



Information Systems (C20)

The Stern School of Business has always been a leader among management schools in teaching and research on information technology in business. In the current climate of rapid globalization and electronic commerce, an understanding of why and how information technology is driving changes in markets and businesses is essential for every business manager. Increasingly, many of the strategic and day-to-day decisions general managers face involve information technology. The information systems (IS) major provides students with the skills and knowledge they require to prepare for and manage the transition from entry-level positions to management.

The central question that our information systems courses address is **Why do some organizations get value from their information technology investments while others do not?**

“Decisions about information technology are critical, as is the ability to understand and work with systems,” says David Baker, Stern alumnus and global head of program trading at Deutsche Bank. “In this emerging marketplace, a strong background in information technology is essential for opening doors as well as career advancement.”

Professionals with skills in management and information systems work in both business and government. Typical problems handled by IS professionals include designing

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and maintaining the information infrastructure of organizations, aligning information technology strategy with business strategy, and supporting the technology requirements of the various functional areas of organizations. Information technology skills are particularly important in industries such as financial services, consulting, telecommunications, and technology.

Program of Study

INFORMATION SYSTEMS MAJOR REQUIREMENTS (12 POINTS)

An information systems major at Stern requires four information systems electives (in addition to C20.0001). Students who wish to pursue a career in information technology are advised to take C20.0035 and C20.0046 as two of their required four courses. (Note: These classes presume a programming background equivalent of V22.0002, Introduction to Computer Science.) Students may also take selected computer science electives, with the permission of the undergraduate program coordinator.

INFORMATION SYSTEMS CONCENTRATION REQUIREMENTS (9 POINTS)

The information systems concentrations are separate from the information systems academic major. They are designed for students who want/need some knowledge of technology to augment another major. An information systems concentration requires 9 points of Stern information systems electives selected from the courses listed for that concentration. Typically, at least one of the courses is required for the concentration. Students cannot complete more than one concentration. Students receive a separate certificate indicating they have completed a concentration when they graduate.

The concentrations and the courses towards the major are listed below.

Financial Systems

This concentration is designed for students comajoring in finance who want to understand systems in the financial services industry.

- C20.0050 Financial Information Systems (required for concentration)
- C20.0057 Modeling and Data Mining with Spreadsheets
- C20.0046 Database Management Systems
- C60.0006 Operations in Financial Services
- C60.0007 Decision Models

Enterprise Systems

This concentration is designed for students who are interested in the implementation and implications of enterprise-wide systems and tools for personal productivity. The courses are especially useful for students who wish to enter a career in consulting.

C20.0038

Electronic Commerce (required for concentration)

C20.0057

Modeling and Data Mining with Spreadsheets

C20.0022

Design and Development of Web-Based Systems

C20.0046

Database Management Systems

C60.0007

Decision Models

Web-Based Systems

This concentration is designed for students who are interested in using the Web to interface with customers and suppliers. The Web has become the standard method of delivering content to both internal and external users, as well as the basis for new XML-based standards for interfacing between business processes. This concentration includes courses that cover both development techniques for Web-based systems as well as business applications.

C20.0035

Fundamentals of Computer Systems (required for concentration)

C20.0046

Database Management Systems

C20.0038

Electronic Commerce

C20.0022

Design and Development of Web-Based Systems

C20.0043

Systems Analysis and Design

C20.0020

Streaming Media

Students majoring in information systems should consult with their adviser in the Office of Undergraduate Advising and Student Services by the end of their sophomore year to ensure that course distribution requirements are being met and to declare formally the information systems major. The Department of Information Systems undergraduate program coordinator is always available to advise on information systems course selection or other matters information systems students may wish to discuss.

Courses

FUNDAMENTAL COURSE

Computer-Based Systems for Management Support

C20.0001 4 points. Fall and spring.

Provides the background necessary to make decisions about computer-based information systems and to be an "end-user." Two major parts of the course are (1) hands-on experience with personal computers and (2) information systems management. Group and individual computer assignments expose students to electronic spreadsheet analysis and database management on a personal computer. Management aspects focus on understanding computer technology, systems analysis and design, and control of information processing by managers.

