Drexel University
Catalog 2008/2009

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The College of Information Science and Technology Undergraduate Programs

The College of Information Science and Technology

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.

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

The College offers the following bachelor degree programs:

Bachelor of Science in Information Systems

Bachelor of Science in Information Technology

Bachelor of Science in Software Engineering

General Information
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 College of Information Science and Technology's Computing Resource Center 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 a College advisor for more information.

The College of Information Science and Technology offers graduate work leading to the degrees of Master of Science, Library and Information Science; Master of Science in Information Systems; Master of Science in Software Engineering; and Doctor of Philosophy.

Co-operative education, academic eligibility requirements, acceptance of transfer students, and career services are described in detail in the Drexel University Undergraduate Admissions web site.

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
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
College of Information Science and Technology
The bachelor of science in Information Technology integrates closely with Drexel's bachelor of science in information systems (B.S.I.S.), 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 B.S.I.T. 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
College of Information Science and Technology and 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.

Co-Operative Education

Co-operative education at Drexel's College of Information Science and Technology (IST) emphasizes career management through experiential learning as an integral part of the education process. IST 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.

Facilities

W. W. Hagerty Library
The Hagerty Library 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 newly renovated iCommons features a new wireless/laptop area, 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 IST courses.

The computers for general use are Microsoft Windows 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. IST is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and IST classrooms.

IST 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, IST 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 both Drexel and non-Drexel events.

Information Systems

The College of Information Science and Technology is also known as "The *i*School at Drexel." This identity highlights the College's participation in the *i*School Consortium, and its status as a founding member of the organization. The *i*School 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.

Drexel's College of Information Science and Technology 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.

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

BSIS Program Outcomes

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

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

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

Information Systems

Bachelor of Science Degree: 188.0 credits
Degree requirements (incoming students, 2008/2009)

Information systems requirements		**77.0 Credits**
INFO 101	**Introduction to Information Technology**	3.0
INFO 102	**Introduction to Information Systems**	3.0
INFO 105	**Information Evaluation, Organization, and Use**	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 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*	15.0

*Any non-required INFO course.

Behavioral science requirements		**21.0 Credits**
PSY 101	**General Psychology**	3.0
PSY 330	**Cognitive Psychology**	3.0
SOC 101	**Introduction to Sociology**	3.0
or		
ANTH 101	**Cultural Diversity**	
SOC 250	**Research Methods I**	3.0
SOC 350	**Research Methods II**	3.0
	Behavioral Science electives*	6.0

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

Mathematics/natural science requirements		**20.0 - 21.0 Credits**
MATH 101	**Introduction to Analysis I**	4.0

MATH 102	**Introduction to Analysis II**	4.0
or		
MATH 121	**Calculus I**	4.0
MATH 122	**Calculus II**	4.0

MATH 180	**Discrete Computational Structures**	4.0
	Natural science sequences*	8.0-9.0

* Students select one of the following course sequences:
CHEM 101 and CHEM 102
CHEM 111 and CHEM 112
ENVS 260 and ENVS 262

PHYS 103 and PHYS 104
PHEV 145 and PHEV 146
BIO 102 and BIO 104
BIO 151, CHEM 151, and PHYS 151
or PHYS 101 and PHYS 102.

Arts/humanities requirements		**24.0 Credits**
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	**Beginning Logic**	3.0
COM 230	**Techniques of Speaking**	3.0
COM 310 WI	**Technical Communication**	3.0
	Arts/Humanities electives*	3.0

* Any non-required course offered by the COM, HIST, ENGL, PHIL, PSCI, ARTH, FMVD, VSST, and WRIT departments, GREC 212, GREC 225, GREC 399 or any foreign language course.

Business Minor Requirements	**24.0 - 32.0 Credits**

Students select one of the following business minors and complete all the required courses:

- Accounting
- Business
- Entrepreneurship
- Finance
- Legal Studies
- Marketing
- Operations Management

Note: Students taking a minor other than Business will also need to take STAT 201 Statistics I and STAT 202 Statistics II.

STAT 201	**Statistics I**	4.0
STAT 202	**Statistics II**	4.0

University and college requirements		**2.0 Credits**
UNIV 101	**The Drexel Experience**	2.0
INFO 120	**Seminar for Transfer Students**	2.0

Free Electives	9.0-20.0 Credits
Free electives	9.0-20.0

Writing-Intensive Course Requirements
In order to graduate, all students must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's Writing-Intensive Course page.

