

Information Systems (ISE)**Major and Minor in Information Systems****Department of Computer Science, College of Engineering and Applied Sciences**

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Information Systems (ISE)

The Information Systems major, which is housed in the Department of Computer Science, prepares its graduates to design and build computerized data processing and decision support systems. The program is technically oriented, emphasizing the design and implementation aspects of large-scale information systems as well as the more traditional managerial and organizational issues, and it balances development of system engineering skills with learning to deliver reliable systems on time and within budget. Throughout the program, students are exposed to diverse application areas ranging from traditional business, finance, and accounting through telecommunications, networks, multimedia, and database management, to computer-aided design and industrial production management systems.

Requirements for the Major and Minor in Information Systems (ISE)

Acceptance into the Information Systems Major

Qualified freshman and transfer applicants may be accepted directly into the Information Systems major upon admission to the University. Currently enrolled students may apply for acceptance to the major with a cumulative grade point average of 2.80 or higher and after completing the following two courses with a grade point average of 3.00 or higher.

1. ISE 102 Introduction to Web Design and Programming
2. ISE 108 Introduction to Programming

Computer Science majors may declare the Information Systems major with a cumulative grade point average of 2.80 or higher.

Enrolling in ISE Courses

To enroll in ISE courses, students must have completed all prerequisites with a grade of C or higher (Pass/No Credit grades are not acceptable to meet prerequisites). For transfer students, official transfer credit evaluations must have been completed and approved.

Failure to satisfy the prerequisites or to attend the first class may result in deregistration. The Pass/No Credit option is not available to ISE majors for ISE courses.

Requirements for the Major

The major in Information Systems leads to the Bachelor of Science degree. At least two of the courses under requirement A.2. below must be completed at Stony Brook.

Completion of the major requires approximately 66 credits.

A. Information Systems Courses:

1. Lower Division Courses

ISE 102 Introduction to Web Design and Programming

ISE 108 Introduction to Programming

ISE 208 Intermediate Programming

ISE 215 Foundations of Computer Science or ISE 218 Introduction to Computer Organization

2. Upper Division Courses:

ISE 312 Legal, Social, and Ethical Issues in Information Systems

ISE 305 Database Design and Practice

ISE 311 Systems Administration

ISE 320 Information Management

3. Electives:

Four additional upper-division ISE courses, including ISE 475. Note: ISE 475 may be repeated once, but only one completion of the course will count towards the ISE upper division elective requirement.

B. Mathematics Courses

1. AMS 151 Applied Calculus I (or MAT 131 or MAT 141 or MAT 125, MAT 126)

2. AMS 201 Matrix Methods and Models or AMS 210 Applied Linear Algebra or MAT 211 Introduction to Linear Algebra

3. AMS 310 Survey of Probability and Statistics or ECO 320 Mathematical Statistics

C. Specializations

Students must complete a specialization in one of the application areas listed below, or else design a specialization of six to eight courses in another application area in consultation with the ISE undergraduate director before the courses for the specialization are completed.

D. Upper-Division Writing Requirement: ISE 300 Technical Communications

All degree candidates must demonstrate technical writing skills at a level that would be acceptable in an industrial setting. To satisfy this requirement, students must pass ISE 300 Technical Communications, a course that requires various writing assignments, including at least one significant technical paper.

EST 304 Communication for Engineers and Scientists may be taken in lieu of ISE 300 to fulfill the ISE upper-division writing requirement.

Grading

All courses taken to satisfy Requirements A through D must be taken for a letter grade and completed with a grade of C or higher. A grade of C or higher is required in prerequisite courses listed for all CSE and ISE courses.

