives** \* 9.0

Total Credits 63.0

\* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other master's level INFO courses may be taken as free electives. MS/MS(LIS) students may not take courses designated as doctoral level or courses INFO 861, INFO 863, or INFO 998.

## Health Informatics

### About the Program

*Master of Science: 45.0 quarter credits*

The MS in Health Informatics program provides students with the ability to use information systems (including knowledge processing methods as well as information and communication technologies) efficiently and responsibly in order to improve health outcomes in such varied settings as clinical medicine, nursing, and public health in primary and hospital care, industry, government and academia.

This program, housed at The *iSchool* at Drexel and delivered online, is a collaborative effort with the the College of Nursing and Health Professions and Drexel University College of Medicine.

Graduates of the MS in Health Informatics program will be prepared to fill the rapidly growing demand for professionals who understand healthcare, information systems, and technology.

### Learning Objectives

Specific learning outcomes for program graduates include the following:

- Articulate the ways in which data, information and knowledge are generated and used to solve biomedical and population health problems, across diverse settings and from the individual to the population level.
- Develop and apply theories, methods, and processes for the generation, storage, retrieval, use, management, and sharing of biomedical data, information and knowledge.
- Apply, adapt, and validate existing informatics concepts and approaches as they relate to specific biomedical and healthcare problems.
- Apply concepts and techniques from the social, behavioral, communications, and organizational sciences and from ethics, law, and social and economic policy to apply, analyze, evaluate, and create systems approaches to the solution of substantive problems in biomedical and healthcare informatics.

### Additional Information

For more information about the degree, visit The *iSchool* at Drexel's MS in Health Informatics (<http://www.ischool.drexel.edu/PS/GraduatePrograms/Degrees/MSHI>) web page.

## Master of Science Admission Requirements

The program is selective in nature and designed to attract students with a wide range of backgrounds.

Application for admission should include:

- Graduate application
- Official final transcripts from all colleges/universities attended
- One letter of recommendation required, two suggested
- Essay/statement of purpose
- Current resume
- Official Graduate Record Exam (GRE) scores (may be waived with a 3.2 GPA cumulative or in the last half credits of a completed undergraduate or graduate degree).
- Credit for work experience (<http://www.ischool.drexel.edu/CS/GraduatePrograms/CWE>)
- Official Test of English as a Foreign Language (TOEFL) scores are required for any applicant whose bachelor's degree is from a non-US institution. Students must obtain a 600 on the written exam or a 100 on the Internet based exam.
- I-20 form and accompanying bank documents are required for international applicants; WES (World Education Service) Course-by-Course Evaluation of foreign transcripts/degrees is required for international applicants.

The Admissions Committee may decide to hold interviews with prospective students. Credit for work experience will be handled according to current *iSchool* practice.

For additional information on how to apply to this program, visit the Drexel University's Graduate Requirements for Admissions (<http://www.drexel.edu/grad/programs/ischool/apply/requirements>) page.

## Master of Science Degree Requirements

45.0 quarter credits

The curriculum is based around contemporary health issues and has been designed to help students understand the current landscape of health informatics and how information, technology and people relate and intersect in healthcare environments. Because health informatics is an interdisciplinary field, all students will complete a common core of 10 courses (30 quarter hours) from *The iSchool* before choosing from a suite of specialized electives offered by *The iSchool* at Drexel or other Colleges at Drexel University.

The College recommends that all students take INFO 648 (<https://nextcatalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/healthinformatics>) in their first term. Students wishing to take two classes their first term should consider enrolling in INFO 530 as well.

### Required Courses

INFO 530	Foundations of Information Systems	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 638	Software Project Management	3.0
INFO 648	Healthcare Informatics	3.0
INFO 712	Information Assurance	3.0
INFO 731	Organization & Social Issues in Healthcare Informatics	3.0

INFO 732 Healthcare Informatics: Planning & Evaluation 3.0

### Track Courses

In addition to these requirements, students complete either Track 1 or 15.0 Track 2 courses (listed below)

Total Credits 45.0

## Track 1: Students Admitted Without a Health-Related Background

Students who lack a health-related background are required to take at least 9.0 credits from the following list of electives, and must complete 1 term clinical experience in a healthcare setting.

### Electives

Select three of the following: 9.0

INFO 526	Information, Innovation & Technology in Advanced Nursing Practice
NURS 564	The Business of Healthcare
NURS 531	Epidemiology in Action: Tracking Health & Disease
NURS 532	Evaluation of Health Outcomes
NURS 557	Leadership and Stewardship in the Health Professions
NURS 558	Economics of Healthcare Management & Policy
RSCH 519	Introduction to Biostatistics
RSCH 523	Methods for Health Research

### Clinical Experience

Independent Study: Clinical Experience 3.0

### Free Elective

One free elective 3.0

Total Credits 15.0

## Track 2: Students Admitted With a Health-Related Background

Students who have a clinical background and who wish to develop additional expertise in information systems must take 3 additional courses (9.0 credits) from the following list. Students intending to sit for Certification in Nursing Informatics should consult the requirements for that credential to determine the additional eligibility requirements.

### Systems-Related Electives

Select three of the following: 9.0

INFO 606	Advanced Database Management
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 622	Content Representation
INFO 624	Information Retrieval Systems
INFO 634	Data Mining

### Free Electives

Two free electives 6.0

Total Credits 15.0

## Certificate in Healthcare Informatics

This online certificate program is designed for information professionals, clinical personnel, and healthcare support personnel who want to increase their knowledge of health information technology and management of the

complex social and organizational issues surrounding this major change in healthcare.

The goal of the Certificate in Healthcare Informatics is to provide knowledge and skills in the application of information technology (IT) in the provision of healthcare. Graduates of the program gain knowledge and skills useful in taking on additional healthcare IT-related responsibilities or embarking upon new careers as managers of developers of healthcare IT systems.

Students working towards an MS in Library and Information Science or an MS in Information systems may also complete the Certificate in Healthcare Informatics.

#### Required Courses

INFO 648	Healthcare Informatics	3.0
INFO 731	Organization & Social Issues in Healthcare Informatics	3.0
INFO 732	Healthcare Informatics: Planning & Evaluation	3.0
Total Credits		9.0

#### Additional Information

For additional information about this program, visit the Certificate in Healthcare Informatics (<http://www.drexel.com/online-degrees/information-sciences-degrees/cert-hci>) page at Drexel Online.

## Facilities

#### W. W. Hagerty Library

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project management software for usage in the iCommons and *iSchool* classrooms.

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In 2005, the *iSchool* designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the laboratory supports. In addition a special system has been built into to the classroom to allow real time control of all classroom workstations.

#### Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://www.ischool.drexel.edu/content/documents/pdf/GardenReservationForm.pdf>) may be reserved for Drexel events.

## Master of Science in Information Systems

### About the Program

*Master of Science in Information Systems (MSIS): 45.0 quarter credits*

The master's program in information systems prepares students for both the technical and real-world aspects of creating and managing an information system. The program, which is offered both online and oncampus, part- and full-time, focuses on a systems engineering approach, evaluating client needs and technological advances in order to create solutions that take into account the latest advances and theories in the field.

### Learning Objectives

Graduates of the MS in Information Systems program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts. Their preparation encompasses the knowledge and abilities required to:

- Apply a systems approach to developing and delivering information systems and services:
  - Identifying clients' information requirements

- Analyzing the flow and structure of information in user tasks and organizational processes with the appropriate formal tools and methods
- Matching requirements to technological opportunities and performing benefit/cost tradeoff analyses among design options
- Designing, implementing, and integrating specified system solutions
- Evaluating development products, including interim deliverables; and
- Developing and implementing plans for maintenance and support of operational systems
- Lead and manage teams of information professionals in the development of quality systems and services:
  - Understanding the business aspects of information systems development and application in organizations
  - Planning, controlling, staffing, and organizing to manage the processes for system development, services delivery, or system support; and
  - Preparing general managers with technical information systems competencies.

## Additional Information

For more information about this program, visit the *iSchool* at Drexel's MS in Information Systems (<http://www.ischool.drexel.edu/PS/GraduatePrograms/Degrees/MSIS>) web page.

## Degree Requirements

### Required Courses

INFO 530	Foundations of Information Systems	3.0
INFO 532	Software Development	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 630	Evaluation of Information Systems	3.0
INFO 638	Software Project Management	3.0
INFO 646	Information Systems Management	3.0

### Distribution Requirements 12.0

Select four of the following:

INFO 540	Perspectives on Information Systems
INFO 606	Advanced Database Management
INFO 607	Applied Database Technologies
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 612	Knowledge Base Systems
INFO 613	XML and Databases
INFO 616	Social and Collaborative Computing
INFO 617	Introduction to System Dynamics
INFO 622	Content Representation
INFO 624	Information Retrieval Systems
INFO 625	Cognition and Information Retrieval
INFO 626	Language Processing
INFO 627	Requirements Engineering and Management
INFO 628	Information Systems Implementation

INFO 629	Concepts in Artificial Intelligence
INFO 631	Information Technology Integration
INFO 633	Information Visualization
INFO 634	Data Mining
INFO 636	Software Engineering Process I
INFO 637	Software Engineering Process II
INFO 648	Healthcare Informatics
INFO 653	Digital Libraries
INFO 655	Intro to Web Programming
INFO 657	Digital Library Technologies
INFO 658	Information Architecture
INFO 710	Information Forensics
INFO 712	Information Assurance
INFO 714	Information Systems Auditing
INFO 731	Organization & Social Issues in Healthcare Informatics
INFO 755	Electronic Records Management
INFO 782	Issues in Informatics

<b>Free Electives *</b>	6.0
<b>Total Credits</b>	<b>45.0</b>

\* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other masters-level INFO courses may be taken as free electives. MSIS students may not take courses designated as doctoral-level courses.

## Dual MSIS and MS(LIS) Option (<https://nextcatalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/informationssystem>)

### About the Program

63.0 quarter credits

The dual master's degree program consisting of a Master of Science in Library and Information Science MS(LIS) and a Master of Science in Information Systems (MSIS) combines the Library and Information Science program focus on selecting, organizing, managing and accessing information resources to meet user information needs with the MS in Information System skills in creating and managing the databases, interfaces, and information systems that connect users with the information they are seeking. Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program to work simultaneously on two master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first degree when requesting admission to the second.

### Learning Objectives

Graduates of the dual program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts; evaluating information services and products; and managing organizations that facilitate access to recorded knowledge. Students

who pursue this path greatly increase their ability to compete in today's cutting-edge information marketplace, where the importance of digitized information resources and the needs of organizations and companies to provide networked access to these resources via intranet gateways and knowledge management systems is steadily increasing. Their preparation encompasses the knowledge and abilities required to:

- Explain the foundational principles, professional ethics and values, and social context within which various information professionals work.
- Design and deliver library and information services and/or products using appropriate resources in libraries, archives and/or other information organizations.
- Analyze the structure, description, and bibliographic control of literatures.
- Develop appropriate information-seeking strategies to select information resources for given audiences.
- Retrieve information in various formats and from various technologies/platforms.
- Communicate knowledge and skills related to accessing, evaluating and using information, information resources and/or information technology.
- Manage information organizations using appropriate strategies and approaches.
- Use a human-centered approach to analyze information needs and design solutions to meet those needs.
- Lead or contribute substantially to a team in developing information technology products and services.
- Evaluate, compare, and select from alternative and emerging information technologies.
- Communicate with technical and non-technical audiences about information technology concepts and stakeholder needs.
- Contribute substantially to an information technology plan for an organization. Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.

#### Required Courses

INFO 530	Foundations of Information Systems	3.0
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#### MS(LIS) Required Courses

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 522	Information Access & Resources	3.0
INFO 521	Information Users and Services	3.0
INFO 640	Managing Information Organizations	3.0

#### MSIS Required Courses

INFO 532	Software Development	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 630	Evaluation of Information Systems	3.0
INFO 638	Software Project Management	3.0

INFO 646	Information Systems Management	3.0
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#### Distribution Requirements

Completion of at least four of the following courses is required for the 12.0 degree. Additional courses from this list may be taken as electives.

