Drexel University
Catalog 2007 / 2008

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The College of Information Science and Technology

Founded in 1892, the College offers programs leading to a Master of Science (Library and Information Science), a Master of Science in Information Systems (M.S.I.S.), and a Ph.D.

Both 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 (M.S.S.E.) degree. Opportunities for professional development are available at the post-master's level or a post-master's certificate of advanced study (C.A.S.).

The College of Information Science and Technology is also known as "The *iSchool* at Drexel." This identity highlights the College's participation in The I-Schools Caucus, and its status as a founding member of the organization. The I-Schools Caucus is a national 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 College of Information Science and Technology web site.

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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

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Master of Science (Library and Information Science)

Learning Objectives of the M.S. Degree

Graduates of the M.S. program (Library and Information Science) are prepared to assume leadership positions in 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 M.S. program (Library and Information Science) is accredited by the American Library Association.

Professional Affiliation for M.S. Students

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

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Master of Science (Library and Information Science)

Curriculum

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. The electives may also include up to 9 credit hours chosen from INFO 780 (Special Topics), INFO 799 (Independent Study), and related graduate courses taken in other departments of Drexel or another area university.

In exceptional cases a student with broad professional experience in library and information science, or previous coursework in library or information science, and well-defined educational goals 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 description of the program the applicant proposes to follow at Drexel. No exemptions are possible for INFO 503 or INFO 520.

Courses		Credits
INFO 503	**Introduction to Information Systems Analysis**	3.0
INFO 510	**Information Resources and Services I**	3.0
INFO 511	**Information Resources and Services II**	3.0
INFO 515	**Action Research**	3.0
INFO 520	**Professional and Social Aspects of Information Services**	3.0
INFO 640	**Managing Information Organizations**	3.0
Electives		
	Free electives	27.0
	Total Credits	**45.0**

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Online M.S. (Library and Information Science)

The online Master of Science (M.S.) degree with specializations in Management of Digital Information (MDI), Information/Library Services (I/LS) and Youth Services, is IST's second full master's degree program provided via the Internet. The online program has a strong technological focus and offers an innovative M.S. curriculum to a wider professional audience.

Students may choose to follow a specialization track or design a personalized curriculum in consultation with their advisor and mentor. The specialization in *Management of Digital Information* provides a unique opportunity for careers that apply new information technologies. The specialization in *Information/Library Services* provides a strong combination of technical and public service courses that can lead to an entry-level position in public, academic, or special libraries. These specializations are applicable to people who are interested in competitive intelligence, web development, library automation, systems librarianship, knowledge management, and reference services in a variety of library settings. The *Youth Services* specialization focuses on the information needs of children and young adults, particularly in school and public libraries.

For more information about this program online, visit the M.S. (Library and Information Science) Drexel eLearning web page.

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Special Options

School Library/Media Specialist (SLMS) Program
The master's and post-master's programs accommodate candidates for Pennsylvania Department of Education (PDE) Library Science K-12 certification. M. S. students follow the SLMS prescribed program to complete the M.S. ALA-accredited degree and the PDE certification requisites. Post-master's students are required to hold an ALA-accredited degree to enroll and follow appropriate courses from the prescribed program to fulfill the PDE requirements.

Temple Archives Option
Students interested in archiving, archives management, and/or historical documents have the option of earning graduate credits by taking courses in Temple University's history department. The archiving sequence consists of Introduction to Archives and Manuscripts, Research in Archives and Manuscripts, and Internship in Archives. This sequence satisfies the educational requirement for individuals desiring to qualify for the Certified Archivists (CA) examination.

View the College of Information Science and Technology's web site for more information about these special options available to students pursuing a master's degree in library and informaton science.

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Master of Science in Information Systems

Learning Objectives of the M.S.I.S. Degree
Graduates of the M.S.I.S. 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.

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Master of Science in Information Systems

Curriculum
The M.S.I.S. program requires 45 credits.

Foundation Courses
Courses required to satisfy these foundation courses do not count toward the credit requirements for the MSIS.