Specialization in Business and Economics

Students may take a specialization in Business and Economics consisting of the following courses:

1. Core Courses

- a. BUS 111 Introduction to Business for Non-Business Majors
- b. ECO 108 Introduction to Economics
- c. BUS 210 Financial Accounting

2. One of the following:

- BUS 214 Managerial Accounting
- BUS 346 Operations Management
- BUS 349 Management Science
- BUS 355 Investment Analysis
- BUS 356 Financial Engineering
- ECO 348 Analysis for Managerial Decision Making
- ECO 389 Corporate Finance
- EST 392 Engineering and Managerial Economics
- EST 393 Production and Operations Analysis

3. One of the following:

- BUS 348 Principles of Marketing
- ECO 326 Industrial Organization
- ECO 345 Law and Economic Issues
- POL 319 Business Laws
- POL 359 Public Policy Analysis
- POL 364 Organizational Decision Making
- SOC 381 Sociology of Organizations

4. One of the following:

- EST 302 Assessment of Computer-Based Technologies
- EST 305 Applications Software in Information Management
- EST 320 Communication Technology Systems
- EST 325 Technology in the Workplace

Specialization in Technological Systems Management

Students may take a specialization in Technological Systems Management consisting of the following courses:

1. Four required courses:

- a. EST 202 Introduction to Science, Technology, and Society Studies
- b. EST 391 Technology Assessment
- c. EST 392 Engineering and Managerial Economics
- d. EST 393 Project Management

2. Two elective courses from the following:

- EST 310/ISE 340 Design of Computer Games
- EST 320 Communication Technology Systems
- EST 323/ISE 323 Human-Computer Interaction
- EST 326 Management for Engineers
- EST 327 Marketing for Engineers
- EST 421 Starting the High-Technology Venture

Note: Courses cross-listed between ISE and EST may be taken either as ISE electives (Item A.3) or as TSM specialization electives (Item C).

Specialization in Other Application Areas

A student may design a specialization in another application area of information systems in consultation with the ISE undergraduate director before the courses for the specialization are completed.

Requirements for the Minor

The minor in Information Systems is open to all students not majoring in either Computer Science or Information Systems or minoring in Computer Science. To declare the minor in Information Systems, students must complete ISE 102 with a grade of C or higher and possess a cumulative grade point average of 2.80 or higher. The minor requires seven courses totaling 21 credits as outlined below:

1. ISE 102 Introduction to Web Design and Programming
 2. ISE 108 Introduction to Programming
 3. ISE 208 Intermediate Programming
 4. Four electives totaling at least twelve credits. Electives must include nine credits of upper-division courses and at least nine credits of ISE courses. Approved electives include most ISE courses, as well as other courses relevant to Information Systems; for details contact the Department of Computer Science Undergraduate Office.
- Note: All courses above must be passed with a grade of C or higher

Sample Course Sequence for the Major in Information Systems

Freshman Fall	Credits	Spring	Credits
First Year Seminar 101		1 First Year Seminar 102	1
ISE 102	3	ISE 108	3
AMS 151	3	D.E.C.	3
D.E.C.	3	WRT 102 (D.E.C. A)	3
WRT 101 (D.E.C. A)	3	D.E.C.	3
		D.E.C.	3
Total	13	Total	16
Sophomore Fall	Credits	Spring	Credits
ISE 208	3	Elective	3
ISE 215	3	Elective	3
AMS 201	3	Specialization Course	3
Elective	4	D.E.C.	3
D.E.C.	3	ISE Elective	3
Total	16	Total	15
Junior Fall	Credits	Spring	Credits
ISE 305	3	ISE 311	3
ISE 320	3	Specialization Course	3
AMS 310 or ECO 320	3	Specialization Course	3
Specialization Course	3	D.E.C.	3
D.E.C.	3	ISE Elective	3
		ISE 312	3
Total	15	Total	18
Senior Fall	Credits	Spring	Credits
ISE 300	3	ISE elective	3
ISE elective	3	Specialization Course	3
Specialization Course	3	D.E.C.	3
D.E.C.	3	Elective	3
ISE 308	3	Elective	3
Total	15	Total	15

ISE

Information Systems

ISE 102: Introduction to Web Design and Programming

An introduction to the design of Web pages, specifically the development of browser and device independent HTML, with an emphasis on the XHTML standards. Includes the use of style sheets (CSS) and tools for page layout and verification. HTML is presented as a mark-up language, exploring the rules of HTML elements and attributes. Students learn the separation of page viewing information from the HTML through CSS style sheets as well as the use of block layout without using HTML tables. Addresses HTML display properties including text, color, image, and graphic elements as well as approaches to HTML validation and techniques.