ADVANCED COURSES

Streaming Media

C20.0020 3 points.

Prerequisite: C20.0001.

Investigates the use of networked multimedia systems as a new way to deliver computer-based information. First reviews basic concepts in multimedia including an overview of some of the available tools. Next investigates networked multimedia and some of the additional problems inherent in delivering multimedia and hypermedia material over networks. Students experiment with some of the current technologies as well as new technologies that allow three-dimensional object manipulation, live streaming video, and virtual reality systems delivered over the Web. Course requirements consist of several homework assignments, a midterm exam, and a final paper/project.

Design and Development of Web-Based Systems

C20.0022 3 points. Spring.

Prerequisite: C20.0001.

The Web and the new technologies and standards surrounding it have dramatically changed the way systems are developed and used in organizations and markets. This course covers the issues and concepts in developing data-driven Web sites. Students evaluate a variety of different Web development approaches and architectures, including the common gateway interface models Java, Active Server Pages, .NET, and Web services. A variety of alternative development approaches are compared, looking at issues such as the development environment and the security, performance, scalability, and maintainability of systems developed with the different approaches. The class is divided into student teams. Each team implements a small system using one of the supported technologies and evaluates their experience. Students should have the ability to build a simple Web page and be proficient with common Microsoft Office business applications, especially Access. Light programming is used for examples of how to build dynamic Web pages for B2C and B2B sites. Assignments include both Active Server Pages as well as J2EE. Unix, Windows 2000, and Linux platforms are available to host projects.

Fundamentals of Computer Systems

C20.0035 3 points. Fall and spring.

Prerequisites or corequisites: C20.0001 and programming experience.

This course provides an in-depth introduction to some of the major computer technologies, including computer systems organization, operating systems, Java programming, and Web technolo-

gies. The students learn the material through a combination of class lectures and discussions, in-class demos, homework assignments, and a project.

The material covered in this course is divided into the following modules: (1) a crash course in Java, (2) an overview of some of the key Web technologies, and (3) computer organization and operating systems.

The purpose of the brief overview of Java is to familiarize the students with the main concepts of the language so that they can develop sufficient familiarity with the language and acquire basic programming skills required in other parts of this course and possibly other IS courses. *It is assumed that the student is either already familiar with basic programming concepts (such as variables, arrays, conditional branching, loops, etc.) or will be able to learn them fast.* At the end of this module, the students are expected to be able to write simple Java programs.

In the Web technologies module, the students learn how the Web "works," including an overview of the HTTP protocol, Web servers, and client- and server-side processing. The students also learn the basics of XML and other types of markup languages, such as wireless markup language (WML), electronic business XML (ebXML), and legal XML (LegalXML). Moreover, the students also learn how Java and XML can be combined together, using DOM, SAX, and JAXP technologies, to create powerful e-business applications. Finally, the course covers the basics of Web services, including the SOAP language and Microsoft's BizTalk. Learning these concepts is combined with the development of practical skills in some of these technologies.

In the computer organization and operating systems module, the students learn about the structure and organization of the main components of a computer system including CPU, memory, buses, and I/O devices. The students also learn how a computer works by studying the fetch-decode-execute cycle and what a Java Virtual Machine (JVM) is and how it works. After that, the students study the basics of operating systems, i.e., what an operating system is, how it works, what computer resources it manages and how. Then the course provides an in-depth coverage of how an operating system manages processors, memory, files, and different I/O and networking devices.

Upon the completion of this course, the students are able to

1. understand some of the current important Web technologies, including Java, XML, DOM/SAX/JAXP, and Web services technologies;
2. understand the organization of modern computers and the principles of operations of operating systems; and
3. develop practical hands-on skills by learning Java, XML, and other Web technologies.

Electronic Commerce

C20.0038 3 points. Fall and spring.
Prerequisites: sophomore standing and C20.0001.