INFO 540	Perspectives on Information Systems
INFO 606	Advanced Database Management
INFO 607	Applied Database Technologies
INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 612	Knowledge Base Systems
INFO 613	XML and Databases
INFO 616	Social and Collaborative Computing
INFO 622	Content Representation
INFO 624	Information Retrieval Systems
INFO 625	Cognition and Information Retrieval
INFO 627	Requirements Engineering and Management
INFO 628	Information Systems Implementation
INFO 631	Information Technology Integration
INFO 633	Information Visualization
INFO 634	Data Mining
INFO 636	Software Engineering Process I
INFO 637	Software Engineering Process II
INFO 648	Healthcare Informatics
INFO 653	Digital Libraries
INFO 655	Intro to Web Programming
INFO 657	Digital Library Technologies
INFO 658	Information Architecture
INFO 710	Information Forensics
INFO 712	Information Assurance
INFO 714	Information Systems Auditing
INFO 731	Organization & Social Issues in Healthcare Informatics
INFO 755	Electronic Records Management
INFO 782	Issues in Informatics

<b>Free Electives</b> *	9.0
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<b>Total Credits</b>	63.0
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\* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other master's level INFO courses may be taken as free electives. MS/MS(LIS) students may not take courses designated as doctoral level or courses INFO 861, INFO 863, or INFO 998.

## Facilities

### W. W. Hagerty Library

The Hagerty Library (<http://www.library.drexel.edu>) supports research supports research in the College of Information Science and Technology through provision of books, periodical literature, and related materials in all fields of inquiry in library and information science, computer science, systems engineering, information systems, and technology. With over 450 online literature databases, more than 21,500 full-text electronic journal titles and more than 110,000 electronic books, the majority of the Library's resources are now available online via its homepage (<http://>



www.library.drexel.edu/). On-site amenities include close to one hundred laptop and desktop PCs for walk-in use by students and hundreds of seating options for quiet work or group projects, including over a dozen group study rooms and the 24/7 cafe area. The staff of ten reference librarians includes an IST subject specialist who is available for individual research consultations.

#### **iCommons**

Located in Room 106 of the Rush Building, the College's iCommons features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with Plasma display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking *iSchool* courses.

The computers for general use are Microsoft Windows and Apple OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the Hagerty Library. The *iSchool* is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and *iSchool* classrooms.

*iSchool* students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

#### **Other Facilities**

The College maintains 7 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, VCR, ceiling mounted projectors, and other equipment for presentations and demonstrations. Two of these classrooms are fully equipped to function as computing labs for networking, programming and database-related projects.

#### **Information Technology Lab**

In 2005, the *iSchool* designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the laboratory supports. In addition a special system has been built into to the classroom to allow real time control of all classroom workstations.

#### **Alumni Garden**

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://www.ischool.drexel.edu/content/documents/pdf/GardenReservationForm.pdf>) may be reserved for Drexel events.

## Master of Science in Library and Information Science

### About the Program

*Master of Science: 45.0 quarter credits*

*Master of Science: 60.0 quarter credits (School of Library Media option if students do not have PDE certification)*

The master's program provides students with a foundation in information systems and services, including the context in which information professionals operate and the effect new technologies have on the library and information science field.

### Learning Objectives

Graduates of the MS program (Library and Information Science) are prepared to assume leadership positions designing, executing, and evaluating information services and products, and managing organizations that facilitate access to recorded knowledge. Their preparation encompasses the knowledge and abilities required to:

- Describe in standard terms the major attributes of information resources
- Demonstrate knowledge of the structure and bibliographic control of literatures
- Augment access to information resources through processes such as thesaurus creation, classification, indexing, abstracting, systematic listing, and reviewing
- Select information resources appropriate for given audiences and develop appropriate information-seeking strategies
- Retrieve textual, numeric, bibliographic, image, and other information from all appropriate information sources
- Analyze or synthesize data and information for the client, in the form of digests, reviews of the literature, or technical reports
- Teach people to use information resources effectively
- Manage information organizations and the production of information services and products through planning, controlling, staffing, organizing, and leading

### Accreditation

The College of Information Science and Technology is a member of the Association for Library and Information Science Education, and its MS program (Library and Information Science) is accredited by the American Library Association.

### Professional Affiliation for MS Students

Student groups include student chapters of the American Library Association, the American Society for Information Science and Technology, the Progressive Librarians Guild, and the Society of American Archivists and the Special Libraries Association.

### Additional Information

For more information about this program, visit the *iSchool* at Drexel's MS in Library and Information Science (<http://www.ischool.drexel.edu/PS/GraduatePrograms/Degrees/MS>) web page.

## Degree Requirements

The library and information science program assures students of a solid introduction to the field, a logical progression of coursework, and a wide variety of electives. All students are required to complete the six core courses, totaling 18 credits. Completion of the MS(LIS) program requires a total of 45.0 credits. Students may take any available INFO subject electives to complete their required number of credits in the program.

Students may declare a concentration in one of six areas: *archival studies, competitive intelligence and knowledge management, digital libraries, library and information services, school library media, and youth services*. These concentrations are optional and will appear on the student's transcript. Except for the school library media concentration, three courses are typically required and two are chosen from a limited list of courses relevant to the topic area. The remaining 12.0 credits are free electives.

In exceptional cases, a student with previous coursework in an ALA-accredited program or information science may petition for exemption from one to three required courses. This petition should be made at the time of application to the College and should include both a detailed statement of the reasons for seeking exemption and a copy of the official transcript, including course descriptions.

### Core Courses

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 521	Information Users and Services	3.0
INFO 522	Information Access & Resources	3.0
INFO 530	Foundations of Information Systems	3.0
INFO 640	Managing Information Organizations	3.0

**Free Electives** 12.0

**Concentration Courses (see below)** 15.0

Total Credits 45.0

## Concentrations

### Archival Studies

The concentration in archival studies focuses on the practice and theory of managing collections of records and papers in a variety of archival settings, including governmental agencies, libraries, historical societies, corporations, not-for-profit organizations, museums, and religious institutions. The course content within this concentration provides the educational component required for post-graduate certification by the Academy of Certified Archivists. This concentration may also be of interest to students planning careers in academic and special libraries.

### Required Courses \*

INFO 560	Introduction to Archives I	3.0
INFO 561	Introduction to Archives II	3.0
INFO 750	Archival Access Systems	3.0
Select two of the following courses:		6.0
INFO 751	Archival Appraisal	
INFO 755	Electronic Records Management	
INFO 756	Digital Preservation	

Total Credits 15.0

### Library and Information Services

This is a generalist concentration that includes key professional skills and an orientation to both a work setting and a relevant elective.

### Required Courses

INFO 552	Introduction to Web Design for Information Organizations	3.0
INFO 660	Cataloging and Classification	3.0
INFO 665	Collection Management	3.0
Library and Information Services Concentration electives		6.0

Students select one Work Setting course (and) either one Public Services course (or) one Technical Services course

### Work Settings

INFO 650	Public Library Service
INFO 651	Academic Library Service
INFO 745	Special Libraries and Information Centers

### Public Services

INFO 649	Library Programming
INFO 682	Storytelling
INFO 740	Digital Reference Services
INFO 672-681 (specialized reference courses INFO 672, 673, 674, 675, 677, 680, and 681)	

### Technical Services

INFO 622	Content Representation
INFO 662	Metadata and Resource Description
INFO 663	Library Technical Services
INFO 664	Library Automation

Total Credits 15.0

### Digital Libraries

This concentration covers a range of topics in digital resources, collections and services. It can serve as a bridging concentration accessible to MSIS students; several courses are part of the MSIS curriculum.

### Required Courses †

INFO 552	Introduction to Web Design for Information Organizations	3.0
INFO 653	Digital Libraries	3.0
INFO 657	Digital Library Technologies	3.0
Select two of the following courses:		6.0

INFO 622 Content Representation or INFO 662 Metadata and Resource Description

INFO 605	Introduction to Database Management
INFO 608	Human-Computer Interaction
INFO 624	Information Retrieval Systems
INFO 658	Information Architecture
INFO 740	Digital Reference Services
INFO 756	Digital Preservation

Total Credits 15.0

### Competitive Intelligence and Knowledge Management

This concentration focuses on information needs and knowledge management in special library, corporate, and other organizational settings.

#### Required Courses †

INFO 643	Information Services In Organizations	3.0
INFO 644	Knowledge Assets Management in Organizations	3.0
INFO 678	Competitive Intelligence	3.0

#### CI & KM Concentration Electives

Select two of the following courses: 6.0

INFO 605	Introduction to Database Management	
INFO 677	Resources in Business	
INFO 680	US Government Information	
INFO 681	Legal Research	
INFO 755	Electronic Records Management	

Total Credits 15.0

#### Youth Services

This concentration meets the interests of students planning public library careers with a focus on youth populations.

#### Required Courses

INFO 649	Library Programming	3.0
INFO 650	Public Library Service	3.0
INFO 683	Resources for Children	3.0
INFO 684	Resources for Young Adults	3.0

Select one of the following courses: 3.0

INFO 552	Introduction to Web Design for Information Organizations	
INFO 665	Collection Management	
INFO 682	Storytelling	
INFO 688	Instructional Role for the Information Specialist	

Total Credits 15.0

#### School Library Media (SLiM)

The School Library Media concentration is designed for students who wish to work in K-12 school library programs in both public and private schools. Designed to prepare graduates to be eligible for certification as school librarians by the Pennsylvania Department of Education (PDE), the program meets the requirements of the State of Pennsylvania and provides a strong basis for seeking certification in other states as well. In most instances, students will be required to complete a supervised field study to be eligible for certification.

Three course sequences are available within the concentration: one for students who have *no prior teaching certification* from PDE; one for students who have had *prior teaching certification from PDE* and who wish to add school librarian certification to their credentials; and one for students *with ALA-accredited master's degrees* who wish to seek school librarian certification from PDE.

Currently, all courses in the School Library Media concentration except the Field Study (INFO 891 or INFO 892) are offered online. Field Study, which is required for certification in the State of Pennsylvania, must be completed within a 50-mile radius of Drexel University's main campus.

Students seeking certification elsewhere should check on requirements in their own jurisdictions.

For full course sequences, visit <http://www.ischool.drexel.edu/CS/GraduatePrograms/MS/slim>.

#### School Library Media (SLiM) curriculum (For students without PDE certification or other teaching certification)

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 521	Information Users and Services	3.0
INFO 522	Information Access & Resources	3.0
INFO 525	School Library Programs & Services	3.0
INFO 530	Foundations of Information Systems	3.0
INFO 552	Introduction to Web Design for Information Organizations	3.0
INFO 640	Managing Information Organizations	3.0
INFO 660	Cataloging and Classification	3.0
INFO 665	Collection Management	3.0
INFO 683	Resources for Children	3.0
INFO 684	Resources for Young Adults	3.0
INFO 688	Instructional Role for the Information Specialist	3.0
INFO 891	Twelve-Week School Library and Media Center Field Study	6.0
EDUC 522	Evaluation of Instruction	3.0
EDUC 542	Fundamentals of Special Education	3.0
EDUC 544	The Inclusive Classroom	3.0
EDUC 546	Literacy and Content Skill Development	3.0
EDUC 565	Foundations in Instructing English Language Learners	3.0
Total Credits		60.0

#### School Library Media (SLiM) curriculum (For students who already have PDE certification or other teaching certification)

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 521	Information Users and Services	3.0
INFO 522	Information Access & Resources	3.0
INFO 525	School Library Programs & Services	3.0
INFO 530	Foundations of Information Systems	3.0
INFO 552	Introduction to Web Design for Information Organizations	3.0
INFO 640	Managing Information Organizations	3.0
INFO 660	Cataloging and Classification	3.0
INFO 665	Collection Management	3.0
INFO 683	Resources for Children	3.0
INFO 684	Resources for Young Adults	3.0
INFO 688	Instructional Role for the Information Specialist	3.0
INFO 892	Six-Week School Library and Media Center Field Study	3.0
Free elective		3.0
Total Credits		45.0

**Recommended Electives**

In addition to the five concentration courses, students must select four elective courses to complete their degree program. Students can elect to take the listed concentration courses that have not been taken as required courses, or choose from the following recommended elective courses or other courses in the iSchool curriculum for which they meet the requirements.