- INFO 503 Introduction to Information Systems Analysis or INFO 530 Information Systems Analysis
- INFO 601 Computer Programming or INFO 532 Software Development
- INFO 605 Database Management I
- INFO 614 Distributed Computing and Networking or INFO 534 Networking Applications
- BUSN 501 Measuring and Maximizing Financial Performance

The distribution of credits for the M.S.I.S. degree is as follows:

Required courses		24.0 Credits
INFO 540	**Introduction to Information Systems Analysis**	3.0
INFO 608	**Human-Computer Interaction**	3.0
INFO 620	**Information Systems Analysis and Design**	3.0
INFO 630	**Evaluation of Information Systems**	3.0
INFO 631	**Information Technology Integration**	3.0
INFO 638	**Software Project Management**	3.0
INFO 646	**Information Systems Management**	3.0
INFO 782	**Issues in Informatics**	3.0

Concentration requirements
Completion of at least one of the following concentrations is required for the degree.

Database Systems		12.0 Credits
INFO 606	**Database Management II**	3.0
INFO 607	**Applied Information and Database Technology**	3.0
INFO 613	**Extensible Markup Language (XML) and Databases**	3.0
INFO 634	**Data Mining**	3.0

Information Architecture	12.0 Credits

Students select four of the following courses.

INFO 622	**Content Representation**	3.0
INFO 633	**Information Visualization**	3.0
INFO 624	**Information Retrieval Systems**	3.0
INFO 625	**Cognition and Information Retrieval**	3.0
INFO 658	**Information Architecture**	3.0

Software Process		12.0 Credits
INFO 627	**Requirements Engineering and Management**	3.0
INFO 628	**Information Systems Implementation**	3.0
INFO 636	**Software Engineering Process I**	3.0
INFO 637	**Software Engineering Process II**	3.0

Human-Computer Interaction		12.0 Credits
INFO 610	**Analysis of Interactive Systems**	3.0
INFO 611	**Design of Interactive Systems**	3.0
INFO 616	**Computer-Supported Cooperative Work**	3.0
INFO 626	**Language Processing**	3.0

Web Systems and Services (offered on campus only)		12.0 Credits
INFO 613	**Extensible Markup Language (XML) and Databases**	3.0
	Web Systems and Services I	3.0
	Web Systems and Services II	3.0
	Web Systems and Services III	3.0

Information Security and Assurance (offered on campus only)		12.0 Credits
	Web Systems and Services II	3.0
INFO 710	**Information Forensics**	3.0
INFO 712	**Information Assurance**	3.0
INFO 714	**Information Systems Auditing**	3.0

Electives		
	Free electives*	9.0

*Students may take any master's-level IST course with the exception of INFO 503, 530, 601, 532, 614, 534, 605, 652, 510, 511 and BUSN 501. If selecting a course outside Drexel University students should seek approval of Advisor. See the Department's pre-approved electives list for additional details.

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Online M.S.I.S.

For students whose professional or personal commitments prevent them from attending regular class meetings, the M.S.I.S. is available online. Classes are conducted completely online, providing an intensive learning experience with the same content and quality as the degree available through the University's traditional campus-based master's program.

For more information about this program online, visit the M.S.I.S. Drexel eLearning web page.

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Master of Science in Software Engineering

Drexel University's Master of Science in Software Engineering (M.S.S.E.) degree program was created in response to the growing importance of software to the national infrastructure and the rapid rise in demand for professional software engineers.

All students in the M.S.S.E. program take a core curriculum that spans the scope of disciplinary areas relevant to the degree, thereby providing a common foundation for all students in the program. Students also elect an area of concentration, or track — a cohesive, more specialized set of courses that builds on the core to support each student's particular career interest. Three tracks are available: information science and technology, computer science, and engineering. Students in all tracks are encouraged to participate in Drexel's Career Integrated Education (CIE) program if they do not have prior or current work experience. The average time to complete this master's degree is two years of full-time study or three years of part-time study.

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Master of Science in Software Engineering

Degree Requirements

Degree requirements vary by track. All students take the required six core courses (18 credits).