Recommended Plan Of Study

BS Information Systems
5 YR UG Co-op Concentration

Term 1		Credits
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	Calculus I	4.0
or		
MATH 101	Introduction to Math Analysis	4.0
	Term Credits	*14.0*

Term 2		Credits
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
UNIV 101	The Drexel Experience	1.0
MATH 122	Calculus II	4.0
or		
MATH 102	Introduction to Math Analysis 4	.0
	Term Credits	*14.0*

Term 3		Credits
ENGL 103	Analytical Writing and Reading	3.0
INFO 105	Information Organization, Evaluation and Use	3.0
INFO 110	Human-Computer Interaction 3	.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
	Term Credits	*16.0*

Term 4		Credits
INFO 153	Applied Data Management 3	.0
INFO 200	Systems Analysis I	3.0
PHIL 105	Critical Reasoning	3.0
SOC 250	Research Methods I	3.0
SOC 101	Introduction to Sociology 3.	0
or		
ANTH 101	Introduction to Cultural Diversity	3.0
	Information Systems (INFO) elective	3.0
	Term Credits	*18.0*

Term 5		Credits
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		Credits
COM 230	Techniques of Speaking	3.0
INFO 324	Team Process and Product	3.0
INFO 355	Systems Analysis II	3.0
PHIL 111	Beginning Logic 3	.0
	Business elective	4.0
	Term Credits	*16.0*

Term 7		Credits
INFO 215	Social Aspects of Information	3.0
INFO 330	Computer Networking Technology I	4.0
PSY 330	Cognitive Psychology	3.0
	Business elective	4.0
	Information Systems (INFO) elective	3.0
	Term Credits	*17.0*

Term 8		Credits
COM 310	Technical Communication	3.0
STAT 201	Statistics I	4.0
	Free elective	3.0
	Information Systems (INFO) elective	3.0
	Science sequence course 1 (See degree requirements list)	4.0
	Term Credits	*17.0*

Term 9		Credits
STAT 202	Statistics II	4.0
	Business elective	4.0
	Information Systems (INFO) elective	3.0
	Science sequence course 2 (See degree requirements list)	4.0
	Term Credits	*15.0*

Term 10		Credits
INFO 420	Software Project Management	3.0
INFO 424	Team Project Practicum	3.0
	Behavioral science elective	3.0
	Business elective	4.0
	Information Systems (INFO) elective	3.0
	Term Credits	*16.0*

Term 11		Credits
INFO 425	Design Problem I	3.0
	Behavioral science elective	3.0
	Business elective	4.0
	Free elective	4.0
	Term Credits	*14.0*

Term 12		Credits
INFO 426	Design Problem II	3.0
	Arts and Humanities elective	3.0
	Business elective	4.0
	Free electives	6.0
	Term Credits	*16.0*
	Total Credits (minimum)	**188.0**

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. A minimum of 25 credits is required to complete the academic minor 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

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.

Information Technology

The College of Information Science and Technology is also known as "The *i*School 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.

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, 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:

(a) An ability to apply knowledge of computing and mathematics appropriate to the discipline

(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

(d) An ability to function effectively on teams to accomplish a common goal

(e) An understanding of professional, ethical, legal, security and social issues and responsibilities

(f) An ability to communicate effectively with a range of audiences

(g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to use and apply current technical concepts and practices in the core information technologies.

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems

(l) An ability to effectively integrate IT-based solutions into the user environment.

(m) An understanding of best practices and standards and their application.

(n) An ability to assist in the creation of an effective project plan.

(o) 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.

(p) An ability to identify and evaluate current and emerging technologies and assess their applicability to address the user's needs.

Integration with BSIS.
The BSIT integrates closely with Drexel's bachelor of science in information systems (BSIS), 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 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.