- \* **Archival Studies Recommended Electives:** INFO 552, INFO 605, INFO 622, INFO 653, INFO 658, INFO 660, INFO 661, INFO 662, INFO 644, INFO 668, INFO 669, INFO 679, INFO 680, INFO 893, and INFO 894.
- † **Digital Libraries Recommended Electives:** INFO 621, INFO 633, INFO 644, INFO 755, INFO 756, INFO 679, and INFO 665.
- ‡ **Competitive Intelligence and Knowledge Management Recommended Electives:** BUSN 501, MKTG 601, MGMT 655, INFO 634, INFO 552, INFO 679, INFO 745, INFO 893, and INFO 894.

**Required Courses**

INFO 530	Foundations of Information Systems	3.0
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**MS(LIS) Required Courses**

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 522	Information Access & Resources	3.0
INFO 521	Information Users and Services	3.0
INFO 640	Managing Information Organizations	3.0

**MSIS Required Courses**

INFO 532	Software Development	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 630	Evaluation of Information Systems	3.0
INFO 638	Software Project Management	3.0
INFO 646	Information Systems Management	3.0

**Distribution Requirements**

Completion of at least four of the following courses is required for the 12.0 degree. Additional courses from this list may be taken as electives.

INFO 540	Perspectives on Information Systems	
INFO 606	Advanced Database Management	
INFO 607	Applied Database Technologies	
INFO 610	Analysis of Interactive Systems	
INFO 611	Design of Interactive Systems	
INFO 612	Knowledge Base Systems	
INFO 613	XML and Databases	
INFO 616	Social and Collaborative Computing	
INFO 622	Content Representation	
INFO 624	Information Retrieval Systems	
INFO 625	Cognition and Information Retrieval	
INFO 627	Requirements Engineering and Management	
INFO 628	Information Systems Implementation	
INFO 631	Information Technology Integration	
INFO 633	Information Visualization	
INFO 634	Data Mining	
INFO 636	Software Engineering Process I	

INFO 637	Software Engineering Process II
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INFO 648	Healthcare Informatics
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INFO 653	Digital Libraries
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INFO 655	Intro to Web Programming
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INFO 657	Digital Library Technologies
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INFO 658	Information Architecture
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INFO 710	Information Forensics
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INFO 712	Information Assurance
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INFO 714	Information Systems Auditing
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INFO 731	Organization & Social Issues in Healthcare Informatics
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INFO 755	Electronic Records Management
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INFO 782	Issues in Informatics
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<b>Free Electives</b> *	9.0
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Total Credits	63.0
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- \* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other master's level INFO courses may be taken as free electives. MS/MS(LIS) students may not take courses designated as doctoral level or courses INFO 861, INFO 863, or INFO 998.

**Facilities****W. W. Hagerty Library**

The Hagerty Library (<http://www.library.drexel.edu>) supports research in the College of Information Science and Technology through provision of books, periodical literature, and related materials in all fields of inquiry in library and information science, computer science, systems engineering, information systems, and technology. With over 450 online literature databases, more than 21,500 full-text electronic journal titles and more than 110,000 electronic books, the majority of the Library's resources are now available online via its homepage (<http://www.library.drexel.edu/>). On-site amenities include close to one hundred laptop and desktop PCs for walk-in use by students and hundreds of seating options for quiet work or group projects, including over a dozen group study rooms and the 24/7 cafe area. The staff of ten reference librarians includes an IST subject specialist who is available for individual research consultations.

**iCommons**

Located in Room 106 of the Rush Building, the College's iCommons features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with Plasma display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking *iSchool* courses.

The computers for general use are Microsoft Windows and Apple OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the Hagerty Library. The *iSchool* is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and *iSchool* classrooms.

iSchool students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

#### Other Facilities

The College maintains 7 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, VCR, ceiling mounted projectors, and other equipment for presentations and demonstrations. Two of these classrooms are fully equipped to function as computing labs for networking, programming and database-related projects.

#### Information Technology Lab

In 2005, the iSchool designed and built a laboratory in support of the new degree program in Information Technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes more than a dozen servers that are available to students and CISCO networking hardware. The hardware is networked and reconfigurable as needed for the various classes the laboratory supports. In addition a special system has been built into the classroom to allow real time control of all classroom workstations.

#### Alumni Garden

The Rush Building's Alumni Garden provides additional collaborative space for students, alumni and faculty. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (<http://www.ischool.drexel.edu/content/documents/pdf/GardenReservationForm.pdf>) may be reserved for Drexel events.

## MS/MS(LIS)

#### Required Courses

INFO 530	Foundations of Information Systems	3.0
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#### MS(LIS) Required Courses

INFO 515	Research in Information Organizations	3.0
INFO 520	Social Context of Information Professions	3.0
INFO 522	Information Access & Resources	3.0
INFO 521	Information Users and Services	3.0
INFO 640	Managing Information Organizations	3.0

#### MSIS Required Courses

INFO 532	Software Development	3.0
INFO 605	Introduction to Database Management	3.0
INFO 608	Human-Computer Interaction	3.0
INFO 614	Distributed Computing and Networking	3.0
INFO 620	Information Systems Analysis and Design	3.0
INFO 630	Evaluation of Information Systems	3.0
INFO 638	Software Project Management	3.0
INFO 646	Information Systems Management	3.0

#### Distribution Requirements

Completion of at least four of the following courses is required for the 12.0 degree. Additional courses from this list may be taken as electives.

INFO 540	Perspectives on Information Systems
INFO 606	Advanced Database Management
INFO 607	Applied Database Technologies

INFO 610	Analysis of Interactive Systems
INFO 611	Design of Interactive Systems
INFO 612	Knowledge Base Systems
INFO 613	XML and Databases
INFO 616	Social and Collaborative Computing
INFO 622	Content Representation
INFO 624	Information Retrieval Systems
INFO 625	Cognition and Information Retrieval
INFO 627	Requirements Engineering and Management
INFO 628	Information Systems Implementation
INFO 631	Information Technology Integration
INFO 633	Information Visualization
INFO 634	Data Mining
INFO 636	Software Engineering Process I
INFO 637	Software Engineering Process II
INFO 648	Healthcare Informatics
INFO 653	Digital Libraries
INFO 655	Intro to Web Programming
INFO 657	Digital Library Technologies
INFO 658	Information Architecture
INFO 710	Information Forensics
INFO 712	Information Assurance
INFO 714	Information Systems Auditing
INFO 731	Organization & Social Issues in Healthcare Informatics
INFO 755	Electronic Records Management
INFO 782	Issues in Informatics

<b>Free Electives</b> *	9.0
<b>Total Credits</b>	63.0

\* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other master's level INFO courses may be taken as free electives. MS/MS(LIS) students may not take courses designated as doctoral level or courses INFO 861, INFO 863, or INFO 998.

## Advanced Certificate in Information Studies and Technology

24.0 quarter credits

This non-degree program provides specialized training beyond the master's degree so that practitioners can update and extend their skills and knowledge by adding position-relevant coursework in order to meet their current employment requirements. It is not intended to provide coursework that can be applied to the IST master's or doctoral degrees. The program leads to an Advanced Certificate in Information Studies and Technology awarded through the College of Information Science and Technology.

### Admission Requirements

Applicants must have completed a master's degree in areas such as library science, computer or information science, information systems, instructional technology, software engineering, or other appropriate degrees from a suitable accredited program that has prepared them for advanced study in the area chosen for specialization. Applicants must meet all the general requirements for admission to graduate studies and the College of Information Science and Technology. Admissions requirements include: completed graduate application form, photocopies of transcripts from all colleges and/or universities attended, essay, resume and Graduate Record Examination (or equivalent), if required.

### Requirements

The Advanced Certificate in Information Studies and Technology consists of a minimum of eight courses that must be completed within three calendar years. Students must take four INFO courses as well as complete the final independent study within the College. The three remaining courses may be taken from offerings within the College or from other programs in the University, based on consultation with the student's advisor and agreement of the faculty mentor.

More courses, including a practicum in place of the independent study, may be required for students holding a master's in library science who are seeking certification as School Library/Media specialists in Pennsylvania.]

For additional information, view the College of Information Science and Technology's Advanced Certificate in Information Studies and Technology (<http://www.ischool.drexel.edu/PS/ProfDevelopment/Programs/ACIST>) web page.

## Archives Specialist Certificate

This certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization.

The specialization in archival studies focuses on the practice and theory of managing collections of records and papers in a variety of archival settings, including governmental agencies, libraries, historical societies, corporations, not-for-profit organizations, museums, and religious institutions.

The course content within this specialization provides the educational component required for post-graduate certification by the Academy of

Certified Archivists. This certification may also be of interest to students planning careers in academic and special libraries.

The program must be completed within three years.

### Required Courses

INFO 560	Introduction to Archives I	3.0
INFO 561	Introduction to Archives II	3.0
INFO 750	Archival Access Systems	3.0
Students select two of the following courses:		6.0
INFO 751	Archival Appraisal	
INFO 755	Electronic Records Management	
INFO 756	Digital Preservation	
Total Credits		15.0

## Certificate in Cybersecurity, Law and Policy

This new certificate program, available for enrollment this coming fall, explores the vulnerabilities that arise from the use of cyberspace. Coursework explore how the United States, and the many other nations, are responding to those vulnerabilities and analyze the policy and legal frameworks that are developing.

Students will examine issues relating to the organization of the Internet and cyberspace to understand how both governmental entities, and private parties, may – and do – respond to cyber threats under the current legal and policy frameworks. Students will be introduced to policy and legal concepts relating to the private sector and civilian government engagement in cyberspace. The program will also include an examination of the application of traditional laws of armed conflict to the new cyber domain.

This program will go into effect academic year 2013-2014.

## Competitive Intelligence and Knowledge Management Specialist Certificate

The Competitive Intelligence/Knowledge Management Certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization.

This specialization focuses on information needs and knowledge management in special library, corporate, and other organizational settings.

The program must be completed within three years.

### Required Courses

INFO 643	Information Services In Organizations	3.0
INFO 644	Knowledge Assets Management in Organizations	3.0
INFO 678	Competitive Intelligence	3.0
Select one of the following:		3.0
INFO 624	Information Retrieval Systems	
INFO 674	Resources in Science and Technology	
INFO 675	Resources in the Health Sciences	

INFO 677	Resources in Business	
INFO 680	US Government Information	
INFO 681	Legal Research	
Select one of the following:		3.0
INFO 612	Knowledge Base Systems	
INFO 622	Content Representation	
INFO 650	Public Library Service	
INFO 651	Academic Library Service	
INFO 653	Digital Libraries	
INFO 658	Information Architecture	
INFO 662	Metadata and Resource Description	
INFO 679	Information Ethics	
Total Credits		15.0

<b>Required Courses</b>		
INFO 650	Public Library Service	3.0
INFO 683	Resources for Children	3.0
INFO 684	Resources for Young Adults	3.0
Select two of the following:		6.0
INFO 649	Library Programming	
INFO 552	Introduction to Web Design for Information Organizations	
INFO 665	Collection Management	
INFO 688	Instructional Role for the Information Specialist	
Total Credits		15.0

## Digital Libraries Specialist Certificate

The Digital Libraries Specialist Certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization. This specialization covers a range of topics in digital resources, collections and services.

The program must be completed within three years.

### Required Courses

INFO 552	Introduction to Web Design for Information Organizations	3.0
INFO 653	Digital Libraries	3.0
INFO 657	Digital Library Technologies	3.0
Select two courses from the following:		6.0

### Resource-Focused Courses

INFO 622	Content Representation	
INFO 662	Metadata and Resource Description	
INFO 740	Digital Reference Services	

### Systems-Focused Courses

INFO 605	Introduction to Database Management	
INFO 608	Human-Computer Interaction	
INFO 624	Information Retrieval Systems	
INFO 658	Information Architecture	

Total Credits		15.0
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## Youth Services Specialist Certificate

This certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization. This program meets the interests of students planning public library careers with a focus on youth populations

The program must be completed within three years.