Core Courses

Core courses cover topics that are essential for the practicing software engineer.

Core Courses		18.0 Credits
Computer science courses		
CS 575	**Software Design**	3.0
CS 576	**Dependable Software Systems**	3.0
Electrical and computer engineering courses		
ECEC 500	**Fundamentals of Computer Hardware**	3.0
ECEC 600	**Fundamentals of Computer Networks**	3.0
Information science and technology courses		
INFO 627	**Requirements Engineering and Management**	3.0
INFO 638	**Software Project Management**	3.0

Tracks

Students in each track follow the policies determined by the respective College.

Information Science and Technology Track

Track Coordinator:
Dr. Eileen Abels, 215-895-6274, eileen.abels@ischool.drexel.edu

This track supports students interested in applying software engineering to information systems problems in commercial organizations and other settings. The principal focus is the process by which user and system requirements are converted into cost-effective, maintainable software systems. This is complemented by a concern for defining, creating, understanding, and evaluating the full range of software life-cycle products. The track places particular emphasis on information systems methodologies such as human-computer interaction, requirements analysis, modeling, and validation, along with the use of off-the-shelf tools and components to assist in software processes.

Students in the information science and technology track take a total of nine track courses: four required track courses, three courses selected from the track distribution courses, and two courses selected from the distribution courses or other approved electives. This track requires a total of 45 credits, 18 of which are from the

required core. CIE is available for up to six credits which do not count toward graduation. Hence, the CIE option requires students to take six credits more than the non-CIE option.

Required courses		12.0 Credits
INFO 608	**Human-Computer Interaction**	3.0
INFO 630	**Evaluation of Information Systems**	3.0
INFO 636	**Software Engineering Process I**	3.0
INFO 637	**Software Engineering Process II**	3.0

Distribution courses		9.0 Credits
INFO 606	**Database Management II**	3.0
INFO 607	**Applied Information and Database Technology**	3.0
INFO 610	**Analysis of Interactive Systems**	3.0
INFO 611	**Design of Interactive Systems**	3.0
INFO 620	**Information Systems Analysis and Design**	3.0
INFO 631	**Information Technology Integration**	3.0
INFO 646	**Information Systems Management**	3.0

Two Elective courses		6.0 Credits
INFO 612	**Knowledge Base Systems**	3.0
INFO 613	**XML and Databases**	3.0
INFO 616	**Computer-Supported Cooperative Work**	3.0
INFO 617	**Introduction to System Dynamics**	3.0
INFO 634	**Data Mining**	3.0
INFO 780	**Special Topics**	3.0

Computer Science Track

Track Coordinator: Dr. Spiros Mancoridis, 215-895-6824, spiros@drexel.edu

The computer science track welcomes students who are interested in a variety of technical topics pertaining to the development of software systems such as databases, networks, operating systems, graphics and animation systems, compilers, expert systems, and systems for scientific computing. Students will use languages and apply techniques to specify, design, implement, test, and maintain software systems.

Students in the computer science track take 9 courses in addition to the 6 core courses. Of the 9 courses, 4 courses must be from one of the six concentrations. The other 5 courses are electives that may be fulfilled by any course offered for the M.S.S.E. degree.

Students in their final 3 quarters of study who have a 3.5 GPA or better may take a 9-credit project instead of 3 elective courses. To register for a project, the student must select a project advisor (a member of the CS faculty who is willing to supervise). The project is a large-scale software development effort in which students specify, design, implement, and test a significant software system.

CIE is also available for up to 6 credits. Hence, the CIE option requires students to take 6 credits more than the non-CIE option.