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

Information Technology

Bachelor of Science Degree: 188.0 credits
Degree requirements (incoming students, 2008/2009)

Technology requirements		**86.0 Credits**
INFO 101	**Introduction to Information Technology**	3.0
INFO 102	**Introduction to Information Systems**	3.0
INFO 105	**Information Evaluation, Organization, and Use**	3.0
INFO 108	**Foundations of Software**	4.0
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 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	12.0 - 15.0

Advanced requirements		**9.0 - 12.0 Credits**

Students select one of the following sequences:

Database Management Systems		
INFO 300	**Information Retrieval Systems**	3.0
INFO 365	**Database Administration I**	3.0
INFO 366	**Database Administration II**	3.0

or

Server and Network Technology		
INFO 321	**Server Technology II**	4.0
INFO 322	**Server Technology III**	4.0
INFO 331	**Computer Networking Technology II**	4.0

Behavioral science requirements		12.0 Credits
PSY 101	**General Psychology I**	3.0
PSY 330	**Cognitive Psychology**	3.0
	Electives	6.0

Mathematics/natural science requirements		20.0 - 21.0 Credits
MATH 101	**Introduction to Analysis I**	4.0
or		
MATH 121	**Calculus I**	4.0
MATH 102	**Introduction to Analysis II**	4.0
or		
MATH 122	**Calculus II**	4.0
MATH 180	**Discrete Computational Structures**	4.0
	Natural science sequence*	8.0-9.0

* Students select one of the following course sequences:
CHEM 101 and CHEM 102
CHEM 111 and CHEM 112
PHYS 103 and PHYS 104
PHEV 145 and PHEV 146
BIO 102 and BIO 104
BIO 151, CHEM 151, and PHYS 151
or PHYS 101 and PHYS 102.

Arts/humanities requirements		24.0 Credits
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	**Beginning Logic**	3.0
COM 230	**Techniques of Speaking**	3.0
COM 310 WI	**Technical Communication**	3.0
	Arts/Humanities electives*	3.0

* Any non-required course offered by the COM, HIST, ENGL, PHIL, PSCI, ARTH, FMVD, VSST, and WRIT departments, GREC 212, GREC 225, GREC 399, or any foreign language course.

Business requirements		12.0 Credits
STAT 201	**Statistics I**	4.0
STAT 202	**Statistics II**	4.0
Students select one of the following:		
ACCT 115	**Financial Accounting Foundations**	4.0
ECON 201	**Principles of Microeconomics**	4.0
ORGB 300 WI	**Organizational Behavior**	4.0

University and college requirements		2.0 Credits
UNIV 101	**The Drexel Experience (for freshmen)**	2.0
or		
INFO 120	**Seminar for Transfer Students**	2.0

Other courses	29.0 - 32.0 Credits
Free electives	29.0-32.0

Writing-Intensive Course Requirements
In order to graduate, all students must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's Writing-Intensive Course page.

Recommended Plan Of Study

BS Information Technology
5 YR UG Co-op Concentration

Term 1		Credits
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	Calculus I	4.0
or		
MATH 101	Introduction to Math Analysis	4.0
	Term Credits	*14.0*

Term 2		Credits
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
UNIV 101	The Drexel Experience	1.0
MATH 122	Calculus II	4.0
or		
MATH 102	Introduction to Math Analysis 4	.0
	Free elective	3.0
	Term Credits	*17.0*

Term 3		Credits
ENGL 103	Analytical Writing and Reading	3.0
INFO 105	Information Organization, Evaluation and Use	3.0
INFO 110	Human-Computer Interaction 3	.0
INFO 152	Web Systems and Services II	3.0
MATH 180	Discrete Computational Structures	4.0
	Term Credits	*16.0*

Term 4		Credits
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		Credits
INFO 210	Database Management Systems	3.0
PHIL 105	Critical Reasoning	3.0
PSY 330	Cognitive Psychology	3.0
	Free elective	3.0
	IT elective	3.0
	Term Credits	*15.0*

Term 6		Credits
PHIL 111	Beginning Logic 3	.0
	Free elective	3.0
	IT advanced topic course (see degree requirements for sequences)	3.0
	IT elective	3.0
	Natural science sequence course (See degree requirements for list)	4.0
	Term Credits	*16.0*

Term 7		Credits
INFO 324	Team Process and Product	3.0
INFO 330	Computer Networking Technology I	4.0
INFO 215	Social Aspects of Information Systems	3.0
	IT advanced topic course (see degree requirements for sequences)	3.0
	Natural science sequence course (See degree requirements for list)	4.0
	Term Credits	*17.0*