# Undergraduate Course Descriptions

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## Information Science & Systems

### Courses

#### **INFO 101 Introduction to Information Technology 3.0 Credits**

Introduces the basic knowledge and techniques required to use computing effectively in organizations. Explores information systems, information technology and software concepts with an emphasis on how computing can be used to help organizations meet their goals.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 105 Introduction to Informatics 3.0 Credits**

Considers the field of informatics as the application of information and computer sciences to a specific domain. Focuses on the three components on informatics: information, users, and information and communication technologies. Topics include information needs, user groups, social media, technology evolution and diffusion of innovation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 108 Foundations of Software 3.0 Credits**

Provides students with fundamental concepts about software and software representation. Topics include software and database representation, development environments, and techniques for designing, coding, testing and deploying software systems. Introduces programming concepts and activities using pair programming activities.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 110 Human-Computer Interaction I 3.0 Credits**

This course introduces the student to the study of computer-based user interfaces. It presents a user-interface layout and design, types and usage of interaction techniques, building a consistent look and feel throughout the interface and how to evaluate designs with users. Centered focus in evaluation of computer interfaces. It teaches the basic principles of user analysis and interface evaluation and gives a practical introduction to ergonomics.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 111 Informatics Design Workshop I 3.0 Credits**

Provides students with an opportunity to explore design practice through hands on experiences with contemporary prototyping platforms and methods. Introduces students to design as a component of informatics.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 110 [Min Grade: D]

#### **INFO 112 Informatics Design Workshop II 3.0 Credits**

Builds on INFO 111 by providing students with an opportunity for open-ended exploration of human-centered systems design practice through a freshman design project. Design groups work with their instructor to develop an initial concept into a design deliverable.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 120 IST Seminar for Transfer Students 2.0 Credits**

Introduces students to academic and co-curricular aspects of university life. Includes academic functions such as writing, reading, and studying skills and co-curricular functions such as campus resources, activities, and social programs. Aids in the transition to student life and is designed to help each student achieve academic and personal success.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 140 Information Systems Laboratory I 1.0 Credit**

Provides hands-on experience with a variety of software products basic to current information systems. Covers products that support personal productivity in organizing, analyzing and presenting information. Addresses both local processing on personal computers and creation and use of information on the Internet.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 101 [Min Grade: D]

#### **INFO 150 Ubiquitous Information Technologies 3.0 Credits**

Introduces students to computing as an integral part of life. Includes topics such as mobile computing, smart devices, sensors, location awareness, and the internet of things. Provides concepts and terminology combined with hands-on experiences constructing applications on mobile or other small computing devices.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 108 [Min Grade: D] or CS 164 [Min Grade: D] or CS 131 [Min Grade: D] or SE 101 [Min Grade: D]

#### **INFO 151 Web Systems and Services I 3.0 Credits**

Introduces technologies used to build leading-edge application systems and services on the World Wide Web. Coverage includes a selection of Web components such as make-up and scripting languages and frameworks for building systems. Introduces Web programming using pair or small team programming activities.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 108 [Min Grade: D] or API2 079

#### **INFO 152 Web Systems and Services II 3.0 Credits**

Explores techniques used to build leading-edge application systems on the World Wide Web. Topics include Web server components of Web applications, and basic database processing. Includes Web programming using pair or small team programming activities.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 151 [Min Grade: D]



**INFO 153 Applied Data Management 3.0 Credits**

Explores technologies used to gather, organize, store, and retrieve data in various forms. Focuses on using databases and other information management components in software systems. Topics include database servers, data management for Web applications, and data structures. Includes data management software development using pair or small team programming activities.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 108 [Min Grade: D]

**INFO 154 Software System Construction 3.0 Credits**

Introduces considerations that make large software systems challenging to design, build, and maintain. Topics include coding standards and documentation, program architecture, verification, software evolution, and managing large software systems. Includes software modification and development using pair and team programming.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 152 [Min Grade: D]

**INFO 200 Systems Analysis I 3.0 Credits**

Study of the principles, practices and tools of information systems analysis and design. Emphasis on learning pragmatic aspects of working as a systems analyst and employing the tools of systems analysis and design.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 101 [Min Grade: D]

**INFO 203 Information Technology for Engineers 3.0 Credits**

Provides an introduction to relational system analysis and design and computer networking for engineering students. Covers requirements gathering, development of data flow diagrams and entity-relationship diagrams, and fundamental protocols for TCP/IP networking and routing.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 204 Nursing Informatics 3.0 Credits**

This course is designed to examine technology and tools of the Internet and World Wide Web with a focus on the use of cyber technology and selected computer applications. The automation of data management through information systems, expert systems, and telecommunication, and the impact of these technologies on nursing administration, education, practice and research are addressed in the context of nursing informatics. Actual problem-solving and mini-design projects on how computerization and automation can improve the efficiency of nursing care delivery will be emphasized.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**Prerequisites:** NURS 100 [Min Grade: D] and NURS 102 [Min Grade: D] and CS 161 [Min Grade: D]

**INFO 205 [WI] Strategic Uses of Information Systems 3.0 Credits**

Familiarizes students with basic business problems and operations and provides an understanding of how information systems can be used to benefit organizations. Also introduces students to the pitfalls of developing and implementing information systems in organizations and helps students improve critical thinking skills. This is a writing intensive course.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** INFO 101 [Min Grade: D]

**INFO 210 Database Management Systems 3.0 Credits**

Focuses on how to design databases for given problems, and how to use database systems effectively. Topics include database design techniques using the entity-relationship approach, techniques of translating the entity-relationship diagram into a relational schema, relational algebra, commercial query languages, and normalization techniques.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 101 [Min Grade: D] or SE 210 [Min Grade: D]

**INFO 215 Social Aspects of Information Systems 3.0 Credits**

Introduces social issues involved in information systems design and use, e.g., personal computing, telecommuting, computers in education, the privacy and security of stored and transmitted information, and information ownership. Explores the interaction of high technology, employment, and class structure.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 105 [Min Grade: D]

**INFO 216 Issues in Information Policy 3.0 Credits**

Introduces students to the fundamentals of information policy, through examination of particular issues such as: privacy, intellectual property, access, and security. Students will gain an understanding of the historical foundations of information policy, read and evaluate information policies, discuss key components of information policies, and create an information policy for an organization or government entity.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**INFO 220 Geographic Information Science 3.0 Credits**

Explores the creation, distribution and growth of geospatial data, highlighting their uses and misuses. Structured as an applications-based course where students learn how geospatial technologies are used to turn data into maps, tables and imagery through hands-on exercises and laboratory work.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**INFO 240 Introduction to Data Science 3.0 Credits**

"Data Science" encompasses skills required for data intensive work. Students will deliver data science products and services through analysis, data transformation and data access techniques. The assignments will involve web programming, statistics, and the ability to manipulate data sets with code, following examples provided.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**INFO 250 Information Visualization 3.0 Credits**

Introduces the foundation and the state of the art of information visualization. Explores and reflects on the design, application, and evaluation of a diverse range of information systems. Demonstrates how a number of common types of information can be visually, intuitively and interactively represented. Provides a first-hand experience of visualizing a variety of realistic data types.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 300 Information Retrieval Systems 3.0 Credits**

The theoretical underpinnings of information retrieval are covered to give the student a solid base for further work with retrieval systems. Emphasis is given to the process of textual information for machine indexing and retrieval. Aspects of information retrieval covered include document description, query formulation, retrieval algorithms, query matching, and system evaluation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 105 [Min Grade: D] and INFO 110 [Min Grade: D] and (CS 260 [Min Grade: D] or CS 133 [Min Grade: D] or INFO 153 [Min Grade: D] or SE 103 [Min Grade: D])

**INFO 310 Human-Computer Interaction II 3.0 Credits**

Introduces the student to interactive computer system design. Teaches some of the basic approaches to task analysis, design, and evaluation of interactive computer systems. Applies these design principles in the development of the interface to an interactive computer system.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 110 [Min Grade: D] or SE 210 [Min Grade: D]

**INFO 320 Server Technology I 4.0 Credits**

Addresses information systems that have server-based architectures. Introduces students to basic concepts of servers and server-based architectures. Discusses dependence on features and capabilities of the underlying operating system. Reviews concepts of operating system, their architectures, and services. Discusses the client-server and various client-server architectures.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** INFO 101 [Min Grade: D] and (CS 131 [Min Grade: D] or CS 164 [Min Grade: D] or CS 171 [Min Grade: D] or SE 101 [Min Grade: D] or INFO 151 [Min Grade: D])

**INFO 321 Server Technology II 4.0 Credits**

Presents details of specific server platforms used to provide services to information systems applications. Prepares students to apply server technologies to information systems problems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** INFO 320 [Min Grade: D]

**INFO 322 Server Technology III 4.0 Credits**

Continues the study of server platform technologies for information systems applications. Prepares students to apply a wide range of server technologies to information systems problems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 321 [Min Grade: D]

**INFO 324 Team Process and Product 3.0 Credits**

Provides hands-on experience with working in small teams to apply processes and produce products typical of current best practices in computing and information technology organizations. Allows students to develop an integrated understanding of project life cycle phases. Examines issues of team organization and operation, problem solving, and communication.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 153 [Min Grade: D] and INFO 200 [Min Grade: D]

**INFO 330 Computer Networking Technology I 4.0 Credits**

Presents the fundamentals of data communications and networking technologies. Focuses on the broad foundational coverall of key technologies and key concepts in network planning, design, and management. Major topics include network models, data and voice communications, local-area and wide-area technologies, IP networks and their applications and internetworking emphasizing the Internet.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** CS 171 [Min Grade: D] or CS 132 [Min Grade: D] or SE 102 [Min Grade: D] or INFO 152 [Min Grade: D]

**INFO 331 Computer Networking Technology II 4.0 Credits**

Focuses on design, construction and use of modern networks and internetworks. Prepares students to successfully create and operate modern secure networks. Major topics include LAN design and construction, internetwork architecture, WAN connectivity, security, virtual private networks and network operation in real-world environments.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 330 [Min Grade: D]

**INFO 333 Introduction to Information Security 3.0 Credits**

Introduction to information security in modern organizations. Examines what information security is, and what motivates organizations to consider information security as a high priority. Introduces legal, ethical and professional issues, risk management, security planning, security technologies, and security implementation and maintenance.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 336 Distributed Systems Security 3.0 Credits**

Study of the principles, practices, and techniques to secure distributed applications, information and the infrastructure of distributed information systems. Topics include security planning, policies and models, threats and attacks, and the use and integration of distributed system security mechanisms for confidentiality, authentication, access control, and intrusion detection.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 330 [Min Grade: D]

**INFO 340 Programming Internet Information Systems I 3.0 Credits**

This is a hands-on course on programming Internet information systems with an object-oriented programming language, currently Java. The course emphasizes programming practice. It covers fundamental concepts such as object-oriented programming, client-server programming, multi-threaded programming, graphical user interface design, and application development.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 171 [Min Grade: D] or CS 132 [Min Grade: D] or INFO 152 [Min Grade: D] or SE 102 [Min Grade: D]

**INFO 341 Programming Internet Information Systems II 3.0 Credits**

Continues to develop design and programming skills for the development of Internet information systems. Studies and compares various web servers, applications servers, and different server-side programming languages. Emphasizes issues related to object-oriented design and server-side programming.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 340 [Min Grade: D]

**INFO 350 Visual Analytics 3.0 Credits**

Introduces the aims, principles, and practical tools of visual analytics for analytic reasoning and decision making. Characterizes key issues concerning with uncertainty, incomplete and conflict information. Examines the role of interactive visual analytic reasoning processes. Provides opportunities to use advanced interactive visual analytic tools.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** INFO 250 [Min Grade: D]

**INFO 355 Systems Analysis II 3.0 Credits**

A project-oriented course that discusses software engineering and advanced techniques of requirements modeling, prototyping and software design, particularly utilizing object-oriented techniques. The course builds upon Systems Analysis I, requiring students to apply their knowledge of systems analysis tools and techniques.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 210 [Min Grade: D] and INFO 200 [Min Grade: D]

**INFO 360 Language Processing 3.0 Credits**

Study of the problems and techniques of processing natural language. Introduces theory of spoken language and how it differs from theories of computer-generated natural language. Includes language pattern recognition and syntactic inference, and semantic networks.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 210 [Min Grade: D] and INFO 200 [Min Grade: D]

**INFO 365 Database Administration I 3.0 Credits**

Database Administration is a continuation of Database Management Systems, and includes the following: advanced ERD techniques, database management system internals and advanced elements of the SQL language, as well as stored procedures and triggers, specifically as demonstrated in the Oracle implementation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 210 [Min Grade: D] and (CS 171 [Min Grade: D] or CS 132 [Min Grade: D] or INFO 153 [Min Grade: D] or SE 102 [Min Grade: D])

**INFO 366 Database Administration II 3.0 Credits**

Introduces the principles and practices of database administration, particularly as they apply to commercial-grade relational database management systems. The course will include, but not be limited to, installation, systems tuning, application tuning, security, user management, backup and recovery. To this end, internals of RDBMSs will be discussed, using major commercial RDBMSs as examples. Distributed database issues will also be discussed. As time permits, other advanced issues will be addressed, such as issues of object and object-relational databases.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 365 [Min Grade: D]

**INFO 370 Artificial Intelligence for Information Systems 3.0 Credits**

Introduction to the field of artificial intelligence (AI). Basic concepts, principles, and techniques used to achieve the goals of AI are studied. Examples and applications are specific to information systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 108 [Min Grade: D]

**INFO 371 Data Mining with Machine Learning 3.0 Credits**

Introduces students to basic data mining approaches using machine learning tools. Focuses on machine learning algorithms for information inference and knowledge discovery from data. Covers major applications in data/text/web processing, analysis and mining.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman

**Prerequisites:** STAT 201 [Min Grade: D]

**INFO 373 Digital Forensics 3.0 Credits**

Provides an introduction to the collection, analysis, presentation, and preservation of digital evidence according to methodologies defined by forensic science to fulfill the needs of the legal and law enforcement communities. Introduces systems understanding as an important tool for digital forensic investigation of crimes that use information technology.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 210 [Min Grade: D] and INFO 355 [Min Grade: D]

**INFO 375 Introduction to Information Systems Assurance 3.0 Credits**

Introduction to the problem of security for modern information systems.

