Unlocking the full potential of information technology—ensuring that it serves the goals and needs of users, clients, and society—is a tremendous challenge, one that requires a unique blend of knowledge and skills. The field of information science (IS) focuses on the relationship between computers, the people who use them, and the contexts in which they operate. IS seeks to further our understanding of:

1. information itself: where it comes from, how it is organized, and how it is used;
2. the design of computer applications that are usable, socially acceptable, and achieve the goals for which they were created;
3. the impact of information technology (IT) on human life and work; and
4. how the nature of the information, the goals of the users, and the relevant social policies and laws both influence and are influenced by the technical aspects of computer systems.

Information science majors have an opportunity to acquire a strong technical foundation by taking classes in mathematics, logic, and computer science and to acquire a strong foundation in behavioral science by taking classes in cognitive psychology, economics, and statistics. A course in the principles of information science introduces students to important intellectual frameworks such as decision theory, general systems theory, and social informatics and to topics of current importance such as digital copyright, trusted systems, and Internet privacy policy. Building on these foundations, the IS core develops expertise in the design, development, management, maintenance, and evaluation of large-scale information technology systems. Elective courses cover topics such as software project management, text/hypertext retrieval and data mining, social information systems, health informatics, ubiquitous computing, artificial intelligence, information security, and e-commerce.

Programs

Bachelor of Science in Information Science (BSIS)

- Information Science (http://catalog.northeastern.edu/undergraduate/computer-information-science/information-science/bsis)

Minor

- Information Science (http://catalog.northeastern.edu/undergraduate/computer-information-science/information-science/minor)

Courses

Information Science Courses

IS 1500. Introduction to Web Development. 4 Hours.
Introduces Web development and networks. Discusses HTML5, CSS, and client-side scripting with JavaScript and jQuery; embedding of media: images, video, and sound; the use of back-end data (either from databases or XML) to create dynamic Web sites; Web hosting, operating systems, and network infrastructure; and the automation of website construction using content management systems. Considers the construction of Web forms and the underlying protocols for information exchange: HTTP and HTTPS. Emphasizes the need for testing both correctness and usability. Offers a brief introduction to server-side scripting. Surveys the security problems faced by dynamic websites. Hands-on laboratory work is built into the course. May be taken as a general elective by CCIS students but does not count as a CS or IS elective.

IS 1990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

Introduces information science. Examines how information is used to solve problems both for individuals and organizations and how information systems interface with their users. Considers the technical, economic, social, and ethical issues that arise when working with information. Discusses how to collect, manage, classify, store, encode, transmit, retrieve, and evaluate data and information with appropriate security and privacy. Storage models include lists, tables, and trees (hierarchies). Examines applications of information: visualization, presentation, categorization, decision making, and predictive modeling. Introduces key concepts in probability. Explains Bayesian analysis for information classification and modeling. Teaches intensive programming in Excel, including VBA macro development. Introduces programming in R.

IS 2990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

IS 3500. Information System Design and Development. 4 Hours.
Discusses the planning, analysis, design, and implementation of computer-based information systems, focusing on the methodologies and procedures used in organizational problem solving and systems development. Topics include the systems development life cycle; project management; requirements analysis and specification; feasibility and cost-benefit analysis; logical and physical design; prototyping; and system validation, deployment, and postimplementation review. Additional topics may include platform and database selection and integration issues; CASE tools; end-user training; maintenance; and object-oriented analysis and design.

IS 3990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.
IS 4200. Information Retrieval. 4 Hours.
Introduces information retrieval (IR) systems and different approaches to IR. Topics covered include evaluation of IR systems; retrieval, language, and indexing models; file organization; compression; relevance feedback; clustering; distributed retrieval and metasearch; probabilistic approaches to IR; Web retrieval; filtering, collaborative filtering, and recommendation systems; cross-language IR; multimedia IR; and machine learning for IR.

IS 4300. Human Computer Interaction. 4 Hours.
Studies the principles of human-computer interaction and the practice of user interface design. Discusses the major human information processing subsystems (perception, memory, attention, and problem solving), and how the properties of these systems influence the design of interactive systems. Reviews guidelines and specification languages for designing user interfaces, with an emphasis on tool kits of standard graphical user interface (GUI) objects. Introduces usability metrics and evaluation methods. Additional topics may include World Wide Web design principles and tools; wireless/mobile device interfaces; computer-supported cooperative work; information visualization; and virtual reality. Course work includes designing user interfaces, creating working prototypes using a GUI tool kit, and evaluating existing interfaces using the methods studied.