This course provides an understanding of e-commerce and its impact on firms, industries, and markets. In a few short years, the Web has already had a large impact on how we shop, read, conduct business, learn, and consume information like music and art. The fundamental architecture of information processing within the firm is changing as new Internet technologies appear. Internet technologies are also having a broad impact on the management of firms. How well firms are able to master these new technologies and business models is having an important impact on their overall success. This course describes the technologies used in electronic commerce; discusses the resulting changes in organization structure, industry, and societal behavior and seeks to understand the forces that bring about these changes; and, where possible, extrapolates to the next five years.

Systems Analysis and Design

C20.0043 3 points. Fall.
Prerequisite or corequisite: C20.0001.

Stresses concepts and methods used in the analysis and design of computer-based information systems. Explores the major issues at each stage in the design of a system, including the management of the implementation process. Various technical tools ranging from flowcharts and decision tables to automated design

techniques are discussed. Emphasizes the importance of users in the design process and focuses on approaches that improve the successful implementation of a computer system. A team project provides students with an opportunity to apply the concepts in class to a systems analysis and design problem.

Database Management Systems

C20.0046 3 points. Fall and spring.

Prerequisites or corequisites: C20.0001 and some programming experience.

Focuses on the overall management of the data needs of an organization and the design and development of database applications. Covers global database architecture, logical and physical data design, and the integration of databases with programming and fourth-generation languages. Topics include conceptual data modeling, data security and integrity, distributed data management, recovery strategies, and overall database administration. Students learn the SQL language—an industry standard for relational databases—and design their own database applications using an available database management system such as Microsoft Access or Oracle.

Financial Information Systems

C20.0050 3 points. Fall.

Prerequisite: C20.0001.

As financial markets become more electronic and more liquid, a higher degree of knowledge about systems and analytics is required in order to compete. This course teaches students how modern financial markets function as a network of systems and information flows, and how to use information technology for decision making in trading and managing customer relationships. Information systems serve two purposes in the financial industry. First, they facilitate markets and their supporting services such as payment, settlement, authentication, and representation. Second, they facilitate or engage in making decisions such as when and how much to invest in various instruments and markets. The first part of the course describes how systems facilitate various kinds of payment and settlement mechanisms, enable financial markets such as exchanges and ECNs, and support inter-institution communication. The second part of the course describes how traders, analysts, and risk managers use systems to cope with the vast amounts of data on the economy, markets, and customers that flow into their systems each day. It covers automated trading systems and other types of customer-oriented analytic systems that are becoming increasingly intelligent in how they make or support decisions. The course features a mix of case studies, Excel-based illustrations and assignments, and the latest

industry tools. It is particularly suited for finance and marketing students interested in understanding information technologies in financial services from a practical career standpoint.

Advanced Software

C20.0056 3 points. Summer.

Prerequisites: C20.0001 and programming experience.

Presents the Unix operating system and its related programming languages and software infrastructure. Topics include the languages awk, csh (C-shell), C, C++, and Java object-oriented programming and design; software reuse and engineering; exploring cyberspace using the Internet; and Unix security, lore, and culture. Course requirements include programming assignments and exams.

Modeling and Data Mining with Spreadsheets

C20.0057 3 points. Spring.

Prerequisite: C20.0001.

As the volume of data that organizations collect continues to grow rapidly, so does managers' struggle to make sense of it. People who are facile with data and can leverage it into valuable intelligence are in short supply. This course teaches students how to structure and solve business problems using analytical and data-driven models. It provides a hands-on learning experience using the familiar Microsoft Excel modeling environment, while significantly extending its power through plug-ins. The aim is twofold:

1. To provide students with powerful spreadsheet modeling skills that enable them to implement and solve a wide range of problems—from capital budgeting and investments to marketing and operations.
2. To introduce students to state-of-the-art data mining methods that support decision making by extracting useful knowledge from the increasingly large volumes of raw data that organizations collect through their business processes.

The course is taught almost entirely through examples and emphasis is on creative problem formulation and implementation. Technical details are kept to a minimum. The course assumes prior knowledge of Microsoft Excel and the fundamentals of finance, marketing, and operations at the level of the core courses at Stern. Prior experience with a programming language or data mining, though useful, is by no means necessary.

Independent Study in Information Systems

Fall and Spring,

Prerequisite: permission of the undergraduate program coordinator.