Provides an overview of threats, both human and computer, to the security of an organization's data and information resources. Explores how systems may be made less vulnerable and how to respond.

Examines issues of personal security in an electronic world.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 200 [Min Grade: D] and INFO 330 [Min Grade: D]

**INFO 399 Independent Study 2.0-12.0 Credits**

Requires approval of advisor, supervising faculty member and college.

BSIS majors may take a maximum of 6 credits of independent study.

Any exception to this maximum must be approved in advance by the student's advisor. Independent study on a topic selected by the student.

Independent study is supervised by a faculty member and guided by a plan of study developed by the student in a term prior to the term in which the independent study is pursued.

**College/Department:** College of Information Science Technology

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

**INFO 404 Nursing Informatics for the Bachelor of Science in Nursing Completion 3.0 Credits**

Designed for registered nurses in the RN-BSN completion program.

Examines computer applications, technology, internet tools, and focuses on health care informatics context for data management, information systems and telecommunications in nursing administration, education and practice. Problem solving and mini-design projects related to increased efficiency in nursing care delivery.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**INFO 405 Social and Collaborative Computing 3.0 Credits**

Examines selected human, social and technical issues and concepts of computer-supported cooperative work, computer-supported collaborative learning and social networking. Topics include: the way that groups work in the networked organization; analysis and design of groupware; social networking and community-learning technologies; and future directions of these technologies.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 310 [Min Grade: D]

**INFO 410 Information Technology Infrastructure 3.0 Credits**

Presents methods for evaluating and selecting information technologies and planning technology implementation. Emphasizes consideration of needs and issues of the organization and individuals served by the technology. Also addresses issues in management of served by the technology. Also addresses issues in management of technology after initial installation including service planning, maintenance, and evolution.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman or Sophomore

**INFO 415 Information Technology Services 3.0 Credits**

Introduces issues in management and delivery of IT services. Addresses needs and approaches to operational support including providing services, help desks, online support, documentation, and user training.

Examines approached to defining, measuring, and analyzing service and support quality.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Cannot enroll if classification is Freshman or Sophomore

**INFO 420 [WI] Software Project Management 3.0 Credits**

The objective of this course is to study project management in the context of software systems development. The course will cover the processes, contexts, metrics, planning and management concerns of managing projects for modern software systems. This is a writing intensive course.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Junior or Senior.

**Prerequisites:** (INFO 200 [Min Grade: D] or SE 210 [Min Grade: D])

and (CS 172 [Min Grade: D] or CS 265 [Min Grade: D] or INFO 153 [Min Grade: D] or SE 103 [Min Grade: D])

**INFO 424 Team Project Practicum 3.0 Credits**

Provides hands-on experience with software systems development in a controlled environment. Student work in small teams to create a software product selected by the instructor. Activities include requirements specification, test specification, design, and software construction. Allows students to develop an integrated understanding of software life-cycle phases.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 200 [Min Grade: D] and INFO 324 [Min Grade: D]

**INFO 425 [WI] Design Problem I 3.0 Credits**

This course is an independent project in which student teams design and implement information systems under faculty guidance. Possible projects include (but are not limited to) information technology areas such as databases, web-based systems, collaborative systems, user interfaces, and expert systems. This is a writing intensive course.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**Prerequisites:** INFO 420 [Min Grade: D] and INFO 424 [Min Grade: D]

**INFO 426 [WI] Design Problem II 3.0 Credits**

This course is a continuation of INFO 425. This is a writing intensive course.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**Prerequisites:** INFO 425 [Min Grade: D]

**INFO 435 Information Services 3.0 Credits**

Examines electronic services that deliver "published" information to an organization from external sources. Relates these services to functions such as planning, marketing, and research. Shows ways of monitoring the organization's larger environments, such as the economy, government, competitors, and new technologies. This course introduces students to the core concepts of information services as they apply to the essential techniques for retrieving, analyzing, organizing and presenting information. The skills learned in this course are transferable to any information seeking activity whether it is in a large research and development lab, or a small start-up company. The overall goal of this course is that upon completion, each student can produce a systematic and accurate method for recovering, analyzing, and disseminating needed information in any setting.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if classification is Junior or Senior.

**Prerequisites:** INFO 105 [Min Grade: D]

**INFO 440 Social Media Trend Spotting 3.0 Credits**

Explores social trend spotting to analyze, understand, visualize and present information from social media feeds, which reflect emerging social, organizational and cultural trends. Students will analyze traces from social media, bespoke discussion forums and virtual organization portals to discern the relationship between online behavior and underlying social phenomena.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 240 [Min Grade: D]

**INFO 450 Expert Consultant Systems 3.0 Credits**

Introduces the basic concepts, techniques, and tools involved in the development of information systems based on human expertise. The course discusses the identification of expert system projects, knowledge acquisition, architectures of expert systems, inference, database and procedural considerations, verification and validation of expert systems. Provides hands-on experience in developing expert systems using an expert system programming language.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 370 [Min Grade: D]

**INFO 480 Special Topics in Information Systems 4.0 Credits**

Selected topics of interest to students in information systems. May be repeated for credit if topic varies.

**College/Department:** College of Information Science Technology

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

# Software Engineering

## Courses

**SE 101 Foundations of Software Engineering I 3.0 Credits**

Teaches students basic programming concepts within a software engineering process that involves specification, documentation, and testing. Programming coverage includes basic programming concepts such as the declaration and assignment of variables, standard data types, constants, conditional statements, loops, introduction to classes and methods, standard and file input/output, arrays, and strings. Process concepts emphasize good internal documentation practices, specifying functional requirements, defect tracking and analysis, and "black-box" testing.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**SE 102 Foundations of Software Engineering II 3.0 Credits**

Introduces students to additional programming concepts. Teaches students how to design, implement, and test object-oriented software applications using simple reusable components. Introduces basic techniques for creating reusable software components. Provides an overview of the software engineering as a discipline.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 101 [Min Grade: D]

**SE 103 Foundations of Software Engineering III 3.0 Credits**

Introduces students to issues and practices for working with medium-size software systems. Teaches students basic techniques for using application frameworks. Introduces students to software development in teams and provides an overview of the software engineering professional practice.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 102 [Min Grade: D]

**SE 210 Software Specification and Design I 3.0 Credits**

Study of the principles, practices, and techniques used to gather system requirements and document them in a requirements specification. Includes techniques for requirements discovery such as user interviews and prototyping. Introduces approaches for organizing and expressing software requirements in a requirements specification.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 103 [Min Grade: D] or CS 133 [Min Grade: D] or CS 172 [Min Grade: D]

**SE 211 Software Specification and Design II 3.0 Credits**

Continues study of requirements with increasing emphasis on converting requirements into a software system design. Presents alternate approaches, techniques for evaluating specifications, specification and design tools, and use of specifications to develop system-level tests.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 210 [Min Grade: D]

**SE 280 Special Topics in Software Engineering 4.0 Credits**

This course covers topics in software engineering. Different topics may be considered in different quarters.

**College/Department:** College of Engineering

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

**SE 310 Software Architecture I 3.0 Credits**

Study of macro-level software system architectures with an emphasis on approaches to interconnection and distribution of current and emerging architectural styles.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 211 [Min Grade: D] and CS 265 [Min Grade: D] and CS 260 [Min Grade: D]

**SE 311 Software Architecture II 3.0 Credits**

Continues discussion of software architecture with a focus on micro-level architecture including patterns, frameworks, and component-based software engineering, and commercial off-the-shelf software.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** SE 310 [Min Grade: D] or CS 350 [Min Grade: D]

**SE 320 Software Verification and Validation 3.0 Credits**

Presents theory and practice of software testing. Covers structural testing including such topics as path testing, dataflow testing, logic based testing, syntax testing, program slicing, mutation testing, fault injection, program perturbation, and testing tools. Discusses techniques for test construction and test suite evaluation, and validation against requirements and design models. Also covers methods of inspection and review at various phases of the software lifecycle.

**College/Department:** College of Engineering

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 260 [Min Grade: D]

**SE 410 Software Evolution 3.0 Credits**

Covers issues related to change in software systems. Addresses principles and techniques of corrective software maintenance, software enhancements, and software product family. Introduces students to issues of change in large software systems including configuration control, change and product management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** CS 260 [Min Grade: D]

**SE 480 Advanced Topics in Software Engineering 4.0 Credits**

This course covers topics in Software Engineering selected from advanced topics from research in this field. Different topics may be considered in different quarters.

**College/Department:** College of Engineering

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

**SE 491 [WI] Design Project I 3.0 Credits**

An independent project in which student teams design and implement a software system under faculty guidance. Students apply a defined software engineering process for the project including process customization as appropriate.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**SE 492 [WI] Design Project II 3.0 Credits**

Continues Design Project I.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**Prerequisites:** SE 491 [Min Grade: D]

**SE 493 [WI] Design Project III 3.0 Credits**

Continues Design Project II.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

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

**Prerequisites:** SE 492 [Min Grade: D]

# Graduate Course Descriptions

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## Information Science & Systems

### Courses

#### **INFO 515 Research in Information Organizations 3.0 Credits**

Introduces quantitative and qualitative methods used to conduct research in library and other information organizations, including sampling strategies, data collection methods, and basic descriptive and inferential statistics. Focuses on research literacy, including developing the skills needed to formulate a research problem, collect and interpret data, and present research results.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 517 Principles of Cybersecurity 3.0 Credits**

Provides the foundation for understanding the key issues associated with protecting information assets, determining the levels of protection and response to security incidents. Presents a general overview and is suitable for individuals with little exposure to IT security.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 520 Social Context of Information Professions 3.0 Credits**

Surveys the professional, social, ethical, and legal issues that affect information service professionals and organizations. Addresses such topics as information law, access, ownership, and censorship. Studies professional organizations and the sociology of professions.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 521 Information Users and Services 3.0 Credits**

Relates basic theories and concepts about information behavior to contemporary provision of information services. Focuses on the conceptual structures of LIS: user communities, factors affecting use of information services and resources, and trends in supporting information services. Develops practical skills in meeting users' information needs, such as answering virtual reference questions and creating online resources.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 522 Information Access & Resources 3.0 Credits**

Presents access and applied information retrieval as the foundation for information services. Provides an overview of contemporary information sources and access methods. Focuses on the structure of tools used for satisfying users' information needs. Emphasizes techniques for building effective search strategies for large-scale retrieval systems. Affords opportunities to evaluate sources.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 525 School Library Programs & Services 3.0 Credits**

Introduces the field of school libraries/media centers. Examines the context in which K12 information programs and services exist; explores key concepts related to information work in schools; explains the major functions of the school-based information professional; and provides opportunities for students to determine their interest in the field.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 526 Information, Innovation & Technology in Advanced Nursing Practice 3.0 Credits**

This course is designed to provide an in-depth introduction to information systems and technologies that support practice and improve patient care and outcomes. Development of information management and technology skills (which meet ANA Informatics Competencies) will be incorporated throughout the course. Content is directed toward assisting the student in understanding the relationship between patient care and complex information and data issues involved in clinical practice.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if major is HI or major is NURS.