Advisory Prerequisite: CSE 101 or basic computer skills

3 credits

ISE 108: Introduction to Programming

Introduces computer programming at a level suitable for those with no prior programming experiences, including liberal arts and humanities majors. Programming exercises involve state-of-the-art visual applications. Topics include problem-solving techniques, object-oriented design, and programming concepts such as conditionals, iteration, arrays, and modularity.

3 credits

ISE 208: Intermediate Programming

Teaches programming and system design techniques with an emphasis on applications to business. Topics include object-oriented design techniques, testing and debugging, data structures, recursion, and exception-handling. Uses the Java programming language.

Prerequisite: ISE 108

3 credits

ISE 215: Foundations of Computer Science

Introduction to the logical and mathematical foundations of computer science. Topics include functions, relations, and sets; recursion and functional programming; elementary logic; and mathematical induction and other proof techniques.

Prerequisite: AMS 151 or MAT 125 or MAT 131

3 credits

ISE 218: Introduction to Computer Organization

This course introduces computer organization to students interested in the relationship between computer hardware and information systems. The course examines components found in high use computing devices such as desktop computers, smart phones and navigation systems. The course explores the underlying technology of each component, along with price/performance curves, competing technologies, and integration into larger systems. Upon completion of the course, students should be proficient in reading device specifications, particularly the functional and performance implications of system components. Students should be able to use that knowledge to compare competing devices.

Prerequisite: Level 4 or higher on the mathematics placement examination; U2 standing or higher

3 credits

ISE 300: Technical Communications

Principles of professional technical communications for Computer Science and Information Systems majors. Topics include writing business communications, user manuals, press releases, literature reviews, and research abstracts. Persuasive oral communications and effective presentation techniques, to address a range of audiences, will also be covered. This course satisfies the upper-division writing requirement for CSE and ISE majors.

Prerequisites: WRT 102, CSE or ISE major, U3 or U4 standing

3 credits

ISE 301 - H: History of Computing

A study of the history of computational devices from the early ages through the end of the 20th century. Topics include needs for computation in ancient times, development of computational models and devices through the 1800's and early 1900's, World War II and the development of the first modern computer, and early uses in business. Creation of programming languages and the microchip. Societal changes in computer usage due to the microcomputer, emergence of the Internet, the World Wide Web, and mobile computing. Legal and social impacts of modern computing. Cannot be used as a technical elective for the CSE major or minor. This course is offered as both CSE 301 and ISE 301.

Prerequisite: U2 standing or higher
Advisory Prerequisite: one course in computing

3 credits

ISE 302: Professional Ethics for Computer Science

Familiarizes students with professional practice in Information Technology. Enables them to identify ethical conflicts, their responsibilities and options, and to think through the implications of possible solutions to ethical conflicts.

Prerequisites: CSE 219 or CSE 260 or ISE 305

1 credit

ISE 305: Database Design and Practice

The design of database applications including Entity-Relationship data modeling, the relational data model, the SQL database query language, application development, and database administration. Students will complete a project that includes designing a database application and implementing it using database development tools.

Prerequisite: ISE 208 or CSE 214 or CSE 230

3 credits

ISE 311: Systems Administration

This course covers practical techniques to manage information systems, also known as IT Systems Administration. Students will learn how to install computers for assorted hardware and software platforms (Windows, Unix/Linux, OS-X). Install networking equipment and configure it. Install server software on several systems (e.g. web, database, mail) and configure it. Secure the network, hosts, and services, and apply system patches. Set up redundant computing services, virtual machines/services, and hardware so that services can survive some hardware/software failures. Evaluate the performance, reliability, and security of the overall system.