Term 8		Credits
COM 310	Technical Communication	3.0
INFO 410	Information Technology Infrastructure	3.0
STAT 201	Statistics I	4.0
	Free elective	3.0
	IT elective	3.0
	Term Credits	*16.0*

Term 9		Credits
INFO 415	Information Technology Service	3.0
STAT 202	Statistics II	4.0
	Free elective	3.0
	IT advanced topic course (see degree requirements for sequences)	3.0
	IT elective	3.0
	Term Credits	*16.0*

Term 10		Credits
INFO 420	Software Project Management	3.0
INFO 424	Team Project Practicum	3.0
ACCT 115	Financial Accounting Foundations	4.0
or		
ORGB 300	Organizational Behavior	4.0
or		
ECON 201	Principles of Microeconomics	4.0
	Free elective	3.0
	IT elective	3.0
	Term Credits	*16.0*

Term 11		Credits
INFO 425	Design Problems I	3.0
	Arts and Humanities elective	3.0
	Behavioral science elective	3.0
	Free electives	8.0
	Term Credits	*17.0*

Term 12		Credits
INFO 426	Design Problem II	3.0
	Behavioral science elective	3.0
	Free electives	6.0
	Term Credits	*12.0*
	Total Credits (minimum)	188.0

Software Engineering

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.

Software Engineering

Bachelor of Science in Software Engineering (BSSE): 188.0 credits
Required courses (incoming students, 2008/2009)

Software engineering requirements		**36.0 Credits**
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	**Sofware Verification and Validation**	3.0
SE 410	**Software Evolution**	3.0
SE 491	**Design Project I**	3.0
SE 492	**Design Project II**	3.0
SE 493	**Design Project III**	3.0

Computer science requirements		**16.0 - 17.0 Credits**
CS 260	**Data Structures**	3.0
CS 265	**Advanced Programming Techniques**	3.0
CS 281	**Systems Architecture I**	4.0
CS 361	**Concurrent Programming**	3.0
CS 472	**Computer Networks**	3.0
or		
INFO 330	**Computer Networking Technology I**	4.0

Information systems requirements		**9.0 Credits**
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		**18.0 Credits**
	Any non-required INFO, CS or SE course at the 300+ level	18.0

Mathematics/statistics requirements	**26.0 Credits**

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

Basic Science requirements (Choose one of the following sequences)		**21.0 Credits**
BIO 102	**Biology I: Cells and Tissues**	4.0
BIO 104	**Biology I: Growth and Heredity**	4.0
BIO 106	**Organismal Biology**	4.0
or		
CHEM 101	**General Chemistry I**	3.5
CHEM 102	**General Chemistry II**	4.5
CHEM 103	**General Chemistry III**	5.0
or		
PHYS 101	**Fundamentals of Physics I**	4.0
PHYS 102	**Fundamentals of Physics II**	4.0
PHYS 201	**Fundamentals of Physics III**	4.0
	Additional science electives	7.5 - 9.0

Liberal studies requirements		**33.0 Credits**
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 311	**Computer Ethics**	3.0
COM 230	**Techniques of Speaking**	3.0
COM 310 WI	**Technical Communication**	3.0
PSY 101	**General Psychology**	3.0
PSY 330	**Cognitive Psychology**	3.0
	Additional liberal studies electives	6.0

Students select two of the following business courses:		**8.0 Credits**
ACCT 115	**Financial Accounting Foundations**	4.0
ECON 201	**Principles of Microeconomics**	4.0
ECON 202	**Principles of Macroeconomics**	4.0

University and college requirements		**20.0 - 21.0 Credits**
UNIV 101	**The Drexel Experience ***	2.0
	Free electives	18.0-19.0

*First-term external transfer students are required to take INFO 120 Seminar for Transfer students instead of UNIV 101.