#### **INFO 530 Foundations of Information Systems 3.0 Credits**

Introduction to concepts and applications of Information Systems (IS) and Information Technology (IT) as applied throughout library and information science. Topics include the structure of information systems, hardware and software concepts, basic principles of system analysis and design, and contemporary applications of computers in organizational environments.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 532 Software Development 3.0 Credits**

Provides a hands-on introduction to software development. Includes programming concepts and a series of programming exercises done by students working in pairs or in small groups. Also covers general concepts and issues in software development to help students understand why creating high quality software is very difficult.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

#### **INFO 540 Perspectives on Information Systems 3.0 Credits**

Examines various types of information systems and the ways in which these systems support activities of individuals and organizations. Investigates application architectures that occur commonly in information systems. Provides an overview of knowledge domains that comprise the information systems discipline.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 530 [Min Grade: C]

#### **INFO 552 Introduction to Web Design for Information Organizations 3.0 Credits**

Introduction to creating websites that incorporate interactive web services to support users in information organizations. Students learn to establish websites that meet usability, accessibility and intellectual property standards, via composition of text and graphic files, and use of scripts for interactive application to support community information resource needs.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 555 Introduction to Geographic Information Systems 3.0 Credits**

Explores the concepts and uses of geographic information systems (GIS). Structured as an applications-based course where students learn how to acquire, clean, integrate, manipulate, visualize and analyze geospatial data through laboratory work.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 560 Introduction to Archives I 3.0 Credits**

Provides an introduction to the theory and practice of archives, including an overview relating to the elements of an archival program and the role and work of archivists. Focuses on the functions of the archives, such as acquisition, appraisal, arrangement and description, preservation, reference, outreach, and technology in archives.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 561 Introduction to Archives II 3.0 Credits**

Continues the introduction to archival theory and practice begun in Introduction to Archives I. Provides additional depth in several areas, including appraisal, arrangement and description, focusing on model and standards. Addresses legal, ethical, cultural, and political issues as well as the range of historical and contemporary archival formats.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 560 [Min Grade: C]

**INFO 604 Object-Oriented Programming for Information Systems 3.0 Credits**

This course provides a hands-on introduction to object-oriented programming language. The language will be a class-based object-oriented programming language in common usage in industry. The class will cover classes, objects, constructors and destructors, access control, inheritance, and use of object libraries and language specific features.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 601 [Min Grade: C] or INFO 532 [Min Grade: C]

**INFO 605 Introduction to Database Management 3.0 Credits**

A first course in database management systems. Covers database design, data manipulation, and data-base integrity. Emphasizes concepts and techniques related to the entity-relationship model and relational database systems. Discusses normalization up to third normal form and commercial query languages.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C], INFO 530 [Min Grade: C] (Can be taken Concurrently)

**INFO 606 Advanced Database Management 3.0 Credits**

Examines both traditional database systems and recent advances in database systems. Topics include formal treatment of normalization and denormalization, extended entity-relationship models, advanced query processing techniques, query optimization, physical database design and indexing, and object-oriented database systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 601 [Min Grade: C] or INFO 532 [Min Grade: C]) and INFO 605 [Min Grade: C]

**INFO 607 Applied Database Technologies 3.0 Credits**

Covers principles and techniques related to data warehousing and online analytic processing (OLAP) as well as advanced database programming. Discusses dimensional modeling, OLAP, aggregation, ETL, physical data warehouse design, optimization techniques such as partitioning, indexing, star schema query optimization, and materialized views. Advanced database programming includes stored procedures, functions, and triggers.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] (Can be taken Concurrently) INFO 606 [Min Grade: C]

**INFO 608 Human-Computer Interaction 3.0 Credits**

Focuses on the physiological, psychological and engineering basis of design and evaluation of human-computer interfaces covering such topics as; theoretical foundation of HCI; cognitive modeling of user interactions; task analysis techniques for gathering design information; iterative design cycles; formative and summative usability testing; and project planning and report writing.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C], INFO 530 [Min Grade: C] (Can be taken Concurrently)

**INFO 610 Analysis of Interactive Systems 3.0 Credits**

Examines current methods in the analysis of interactive systems. Topics address the rationale and practices associated with techniques for assessing and evaluating how well they fit social and institutional context of use. Provides opportunities for both hands-on analysis work and reflection on theoretical foundations of interactive-systems analysis.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 608 [Min Grade: C]

**INFO 611 Design of Interactive Systems 3.0 Credits**

Examines current methods in the design of new interactive systems. Topics address the rationale and practices associated with techniques for assessing and modeling user and organizational needs, exploring design alternatives, communicating and justifying design choices, and prototyping designs. Provides opportunities for both hands-on design work and reflection on theoretical foundation of interactive systems design.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 608 [Min Grade: C]

**INFO 612 Knowledge Base Systems 3.0 Credits**

Introduces the concepts, principles, and techniques of knowledge base systems, with a focus on implementation of a working expert system. Presents the expert system development life cycle with a focus on analysis and conceptual modeling techniques.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]



**INFO 613 XML and Databases 3.0 Credits**

Introduces background and basics of XML and XML Schema. Focuses on storing and extracting XML data in Relational Database Systems. Covers the process of modeling real-world problems in XML. Investigates native XML database management systems. Discusses current issues in XML and XML storage research.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 604 [Min Grade: C] and INFO 605 [Min Grade: C]

**INFO 614 Distributed Computing and Networking 3.0 Credits**

Presents the fundamentals of data communications, networking, and distributed computing technologies. Focuses on the broad foundational coverage of key technologies as well as the key concepts in network planning, design, and management. Major topics include network models, data and voice communications, local-area and wide-area technologies, IP networks and their applications, internetworking (with an emphasis on the Internet), client/server systems, and distributed computing applications.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C], INFO 530 [Min Grade: C] (Can be taken Concurrently)

**INFO 616 Social and Collaborative Computing 3.0 Credits**

Examines selected human, social and technical issues and concepts of computer-supported cooperative work, computer-supported collaborative learning and social networking. Topics include: the way that groups work in the networked organization; analysis and design of groupware; social networking and community-learning technologies; and future directions of these technologies. Includes theoretical and research literature on the design of social and collaborative systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 608 [Min Grade: C]

**INFO 617 Introduction to System Dynamics 3.0 Credits**

Introduces simulation, particularly of business processes, using the principles of system dynamics.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 618 Computer-Supported Collaborative Learning 3.0 Credits**

Examines socio-technical issues and concepts of computer-supported collaborative learning (CSCL). Covers how individuals and groups learn in classes, teams and collaborations with computer support; theory of collaborative knowledge building; CSCL software design, implementation and evaluation issues, and future directions. Review of current research, literature, theories, issues, technologies, and methodologies.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 608 [Min Grade: D]

**INFO 620 Information Systems Analysis and Design 3.0 Credits**

Offers an advanced treatment of systems analysis and design with special emphasis on object-oriented analysis and design techniques based on the Unified Modeling Language (UML). Discusses major modeling techniques of UML including use-case modeling, class modeling, object-interaction modeling, dynamic modeling and state diagrams and activity diagrams, subsystems developments, logical design, and physical design.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 605 [Min Grade: C] and INFO 608 [Min Grade: C]

**INFO 621 Social Media Resource Design for Information Professionals 3.0 Credits**

Surveys applications and practices associated with immersive online experiences with web-based social networking tools and virtual reality environments. Provides expanded application of web design skills to foster development of participatory, social networked, web-based resources.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 552 [Min Grade: C] or INFO 652 [Min Grade: C])

**INFO 622 Content Representation 3.0 Credits**

Focuses on fundamental decisions in designing subject access systems and alternative approaches to indexing. Explores current issues in content representation of text and non-text information resources in information systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) or INFO 605 [Min Grade: C]

**INFO 624 Information Retrieval Systems 3.0 Credits**

Covers the theoretical underpinnings of information retrieval to provide a solid base for further work with retrieval systems. Emphasizes systems that involve user-computer interaction. Covers aspects of information retrieval including document selection, document description, query formulation, matching, and evaluation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 625 Cognition and Information Retrieval 3.0 Credits**

Applies cognitive processing and concept formation to the case of humans interacting with information storage and retrieval systems, including automated systems. Links theoretical models of cognitive processes to research studies that examine actual information-seeking behavior.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 626 Language Processing 3.0 Credits**

Studies the problems and techniques of automating human language use and understanding. Introduces different annotations of human language and examines how spoken language differs from written language. Includes syntactic inference, parsing, semantic interpretation, and natural language planning, and discusses how to combine analyses of spoken language with analyses of written language.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 601 [Min Grade: C] or INFO 532 [Min Grade: C]) and INFO 605 [Min Grade: C]

**INFO 627 Requirements Engineering and Management 3.0 Credits**

Provides students with an opportunity to explore and experience methodologies, tools, and techniques for eliciting, analyzing, specifying, and managing requirements in modern software development organizations. Focuses on the intersection of requirements engineering, strategic IS and business planning, and business process reengineering. Students will also learn about change management in requirements engineering context in response to a fast-paced, changing world. Upon completion of the course, each student should have new skills and insights that are immediately applicable to the performance of the requirements engineering project function.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 628 Information Systems Implementation 3.0 Credits**

Addresses issues involved in implementing an information system in the context of a real organization, including ensuring quality in the delivered system. Focuses on the detailed design, coding, test, and distribution aspects of software system implementation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 603 [Min Grade: C] and INFO 620 [Min Grade: C]

**INFO 629 Concepts in Artificial Intelligence 3.0 Credits**

Introduces the concepts, principles, and techniques of artificial intelligence (AI), with emphasis on its application to information systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C] (Can be taken Concurrently)

**INFO 630 Evaluation of Information Systems 3.0 Credits**

Focuses on the evaluation of software and software system development. Covers a variety of methodologies, techniques, and tools for measuring both software and software development attributes in modern software development organizations. Includes both graphical approaches for representing these attributes and statistical approaches for modeling various software relationships.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C]

**INFO 631 Information Technology Integration 3.0 Credits**

Focuses on integration of information technologies from an organizational perspective. Coverage includes IT Product and service selection and evaluation, impact of emerging technologies, standards, and vendor strategies. Emphasizes financial considerations including return on investment, time cost of money, depreciation, and system life.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]) and (INFO 532 [Min Grade: C] or INFO 601 [Min Grade: C]) and INFO 605 [Min Grade: C] and (INFO 534 [Min Grade: C] or INFO 614 [Min Grade: C])

**INFO 632 Information Services Design and Evaluation 3.0 Credits**

Offers perspectives on the design and evaluation of information services and products. Considers the distinguishing features of information organizations and units; the nature of service effectiveness; service quality; market positioning; client-provider relations; needs analysis; information valuation; information economics; information in organizations; and the introduction of information services innovations.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 633 Information Visualization 3.0 Credits**

Introduces concepts and principles of information visualization from both theoretical and practical perspectives. Emphasizes the development of critical thinking and problem solving abilities in the context of information visualization. Provides exposure to current information visualization tools.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 634 Data Mining 3.0 Credits**

This course introduces the concepts and principles of knowledge discovery in databases (KDD), with a focus on the techniques of data mining and its function in business, governmental, medical or other information-intensive environments.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 605 [Min Grade: C] and INFO 629 [Min Grade: C]

**INFO 635 Scholarly and Professional Communication 3.0 Credits**

Provides an overview of traditional and contemporary communication patterns and the generation and use of information in research, scholarly, and professional communities. Considers models of communication and information-seeking behavior underlying the development of these communities, formal and informal communication networks, and the structure of the literatures produced.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 636 Software Engineering Process I 3.0 Credits**

Focuses on behaviors and activities of individuals developing software with a disciplined software engineering approach. Provides hands-on experience in which students complete programming exercises using a defined software engineering process. Requires students to plan, estimate, measure, and analyze their work, and to define, analyze, and improve development processes and create process documentation.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 601 [Min Grade: C] or INFO 532 [Min Grade: C]) and INFO 630 [Min Grade: C] and INFO 638 [Min Grade: C]

**INFO 637 Software Engineering Process II 3.0 Credits**

Focuses on behaviors and activities of teams developing software with a disciplined software engineering approach. Provides hands-on experience in which students complete team activities using a defined software engineering process. Covers topics including planning and estimating for team projects, reviews and inspections, standards, software reuse, and configuration management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 636 [Min Grade: C]

**INFO 638 Software Project Management 3.0 Credits**

Focuses on first-line management of software system development. Covers major themes including estimation (software cost factors, estimation models, and risk management), planning (work breakdown, scheduling, staffing, resource allocation, and creation of a project plan), and execution (team building, leadership, motivation, process tracking, control recovery, and communication within and outside the project).