Concentration courses		Credits
Computing systems concentration		
CS 543	Operating Systems	3.0
CS 643	Advanced Operating Systems	3.0
CS 544	Computer Networks	3.0
CS 741	Computer Networks II	3.0
CS 645	Cryptography and Network Security	3.0
CS 675	Software Reverse Engineering	3.0
Programming languages concentration		
CS 525	Theory of Computation	3.0
CS 550	Programming Languages	3.0
CS 551	Compiler Construction I	3.0
CS 552	Compiler Construction II	3.0
CS 675	Software Reverse Engineering	3.0
CS 680	Special Topics in Computer Science: Program Generation and Optimization	3.0
User interface software concentration		
CS 536	Computer Graphics	3.0
CS 636	Advanced Computer Graphics	3.0
CS 530	Developing User Interfaces	3.0
CS 630	Cognitive Systems	3.0
CS 680	Special Topics in Computer Science: Game Design and Implementation	3.0
PSY 612	Psychology of Human-Computer Interaction Design	3.0
Artificial intelligence concentration		
CS 510	Artificial Intelligence	3.0
CS 610	Advanced Artificial Intelligence	3.0
CS 612	Knowledge-Based Agents	3.0
CS 511	Robot Building Laboratory	3.0
Scientific computation concentration		
CS 668	Computer Algebra I	3.0
CS 669	Computer Algebra II	3.0
CS 680	Special Topics in Computer Science: Methods I	3.0
CS 680	Special Topics in Computer Science: Methods II	3.0
CS 540	High Performance Computing	3.0
CS 567	Applied Symbolic Computing	3.0
CS 676	Parallel Programming	3.0

For additional information on the Computer Science Track, as well as an FAQ, visit the Department of Computer Science's Master of Science in Software Engineering web page.

Engineering Track

Track Coordinator: Dr. Leonid Hrebien, 215-895-6755, lhrebien@ece.drexel.edu

Students in this track pursue techniques to model engineering problems and offer software solutions. The courses in this track emphasize problems facing engineering industries including electrical, mechanical, environmental, chemical, and others. Systems modeling and simulation techniques will be used to solve these problems.

Students in this track take 27 or more credits of track courses in addition to the 18 credits of required core courses. Three computer engineering courses are required; the other courses are from one of five concentrations. A total of 45 approved graduate credits are required for the M.S.S.E., including the 18 credits of core courses. Students opting for the CIE option are required to complete 51 approved credits, including 6 CIE credits.

For more information on curriculum requirements, visit the Department of Electrical and Computer Engineering's Graduate Student Guide.

Courses		Credits
ECEC 511	**Issues in Combinational Circuit Design**	3.0
ECEC 512	**Issues in Sequential Circuit Design**	3.0
ECEC 513	**Design for Testability**	3.0
Chemical engineering concentration		
CHE 554	**Process Systems Engineering**	3.0
CHE 658	**Advanced Process Design**	3.0
Civil and architectural engineering concentration		
CIVE 501	**Model Analysis of Structures**	3.0
CIVE 605	**Advanced Mechanics of Materials**	3.0
CIVE 701	**Structural Analysis I**	3.0
CIVE 702	**Structural Analysis II**	3.0
CIVE 703	**Structural Analysis III**	3.0
CIVE 704	**Behavior and Stability of Structural Members I**	3.0
Electrical and computer engineering concentration		
ECEC 621	**High Performance Computer Architecture**	3.0
ECEC 622	**Parallel Computer Architecture**	3.0
ECEC 623	**Advanced Parallel Computer Architecture**	3.0

NOTE: Any other ECE 600-level or above course may be eligible for credit for the Electrical and Computer Engineering concentration..

Materials engineering concentration

MATE 605	**Computer Simulation of Materials and Processes I**	3.0
MATE 606	**Computer Simulation of Materials and Processes II**	3.0
MATE 670	**Materials Processing I**	3.0
MATE 671	**Materials Processing II**	3.0

Mechanical engineering and mechanics concentration

MEM 534	**Discrete Time Control and Estimation I**	3.0
MEM 535	**Discrete Time Control and Estimation II**	3.0
MEM 536	**Microcomputer-Based Control of Dynamic Systems I**	3.0
MEM 537	**Microcomputer-Based Control of Dynamic Systems II**	3.0
MEM 574	**Introduction to CAM**	3.0
MEM 534	**Reliability of Mechanical Systems I**	3.0
MEM 677	**Reliability of Mechanical Systems II**	3.0
MEM 678	**Reliability of Mechanical Systems III**	3.0
MEM 681	**Finite Element Methods I**	3.0
MEM 682	**Finite Element Methods II**	3.0
MEM 683	**Finite Element Methods III**	3.0

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Doctor of Philosophy (Ph.D.)