Prerequisites: CSE 214 or CSE 230 or CSE 260 or ISE 208

3 credits

ISE 312: Legal, Social, and Ethical Issues in Information Systems

This course deals with the impact of computers on us as individuals and on our society. Rapid changes in computing technology and in our use of that technology have changed the way we work, play, and interact with other people. These changes have created a flood of new social and legal issues that demand critical examination. For example, technologies such as Gmail, Facebook, MySpace, along with music sharing sites and wikis create new social, ethical, and legal issues. This course is offered as both CSE 312 and ISE 312.

Prerequisites: U3 or U4 standing, one D.E.C. E course

3 credits

ISE 315: Database Transaction Processing Systems

Theory and practice of design for applications involving transactional access to a database. Transaction design, schema design, restart and recovery, journaling, concurrency control, distributed databases. Student groups perform design and implementation of significant database application.

Prerequisite: CSE or ISE 305

3 credits

ISE 320: Information Management

The course presents the relationship between information technology and the systems that use the technology. The emphasis is on business systems with a high information technology components (e.g. software developments, communications, financial management, etc.). Topics include infrastructure management, information management, security, and communications. Emphasis is given to case studies relating to information management.

Prerequisite: U2 Standing

3 credits

ISE 321: Introduction to Network Administration

The course introduces students to the fundamentals of network management, primarily for TCP/IP networks. Students are introduced to networking protocols, hardware, architecture, media, and software and experience hands-on management of typical network components. Various network protocols are examined, including Internet routing protocols. Network security is introduced in the overall context of network management.

Prerequisites: ISE 208 or CSE 214; ISE 218 or CSE 220

4 credits

ISE 323: Human-Computer Interaction

A survey course designed to introduce students to Human-Computer Interaction and prepare them for further study in the specialized topics of their choice. Students will have the opportunity to delve deeper in the course through a course project, and through a two-three week special topic selected at the instructor's discretion.

Prerequisites: CSE 214 or CSE 230 or CSE 260 or ISE 208

3 credits

ISE 325: Computers and Sculpture

This multidisciplinary class surveys how computer science and computer technology

are used in sculpture. Case studies with slides, videos, and software demonstrations illustrate a range of approaches of sculptors incorporating computers in their creative process. Various state-of-the art fabrication technologies are studied (with site visits if available on campus). Mathematical foundations are emphasized so students can recognize them when analyzing sculpture and choose the right tool when designing. In the weekly laboratory, these ideas are reinforced with projects using a range of available software and inexpensive construction materials, e.g., paper, cardboard, and foamcore. Prerequisites: CSE 110 or permission of instructor 3 credits

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3 credits

ISE 332: Introduction to Visualization

Visualization of scientific, engineering, medical, and business data sets. Mechanisms to acquire sampled, computed, or synthetic data and methods to transform symbolic into the visual. Topics include classic visualization process; visual perception; volume and surface visualization; methods for visualizing sampled, simulated, and geometric objects; and visualization systems. Emphasis on applications and case studies. This course is offered as both CSE 332 and ISE 332.

Prerequisites: CSE 219 or CSE 260; MAT 211 or AMS 210

3 credits

ISE 334: Introduction to Multimedia Systems

Survey of technologies available for user interfaces. Discussion of hypertext; voice, music, and video together with tools and models for capturing, editing, presenting, and combining them. Capabilities and characteristics of a range of peripheral devices including devices based on posture, gesture, head movement, and touch. Case studies of academic and commercial multimedia systems including virtual reality systems. Students participate in laboratory exercises and build a multimedia project. This course is offered as both CSE 334 and ISE 334.