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C]

**INFO 640 Managing Information Organizations 3.0 Credits**

Introduces basic theories, approaches, and concepts of management as they apply to libraries, information centers, and information enterprises. Explores managerial principles, practices, and techniques needed to develop and enrich effective information organizations.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 515 [Min Grade: C] and INFO 520 [Min Grade: C] and (INFO 530 [Min Grade: C] or INFO 503 [Min Grade: C])

**INFO 643 Information Services In Organizations 3.0 Credits**

Examines various organizational structures and the influence of structure and environment on patterns of information processing and utilization by organizations. Emphasizes the role of function driving the demand for information. Focuses on the structure of information services, resources, and technology as a means of attaining organizational goals. Includes not only traditional business data but all forms of knowledge and emphasizes strategic and tactical uses.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 644 Knowledge Assets Management in Organizations 3.0 Credits**

Focuses on the nature, acquisition, and use of knowledge assets and their strategic role in organizations. Examines the role of information professionals in organizing, managing, and providing access to these important assets using formal and informal knowledge management systems.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 643 [Min Grade: C]

**INFO 646 Information Systems Management 3.0 Credits**

Addresses information technology-enabled change and policy issues in the management of information systems (IS). Stresses systems development, staffing and organization, technology infrastructure, project selection, justification and funding, and data. Studies the issues and their resolution in the context of an IS plan. Emphasizes communication about the issues to senior management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 620 [Min Grade: C]

**INFO 648 Healthcare Informatics 3.0 Credits**

The course presents an overview of all aspects of healthcare informatics, including medical, nursing and bioinformatics. It provides an introduction to the applications of information systems in a variety of healthcare environments, including education, research and clinical settings. It includes extensive reading and critical discussion of relevant professional research literature.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 649 Library Programming 3.0 Credits**

Provides an overview of the broad range of cultural, educational, and social library programming initiatives available for children, adolescents, and adults in academic libraries, public libraries, and school library media centers. Teaches community analysis, planning and evaluation. Emphasizes the collaborative nature of developing and implementing library programs.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C])

**INFO 650 Public Library Service 3.0 Credits**

Surveys information services provided through public libraries, with attention to governmental and funding issues, determinants of use, extending services to non-users, and cooperation among libraries.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 511 [Min Grade: C] (Can be taken Concurrently) or INFO 521 [Min Grade: C] and INFO 520 [Min Grade: C]

**INFO 651 Academic Library Service 3.0 Credits**

Examines the role of library service in higher education, with emphasis on problems of organization, administration, services, and the relationship of the library to the overall educational program.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 520 [Min Grade: C] and (INFO 521 [Min Grade: C] or INFO 511 [Min Grade: C])

**INFO 653 Digital Libraries 3.0 Credits**

This course introduces research and development in the world of digital libraries. Focuses on intellectual access to digital information resources. Topics include foundations and architectures of digital libraries, searching and resource organizing, knowledge representations and discovery, metadata and standards, interfaces and information visualization, intellectual property rights and electronic publishing.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 624 [Min Grade: C] or INFO 652 [Min Grade: C] or INFO 552 [Min Grade: C]

**INFO 655 Intro to Web Programming 3.0 Credits**

Provides a hands-on workshop in programming for Internet information systems using an appropriate programming language (Java is used currently). Covers fundamental concepts such as object-oriented programming, client-server programming, multi-threaded programming, graphical user interface design, and application development.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 532 [Min Grade: C] or INFO 601 [Min Grade: C]

**INFO 656 Internet Information Systems II 3.0 Credits**

This course provides additional design and programming skills for the development of Internet information systems with an emphasis in server-side programming. It covers various web servers, applications servers, and other server technologies, as well as tools and methods for creating dynamic web-based information systems. It discusses issues related to the development of server-based information on the web.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 655 [Min Grade: C]

**INFO 657 Digital Library Technologies 3.0 Credits**

Introduces technologies that enable the design and implementation of digital libraries. Focuses on hands-on activities relating to content description technologies (such as XML) systems technologies, and user interface technologies. Students learn through building components of digital libraries collaboratively.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 652 [Min Grade: C] or INFO 552 [Min Grade: C]) and INFO 653 [Min Grade: C]

**INFO 658 Information Architecture 3.0 Credits**

Introduces fundamental concepts, methods and theories in Information Architecture for virtual, physical, and hybrid worlds. Focuses on organization, representation, and navigation of conceptual space. Topics include foundations, Web design, cognitive aspects, search, interaction design, knowledge organization, and user experience.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 652 [Min Grade: C] or INFO 552 [Min Grade: C]

**INFO 660 Cataloging and Classification 3.0 Credits**

Introduces and provides intensive practice in the fundamentals of library cataloging and classification with primary focus on modern printed materials, but also includes reference to other media. Instruction on critical reading, interpretation, and use of current professional standards and documentation for the creation of MARC records. Encompasses discussion of relevant historical and theoretical issues in the construction of contemporary bibliographic databases.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 522 [Min Grade: C] (Can be taken Concurrently) or INFO 510 [Min Grade: C]

**INFO 661 Cataloging Special Materials 3.0 Credits**

Introduces and provides intensive practice in the fundamentals of descriptive cataloging for non-print materials (e.g., audio/visual, electronic, graphic, sound, three-dimensional) and special print materials (e.g., archival/manuscript collections, books printed before 1800, serials, sheet music). Explores emerging trends and practices.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 660 [Min Grade: C]

**INFO 662 Metadata and Resource Description 3.0 Credits**

Introduces the critical roles played by metadata for resource description and discovery. Provides instruction on application and implementation of current metadata schemes and tools. Provides practice in creating metadata records, analyzing the usage of metadata elements and vocabulary schemes, and evaluating the metadata quality of digital repositories.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 622 [Min Grade: C] or INFO 660 [Min Grade: C]

**INFO 663 Library Technical Services 3.0 Credits**

Focuses on management, policy, and organizational issues related to the administration of technical services in libraries. Includes acquisitions, copy cataloging, original cataloging, serials control, circulation, and preservation. Emphasizes management in an automated environment where traditional methods are being supplanted by new technologies and related organizational changes.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 660 [Min Grade: C]

**INFO 664 Library Automation 3.0 Credits**

Provides an overview of information technology applications in library settings, focusing on underlying concepts and management issues.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]) and (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 665 Collection Management 3.0 Credits**

Introduces the basic steps of collection management, including community analysis, planning, policy preparation, selecting & acquiring materials, evaluating, preserving and publicizing collections. Explores a variety of related issues, including the impact of user expectations, publishing trends, electronic access, resource sharing, and outsourcing, on collection management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 511 [Min Grade: C], INFO 521 [Min Grade: C] (Can be taken Concurrently) INFO 520 [Min Grade: C]

**INFO 666 Serial Literature 3.0 Credits**

Provides an overview of serial publishing, including selection, acquisition, handling, and bibliographic control of serials. Covers current trends in serials management, including organization of serials work, manual and automated methods of serials control, resource sharing, and issues in serials public service.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 667 Research Collections 3.0 Credits**

Examines the work of subject specialists in large libraries with multinational collections in history, literature, the social sciences, and area studies. Surveys acquisition arrangements, resource-sharing plans, and collection evaluation techniques. Introduces foreign and international resources, including national and trade bibliographies, government documents, archival collections, and microforms, in both English and foreign languages.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 515 [Min Grade: C] and INFO 520 [Min Grade: C] and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C])

**INFO 668 History of the Book 3.0 Credits**

Examines the history of written knowledge representation through manuscripts, books, digital media, and other forms in western culture, from the classical age to the present day. Topics include cultures of reading, social impact of texts, methods of production, distribution, and classification, and historical influences such as church, state, and economy.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and INFO 520 [Min Grade: C]

**INFO 669 Special Collections 3.0 Credits**

Provides an overview of special collections environments and focuses on the skills required of information professionals in such environments. Special collections can include both modern and historical collections of printed materials, manuscripts, artifacts, art works, audio and visual materials, and digital materials. The unique aspects of collection management, acquisitions, reference, and cataloging and arrangement for special collections are considered, along with print and digital exhibitions, publications, and outreach.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C])

**INFO 672 Resources in the Humanities 3.0 Credits**

Studies the major information resources in the fields of religion, philosophy, the performing arts, the visual arts, language, and literature. Emphasizes user needs, bibliographic organization of the materials, collection building, and the provision of reference and information services.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 673 Resources in Social Sciences 3.0 Credits**

Studies major information resources in the social sciences, including history, geography, political science, sociology, anthropology, psychology, demography, economics, and education. Emphasizes bibliographic organization, collection building, user needs, and reference service.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 674 Resources in Science and Technology 3.0 Credits**

Studies major information resources in pure and applied sciences, including the physical and biological sciences, engineering and technology, and interdisciplinary subjects. Emphasizes bibliographic organization, collection building, user needs, and reference service.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 675 Resources in the Health Sciences 3.0 Credits**

Introduces students to the information needs encountered in the health sciences, and the sources and services designed to meet them. Students learn to access, retrieve, analyze and present information from a variety of sources including databases of several types. Teaching the steps in evidence-based practice, and surveys broadly the provision of health information services.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C])

**INFO 677 Resources in Business 3.0 Credits**

Focuses on meeting user needs for specific types of business information using strategies for identification, evaluation, selection, and use of specific sources. Sources include topical dictionaries and directories; indexes and abstracts; and numeric and full-text databases. Emphasizes the use of value-added print and electronic resources to meet user needs for information related to companies, industries and markets; corporate and international finance and investments; economic and demographic statistics; and one or more of the following topics: accounting, human resources, insurance and risk management, intellectual property, information systems, operations and logistics.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 678 Competitive Intelligence 3.0 Credits**

Focuses on the analysis of existing information in order to uncover hidden knowledge about the environment internal and external to (or competing with) an organization. Examines how to analyze and integrate various types of information (patents, financial, production, market); how to use the new knowledge in strategic, tactical and operational decision-making; how to produce reports; and the ethics of competitive intelligence.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 643 [Min Grade: C] and (INFO 624 [Min Grade: C] or INFO 674 [Min Grade: C] or INFO 675 [Min Grade: C] or INFO 677 [Min Grade: C] or INFO 680 [Min Grade: C] or INFO 681 [Min Grade: C])

**INFO 679 Information Ethics 3.0 Credits**

Presents the philosophical foundations of applied ethics and technology with primary focus on the uses and abuses of information, human moral agency in relation to new information and communication technologies, and the meaning of social responsibility in the global information society, including the concepts of global information justice and human rights.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 680 US Government Information 3.0 Credits**

Studies the nature of United States federal government documents and techniques for their acquisition, organization, and use.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 511 [Min Grade: C], INFO 521 [Min Grade: C], INFO 510 [Min Grade: C] (Can be taken Concurrently) or INFO 522 [Min Grade: C])

**INFO 681 Legal Research 3.0 Credits**

Introduces the fundamentals of legal research, including sources and research strategies.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C]) and (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C])

**INFO 682 Storytelling 3.0 Credits**

Provides an overview of the study and practice of storytelling in face-to-face and digital environments. Familiarizes students with a wide range of print and digital storytelling resources from a variety of world cultures. Focuses on oral presentation and organization skills.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 683 Resources for Children 3.0 Credits**

Acquaints prospective professionals with the resources published for use by and with children in grades K to 8. Provides an opportunity to develop basic standards for evaluation of resources. Includes recent research concerning children and the central role of resources in the development of their reading/viewing/listening interests and tastes.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 684 Resources for Young Adults 3.0 Credits**