Purpose and Scope

The Ph.D. degree is not based on the accumulation of credits but represents a high level of scholarly achievement in both supervised and independent study and research. There are few fixed program requirements, and the master's degree is not a prerequisite for the Ph.D. The doctoral program has two major goals: to allow students to acquire in-depth knowledge of a specialized area within the field of information science and technology and to prepare students for a career in which research is a basic element, whether that career is in administration, research, or teaching.

For additional information about the program visit the College of Information Science and Technology's Ph.D. Program web pages.

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Doctor of Philosophy (Ph.D.)

Coursework
The degree requires a minimum of 60 credits beyond the bachelor's degree for the Ph.D. degree or 45 credits beyond an applicable M.S. degree. At least three consecutive terms of full-time resident doctoral study are required. Students may be admitted to the program for part-time study, but they must be formally accepted as doctoral students and must meet the residency requirement.

Courses are taken, under an approved plan of study, to ensure the development of competence in:

- Information science and technology broadly construed
- One or more domains of study
- Research methodology
- Other courses as required by the plan of study
- Additional credits as needed

Advancement to Candidacy
To measure proficiencies in research and to assess students' mastery of their chosen area of study, students maintain a portfolio that is reviewed on a regular basis. Candidacy is awarded based on satisfactory reviews and the presentation of an acceptable dissertation proposal.

Dissertation
The dissertation must be an original scholarly contribution to the field of information science and technology that will demonstrate the student's capacity to conduct research. The final defense of the dissertation completes the program.

For a sample plan of study, visit the College of Information Science and Technology's Ph.D. Program web pages.

Undergraduate Catalog

- All majors
- All minors
- Arts and Sciences
- Business
- Biomedical Engineering
- Education
- Engineering
- Information Science and Technology
- Media Arts & Design
- Nursing and Health Professions
- Professional Studies
- ROTC

Graduate Catalog

- All degree programs
- Arts and Sciences
- Business
- Biomedical Engineering
- Education
- Engineering
- Information Science and Technology
- Law
- Media Arts & Design
- Medicine
- Nursing and Health Professions
- Professional Studies
- Public Health

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Information Science and Technology Professional Development Programs

The College of Information Science and Technology offers opportunities for librarians and information specialists in related fields to update their education or develop new specialties.

Post-Master's Certificate of Advanced Study
This nondegree program provides specialized training beyond the master's degree so that practitioners can update and extend their skills and knowledge. It is not research-oriented and is not intended to provide coursework that can be applied to the IST master's or doctoral degrees. The program leads to a Post-Master's Certificate of Advanced Study awarded through the College of Information Science and Technology.

Admission Requirements

Applicants must have completed a master’s degree in library science, computer or information science, information systems, instructional technology, or software engineering from an 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, except that they need not submit scores from the Graduate Record Examination. Admissions requirements include: completed graduate application form, photocopies of transcripts from all colleges and/or universities attended, essay, and resume.

Program Requirements

Students design a program of study in consultation with a faculty mentor, and must complete 8 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 Information Science and Technology 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
Applicants who hold the master's degree from the College of Information Science and Technology may request readmission by contacting the College.

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.

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Dual M.S./M.S.I.S. Degree Option

The College of Information Science and Technology offers a dual masters degree program, leading to the Master of Science in Library and Information Science (M.. S) and the Master of Science in Information Systems (M.S.I.S.). The dual degree combines the focus of the MS program a concern with selecting, organizing, managing and accessing information resources to meet user's information needs with the MSIS graduates skills in creating and managing the databases, interfaces, and information systems that connect users with the information they are seeking. 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.

Graduate students already enrolled in a masters degree program at Drexel have the opportunity, through the dual masters program to work simultaneously on two masters 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.

For more information, see the MS/MSIS degree web page on the College's web site.