IS 4500. Software Quality Assurance. 4 Hours.
Introduces the main concepts and techniques of software quality assurance (SQA). Quality assurance and control are integral elements of the software development life cycle. Examines the difference between quality assurance and quality control and explores techniques used for both. Focuses on practical approaches framed within industry standards. Presents processes and techniques that ensure the delivery of reliable software to end users. Covers quality factors, testing strategies, writing of test cases and test plans, SQA standards, defect tracking, and automated testing platforms. Discusses quality control practices for verification and validation, including reviews, inspections, audits, and metrics. While the course concentrates on black-box testing, white-box testing and defensive coding strategies are addressed as well.

IS 4600. Software Project Management. 4 Hours.
Covers both technical and managerial aspects of software project management, which is critical to the success of software projects. Emphasizes the differences between traditional software life-cycle models and modern iterative and agile practices. Includes project manager responsibilities, stakeholder management, staffing, resource allocation, estimation, activity scheduling, budget control, quality management, risk assessment, communication, scope control, and project metrics. Introduces standard project management tools combined with control mechanisms including PERT, burn-down, and Gantt charts. Examines these methods in the context of standard frameworks, including the Project Management Body of Knowledge (PMBOK), applicable IEEE Standards, ISO 9001, CMMI, Unified Process, Scrum, and Kanban-driven continuous delivery models.

IS 4700. Social Information Systems. 4 Hours.
Analyzes popular social information systems, including online social networks, blogging platforms, recommendation engines, and content sharing sites. Studies the objectives, user interaction modes, policies, and design issues for social information systems. Introduces relevant theories, both computational and sociological, that model the behavior of social networks and their users. Offers students an opportunity to learn to apply such models, both theoretically and by analyzing real-world interaction data from social information systems, to answer questions such as: What causes users to form links? What mechanisms work best for encouraging collaboration? How does information spread through cyberspace? How can security and privacy goals be achieved?

IS 4800. Empirical Research Methods. 4 Hours.
Evaluates and conducts empirical research, focusing on students’ use of empirical methods to study the effectiveness and organizational/social impact of information systems and technologies. Empirical research involves a number of broad steps including identifying problems; developing specific hypotheses; collecting data relevant to the hypotheses; analyzing the data; and considering alternative explanations for the empirical findings. Some of the most commonly used research techniques, such as surveys, experiments, and ethnographic methods, are discussed. Additional topics include the ethics of data collection and experimentation in behavioral science. Although the course focuses primarily on the relationship between formulating research questions and implementing the appropriate methods to answer them, students can expect to apply the statistical techniques learned in the course prerequisites.

IS 4900. Information Science Senior Project. 5 Hours.
Helps students develop a sophisticated understanding of the interaction between technology and its context. Students write an in-depth research paper that reflects upon and analyzes the observations and experiences of the field study using the information science literature to interpret and better understand those experiences. Students then participate in a seminar in which they present the results of their research.

IS 4910. Information Science Topics. 4 Hours.
Offers a lecture course in information science on a topic not regularly taught in a formal course. Topics may vary from offering to offering. May be repeated up to three times.

IS 4920. Information Science Project. 4 Hours.
Focuses on student working on a substantial project in information science under faculty supervision. May be repeated up to three times.

IS 4970. Junior/Senior Honors Project 1. 4 Hours.
Focuses on in-depth project in which a student conducts research or produces a product related to the student’s major field. Combined with Junior/Senior Project 2 or college-defined equivalent for 8-credit honors project. May be repeated without limit.

IS 4971. Junior/Senior Honors Project 2. 4 Hours.
Focuses on second semester of in-depth project in which a student conducts research or produces a product related to the student’s major field. May be repeated without limit.

IS 4990. Elective. 1-4 Hours.
Offers elective credit for courses taken at other academic institutions. May be repeated without limit.

IS 4991. Research. 4,8 Hours.
Offers an opportunity to conduct research under faculty supervision. May be repeated up to three times.

IS 4992. Directed Study. 1-6 Hours.
Focuses on student examining standard information science material in fresh ways or new information science material that is not covered in formal courses. May be repeated up to three times.

IS 4993. Independent Study. 1-6 Hours.
Focuses on student examining standard information science material in fresh ways or new information science material that is not covered in formal courses. May be repeated up to three times.

IS 4994. Internship. 4 Hours.
Offers students an opportunity for internship work. May be repeated without limit.

IS 4996. Experiential Education Directed Study. 4 Hours.
Draws upon the student’s approved experiential activity and integrates it with study in the academic major. Restricted to those students who are using the course to fulfill their experiential education requirement.
IS 4997. Information Science Thesis. 4 Hours.
Focuses on student preparing an undergraduate thesis under faculty supervision.

IS 4998. Information Science Thesis Continuation. 4 Hours.
Focuses on student continuing to prepare an undergraduate thesis under faculty supervision.