Acquaints prospective professionals with the materials intended for use by and with young adults. Provides an opportunity to develop basic standards for evaluation of materials and to learn about recent research concerning young adults and their information needs, reading interests, tastes, and development.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 510 [Min Grade: C], INFO 522 [Min Grade: C], INFO 511 [Min Grade: C], INFO 521 [Min Grade: C] (Can be taken Concurrently)

**INFO 688 Instructional Role for the Information Specialist 3.0 Credits**

Examines the instructional role of the information professional. Emphasizes the planning, implementation, and evaluation of instruction for the purpose of information education.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 701 Career Integrated Education I 3.0 Credits**

This course provides relevant off-campus employment for students wanting to strengthen their work skills. It is particularly useful for students changing careers, for international students hoping to gain work experience in the U.S., and for students seeking to work abroad.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 702 Career Integrated Education II 3.0 Credits**

This course is a continuation of INFO 701. It provides relevant off-campus employment for students wanting to strengthen their work skills. It is particularly useful for students changing careers, for international students hoping to gain work experience in the U.S., and for U.S. students seeking to work abroad.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 701 [Min Grade: C]

**INFO 710 Information Forensics 3.0 Credits**

Focuses on the principles and practices of the forensic investigation and analysis of information in modern organizations and distributed information systems. Includes studies of information processes, events, time measurement, casual factors, information volatility, technical and procedural forensic methods, rules of evidence and case law.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 712 Information Assurance 3.0 Credits**

Describes how to protect an organization's information resources and assets within national and international context. Topics include organizational policies and assurance requirements, relationships between assurance and security, and information assurance planning assessment and management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 714 Information Systems Auditing 3.0 Credits**

Discusses modern principles and practices of information systems and technologies auditing. Topics include IT governance, information systems risks and controls, the audit process, auditing standards, legal and ethical issues, auditing of IT development and planning assessment and management process, auditing standards, legal and ethical management, and forensic auditing.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 717 Cyber-Computer Crime Law 3.0 Credits**

Surveys the legal issues raised by computer-related crime. Covers criminal law—the structure of the laws relating to computer crime. Examines the nature and function of the privacy laws that regulate investigations of computer-related crime. Evaluates how competing jurisdictions work together or independently to investigate and prosecute computer-related crimes.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 517 [Min Grade: C]

**INFO 718 Cybersecurity, Law and Policy 3.0 Credits**

Examines issues relating to the organization of the Internet and the government's response to cyber threats. Introduces policy/legal concepts relating to the private sector and civilian government engagement in cyberspace. Examines the application of traditional laws of armed conflict to the new cyber domain and public policy issues surrounding cyberspace.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 517 [Min Grade: C]

**INFO 720 Data Mining in Bioinformatics 3.0 Credits**

Provides an introduction to data mining in bioinformatics, focusing on methods and applications in biological datasets. Topics include: DNA/protein sequence analysis and alignment techniques, data mining approaches to protein and gene expression analysis, and life science database management.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 605 [Min Grade: C]

**INFO 725 Information Policy 3.0 Credits**

Provides an introduction to the fundamentals and issues of information policy, including an introduction to fundamental policies in early and recent government documents and issues relating to the practical development and implement of information policies for a variety of organizations, companies and governments.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 731 Organization & Social Issues in Healthcare Informatics 3.0 Credits**

Presents an overview of sociotechnical issues in healthcare informatics, focusing on patient care and biomedical research settings. Deals with the human, social, and technological aspects of healthcare IT. Focuses on the role of information professionals in applied healthcare IT settings.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 648 [Min Grade: C]

**INFO 732 Healthcare Informatics: Planning & Evaluation 3.0 Credits**

Introduces planning and evaluation of healthcare informatics applications. Through critical reading, students learn the planning and evaluation cycle and become familiar with quantitative and qualitative methods and measures. Through lectures and assignments, students select a healthcare problem, formulate a problem statement, select evaluation methods and measures and write a proposal.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 648 [Min Grade: C]

**INFO 733 Public Health Informatics 3.0 Credits**

Presents an overview of issues, methods and tools of public health informatics. Explores topics including knowledge management, literacy skills for the public health provider and the health consumer, public health surveillance systems, public health applications of clinical data, Geographic Information Systems (GIS), and eHealth/mHealth applications.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 648 [Min Grade: C] or PBHL 516 [Min Grade: C]

**INFO 740 Digital Reference Services 3.0 Credits**

Presents an overview of digital reference services with hands on experience. Prepares students to become managers of digital reference services by exploring question answering services, developing virtual collections, exploring the state of the art in digital reference, and discussing issues related to digital reference services.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 510 [Min Grade: C] or INFO 522 [Min Grade: C]) and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 745 Special Libraries and Information Centers 3.0 Credits**

Focuses on current issues and future trends affecting and defining special libraries and information centers. Provides an overview of the unique aspects of the social, political and business environments in which special libraries operate with an emphasis on management, operations, services and the distinctive needs of users in different types of special libraries and information centers.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 520 [Min Grade: C] and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 748 Museum Informatics 3.0 Credits**

Provides an introduction to managing the interactions among people, information, and technology in museum settings including identifying audience/stakeholder information needs, determining appropriate opportunities for informatics, evaluating design/implementation, and keeping abreast of new technology. Focuses on factors involved in making decisions about implementing informatics initiatives including financial, legal, and ethical issues.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 520 [Min Grade: C] and (INFO 511 [Min Grade: C] or INFO 521 [Min Grade: C])

**INFO 750 Archival Access Systems 3.0 Credits**

Introduces students to the creation, maintenance, and evaluation of archival access systems. Covers the theoretical concepts that underlie archival description and their evolution into the current set of electronic information systems. Reviews current descriptive standards. Addresses user needs and different formats.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 561 [Min Grade: C]

**INFO 751 Archival Appraisal 3.0 Credits**

Introduces students to the theory and practice surrounding the core function of selection and appraisal of records and papers enduring value. Focuses on the development of methodologies as well as approaches used in different settings, for different audiences, and for various formats of material.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 561 [Min Grade: C]

**INFO 755 Electronic Records Management 3.0 Credits**

Presents records management theory and practice from the perspective of the archivist. Covers the transformation of the profession and its practices as it adapts to electronic record keeping. Introduced records management principles and applies them to the contemporary digital office environment. Relates records management concepts to other information management disciplines.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 756 Digital Preservation 3.0 Credits**

Explores concepts, principles, and practice for preserving digital information resources. Topics include selection, organization, and access for materials in trusted repositories. Both technological and policy perspectives are addressed.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]

**INFO 780 Special Topics 2.0-12.0 Credits**

May be repeated for credit if topic varies.

**College/Department:** College of Information Science Technology

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

**INFO 782 Issues in Informatics 3.0 Credits**

Examines recent developments in a selected informatics area as a case study. Focuses on research results and leading edge application of information technology in practice. Helps students prepare for success in information science and technology fields. Addresses issues and methods for maintaining technical knowledge throughout a professional career.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** (INFO 503 [Min Grade: C] or INFO 530 [Min Grade: C]) and (INFO 532 [Min Grade: C] or INFO 601 [Min Grade: C]) and INFO 605 [Min Grade: C] and (INFO 534 [Min Grade: C] or INFO 614 [Min Grade: C])

**INFO 799 Independent Study 2.0-12.0 Credits**

Provides individual investigation in special areas of information science and technology not regularly covered in the courses offered. Topic for study must be approved, in advance of registration, by the faculty adviser, the instructor involved, and the associate dean. May be repeated for credit if topic varies.

**College/Department:** College of Information Science Technology

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

**INFO 811 Applied Research Methods 3.0 Credits**

Provides an overarching understanding of several applied research methodologies that are relevant to decision makers, practitioners and scholars. Stresses identification of the appropriate research methodology for a given problem, as well as the advantages and disadvantages of each. Emphasizes real-world factors associated with the research process.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.



**INFO 812 Research Statistics I 3.0 Credits**

This course provides the knowledge and tools necessary for conducting and understanding many types of empirical studies in the field of information science. It examines the fundamentals of descriptive and inferential statistics, and hypothesis testing. It covers analysis of variance and introduces regression. Students gain practical experience with a statistical package such as SPSS.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 813 Quantitative Methods 3.0 Credits**

Introduces research designs and methods of quantitative analysis for various problems in information systems, management of information resources, and scholarly and professional communication. Presents statistical techniques through packaged computer programs.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 816 Qualitative Research Methods 3.0 Credits**

Provides doctoral students with an opportunity to explore and experience qualitative research methods, tools, and techniques, with emphasis on historical, philosophical, and theoretical underpinnings of the qualitative perspective. Concerned with analysis of the social construction and reproduction of human activity. Explores interpretive research methods that try to analyze social sense-making.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** INFO 811 [Min Grade: C]

**INFO 830 Issues in Information Studies 3.0 Credits**

This doctoral seminar course examines a current research topic in library information science or information systems. Students may repeat the course in different research topics.

**College/Department:** College of Information Science Technology

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

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** INFO 861 [Min Grade: C] and INFO 863 [Min Grade: C]

**INFO 861 Topics in Information Science 3.0 Credits**

This course introduces students to the community of practice in information science research by a broad introduction to a common body of knowledge. It helps prepare students to join in the collective work to expand that body of knowledge. It covers a variety of the most important texts and papers in the field of information science. Must have doctoral student status or master student with permission of instructor.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 863 Topics in Information Systems 3.0 Credits**

This course introduces students to the community of practice in information systems research by a broad introduction to a common body of knowledge. It helps prepare students to join in the collective work to expand that body of knowledge. It covers a variety of the most important texts and papers in the field of information systems. Must have doctoral student status or master student with permission of instructor.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 865 Seminar in Research Methodology 3.0 Credits**

Centers around the creation of a research proposal. Emphasizes problem identification, research problem statement, hypothesis construction, ethnographic methods of inquiry, validity, and reliability. Must have doctoral student status or master student with permission of instructor.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**Prerequisites:** INFO 515 [Min Grade: C]

**INFO 866 Seminar in Information Systems Research 3.0 Credits**

Examines interdisciplinary information systems theory and research. Combines quantitative and qualitative methods in such areas as conceptual modeling, simulation, and human factors research. Considers research literature in both experimentation and design. Must have doctoral student status or master student with permission of instructor.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Restrictions:** Can enroll if program is PHD.

**INFO 891 Twelve-Week School Library and Media Center Field Study 6.0 Credits**

Designed to give practical experience to students in managing libraries and media centers. Provides supervised field experience in two selected school library media centers for students without teaching certification. Class discussions are offered online and accompany the on-site experience.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 525 [Min Grade: C]

**INFO 892 Six-Week School Library and Media Center Field Study 3.0 Credits**

Designed to give practical experience to students in managing libraries and media centers. Provides supervised field experience in a selected school library media center for students who already hold teaching certification. Class discussions are offered online and accompany the on-site experience.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 525 [Min Grade: C]

**INFO 893 Practicum I 3.0 Credits**

Provides relevant professional experience that will strengthen work skills. Particularly useful for students without prior work experience, career changers, or those exploring possible work environments. Associated academic coursework provides the opportunity to more deeply explore professional issues, and places the practical work experience within the context of larger workplace trends.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**INFO 894 Practicum II 3.0 Credits**

Provides relevant professional experience that will strengthen work skills. Particularly useful for students without prior work experience, career changers, or those exploring possible work environments. Associated academic coursework provides the opportunity to more deeply explore professional issues, and places the practical work experience within the context of larger workplace trends.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 893 [Min Grade: C]

**INFO 895 Workshop 3.0 Credits**

Considers special issues and problems in information science and technology in a series of short courses and workshops.

**College/Department:** College of Information Science Technology

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

**INFO 896 Clinical Experience 3.0 Credits**

Provides exposure to an approved clinical environment in which healthcare is delivered. Associated academic course work enables students to explore in greater depth a focused topic in health informatics. Required for students who lack prior clinical experience.

**College/Department:** College of Information Science Technology

**Repeat Status:** Not repeatable for credit

**Prerequisites:** INFO 530 [Min Grade: C] and INFO 605 [Min Grade: C] and INFO 608 [Min Grade: C] and INFO 614 [Min Grade: C] and INFO 648 [Min Grade: C] and INFO 731 [Min Grade: C]

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

Provides individual work on an approved topic leading to a doctoral dissertation in information science and technology.

**College/Department:** College of Information Science Technology

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

**Restrictions:** Can enroll if program is PHD.

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