Recommended Plan Of Study

BS Software Engineering
5 YR UG Co-op Concentration

Term 1		Credits
COOP 101	Career Management/Professional Development	0.0
ENGL 101	Expository Writing and Reading	3.0
MATH 121	Calculus I	4.0
SE 101	Foundations of Software Engineering I	3.0
UNIV 101	The Drexel Experience	1.0
BIO 102	Biology I: Cells and Tissues	4.0
or		
PHYS 101	Fundamentals of Physics I	4.0
or		
CHEM 101	General Chemistry I	4.0
	Term Credits	*15.0*

Term 2		Credits
ENGL 102	Persuasive Writing and Reading 3.	0
MATH 122	Calculus II	4.0
SE 102	Foundations of Software Engineering II	3.0
UNIV 101	The Drexel Experience	1.0
BIO 104	Biology II: Growth and Heredity 4.	0
or		
PHYS 102	Fundamentals of Physics II	4.0
or		
CHEM 102	General Chemistry II	4.0
	Term Credits	*15.0*

Term 3		Credits
ENGL 103	Analytical Writing and Reading 3.	0
MATH 123	Calculus III	4.0
SE 103	Foundations of Software Engineering III	3.0
UNIV 101	The Drexel Experience	0.5
BIO 106	Biology III: Organismal Biology 4.	0
or		
PHYS 201	Fundamentals of Physics III	4.0
or		
CHEM 103	General Chemistry III	5.0
	Liberal studies elective	3.0
	Term Credits	*17.5*

Term 4		Credits
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
	Term Credits	*15.0*

Term 5		Credits
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
	Term Credits	*15.0*

Term 6		Credits

COM 310	Technical Communication	3.0
CS 281	Systems Architecture I	4.0
PSY 101	General Psychology I	3.0
SE 310	Software Architecture I	3.0
STAT 201	Business Statistics I	4.0
	Term Credits	*17.0*

Term 7		Credits
SE 311	Software Architecture II	3.0
STAT 202	Business Statistics II	4.0
	Free elective	3.0
	Computing elective (300-level or higher INFO, SE, CS)	3.0
	Natural Science elective	3.0
	Term Credits	*16.0*

Term 8		Credits
CS 361	Concurrent Programming 3.	0
INFO 420	Software Project Management 3	.0
PHIL 105	Critical Reasoning 3.	0
SE 320	Software Verification and Validation	3.0
	Free elective	3.0
	Term Credits	*15.0*

Term 9		Credits
INFO 310	Human-Computer Interaction II	3.0
PHIL 311	Computer Ethics	3.0
SE 410	Software Evolution	3.0
	Computing electives (300-level or higher INFO, SE, CS)	3.0
	Free elective	3.0
	Term Credits	*15.0*

Term 10		Credits
SE 491	Design Project I	3.0
INFO 330	Computer Networking Technologies I	4.0
or		
CS 472	Computer Networks	3.0
ECON 201	Principles of Microeconomics	4.0
or		
ACCT 115	Financial Accounting Foundations	4.0
or		
ECON 202	Principles of Macroeconomics	4.0
	Computing elective (300-level or higher INFO, SE, CS)	3.0
	Free elective	3.0
	Term Credits	*17.0*

Term 11		Credits
PSY 330	Cognitive Psychology	3.0
SE 492	Design Project II	3.0
ACCT 115	Financial Accounting Foundations	4.0
or		
ECON 202	Principles of Macroeconomics	4.0
or		
ECON 201	Principles of Microeconomics	4.0
	Computing electives (300-level or higher INFO, SE, CS)	6.0
	Term Credits	*16.0*

Term 12		Credits
SE 493	Design Project III	3.0
	Computing elective (300-level or higher INFO, SE, CS) 3.	0
	Free electives	7.0
	Liberal studies elective	3.0
	Term Credits	*16.0*
	Total Credits (minimum)	**189.5**

Minor in Software Engineering

The software engineering minor is available to all University students in good standing, with the exception of software engineering majors. A total of 24 credits is needed to complete the academic minor in software engineering.

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

- CS 171-2 (Computer Programming I-II)
- CS 131-2-3 (Computer Programming A-B-C)
- SE 101-2-3 (Fundamentals of Software Engineering I-II-III)
- CS/ECE203-ECEC480 (Programming for Engineers, Advanced Programming for Engineers)
- INFO 151-2-3-4 (IS Software I-II-III-IV)

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

Minor Requirements		Credits
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	**Sofware Verification and Validation**	3.0
SE 410	**Software Evolution**	3.0
	Two Computing/Software Engineering electives	6.0