Prerequisite: U2, U3 or U4 standing

3 credits

ISE 340: Design of Computer Games

Fundamental ideas underlying the design of games, which occurs before the programming stage. How games function to create experiences, including rule design, play mechanics, game balancing, social game interaction and the integration of visual, audio,

tactile and textual elements into the total game experience. Game design documentation and play testing. Students will design their own game during the semester. This course is offered as both EST 310 and ISE 340.

Advisory Prerequisite: Basic Computer Skills
3 credits

ISE 364: Advanced Multimedia Techniques

Digital media production techniques for high-bandwidth applications such as electronic magazine illustration, broadcast television, and motion picture special effects. Students explore techniques such as 3D modeling and character animation, video compositing, and high-resolution image processing in a state-of-the art multimedia computing laboratory. High-capacity multimedia storage, high-speed networks, and new technologies such as DVD, HDTV, and broadband will be reviewed. This course is offered as both CSE 364 and ISE 364.

Prerequisites: CSE/ISE 334 and permission of the instructor

3 credits

ISE 377: Introduction to Medical Imaging

An introduction to the mathematical, physical, and computational principles underlying modern medical imaging systems. Covers fundamentals of X-ray computer tomography, ultrasonic imaging, nuclear imaging, and magnetic resonance imaging (MRI), as well as more general concepts required for these, such as linear systems theory and the Fourier transform. Popular techniques for the visualization, segmentation, and analysis of medical image data are discussed, as well as applications of medical imaging, such as image-guided intervention. The course is appropriate for computer science, biomedical engineering, and electrical engineering majors.

Prerequisites: AMS 161 or MAT 127 or 132 or 142; AMS 210 or MAT 211

3 credits

ISE 378: Introduction to Robotics

Introduces basic concepts in robotics including coordinate transformation, kinematics, dynamics, Laplace transforms, equations of motion, feedback and feedforward control, and trajectory planning. Covers simple and complex sensors (such as cameras), hybrid and behavior based control and path planning. Concepts are illustrated through laboratories using the LEGO Robot Kit.

Prerequisites: AMS 161 or MAT 127 or 132 or 142; AMS 210 or MAT 211 or MEC 262

3 credits

ISE 390: Special Topics in Information Systems

Lecture or seminar course on a current topic in information systems. Semester supplements to this Bulletin contain specific description when course is offered. May be repeated as the topic changes, but cannot be used more than twice to satisfy ISE major requirements.

Prerequisites: ISE or CSE major; U3 or U4 standing

3 credits

ISE 391: Special Topics in Information Systems

Lecture or seminar course on a current topic in information systems. Semester supplements to this Bulletin contain specific description when course is offered. May be repeated as the topic changes, but cannot be used more than twice to satisfy ISE major requirements.

3 credits

ISE 475: Undergraduate Teaching Practicum

Students assist faculty by conducting a recitation or laboratory section that supplements a lecture course. The student receives regularly scheduled supervision from the faculty advisor. May be repeated once, but only one completion of the course will count towards the ISE upper division elective requirement.

Prerequisites: U4 standing as an undergraduate CEAS major; a minimum g.p.a. of 3.00 in all Stony Brook courses; grade of B or better in the course in which the student is to assist; or permission of department

3 credits

ISE 487: Research in Information Systems

An independent research project with faculty supervision. Only three credits of research electives (AMS 487, BME 499, CSE 487, ESE 499, ESM 499, EST 499, ISE 487, MEC 499) may be counted toward technical elective requirements. May not be taken for more than six credits.

Prerequisites: Permission of instructor and department

0-6 credits

ISE 488: Information Systems Internship

Participation in local, state, national, or international private enterprises, public agencies, or nonprofit institutions. Students are required to submit a written proposal, progress

reports, and a final report on their experience to the client and to the department. May be repeated up to a limit of 12 credits but only 3 credits of CSE or ISE 488 may be used as an elective to satisfy ISE major requirements.

Prerequisites: ISE major; U3 or U4 standing; permission of faculty sponsor and department

3 credits, S/U grading