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
SBC: TECH
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.

SBC: TECH
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 218: Fundamentals of Information Technology

This course introduces the fundamentals of Information Technology (IT) to students interested in the relationship between computer hardware, software, networks, and information systems. The course examines components found in high use computing devices such as desktop computers, smart phones, and navigation systems. The focus of the examination is understanding the underlying technology of each component, along with price/performance curves and competing technologies. Upon completion of the course, students should be proficient in reading device specifications, particularly functional and performance implications. Students should also be able to use that knowledge to compare competing devices.

Prerequisite: Level 4 or higher on the mathematics placement examination or a grade of C or better in MAT 123 or higher; 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
SBC: SPK, WRTD
3 credits

ISE 301: 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
DEC: H
SBC: STAS
3 credits

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 114 or CSE 230
SBC: EXP+, TECH
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; ISE or CSE major
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 or SNW course
SBC: CER, ESI, STAS
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 316: Introduction to Networking
This course introduces the principles of computer networks, including network architectures, algorithms, and performance, with the TCP/IP based Internet as an example. It examines various networking protocols at different layers of the Internet protocol stack, including those at the application, transport, network, and the data link layers, respectively. May not be taken for credit in addition to CSE 310 or CSE 346/ESE 346. 
Prerequisites: CSE 114 or ISE 208; Level 4 or higher on the mathematics placement exam or MAT 123
3 credits

ISE 317: Computer Networking II
Today's computer networks have become an infrastructure as essential as utility networks such as the transportation network and the national grid of electricity. A wide variety of networking technologies are deployed to support nearly every sector of the society. Among these technologies, those that are related to wireless and mobile networking, multimedia networking, as well as network security are among the most popular and important. After learning fundamental concepts and protocols in computer networks from the first networks course, this second computer networks course examines more practical and advanced topics in computer networking. In addition to those mentioned above, we will also study advanced routing algorithms in computer networks and network management. Both are critical tasks for corporations such as network service providers and for individual professionals such as network administrators. 
Prerequisites: ISE 316 or CSE 310; ISE or CSE major
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.
Prerequisite: ISE 316 or CSE 310; ISE or CSE major
3 credits

ISE 322: 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. Course is cross-listed as CSE 323, EST 323 and ISE 323. 
Prerequisites: CSE 214 or CSE 230 or CSE 260 or ISE 208
3 credits

ISE 323: Human-Computer Interaction
This course introduces the concepts and terminology of computer security in addition to describing attacks against computer infrastructure and typical defenses against such attacks. The course will outline security policies and procedures used by enterprises and will introduce tools and techniques used by both attackers and defenders.
Prerequisite: ISE 218 or CSE 220 
Corequisite: ISE 316 or CSE 310 or CSE/ESE 346 
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. 
Prerequisite: CSE 110 or CSE 101 or CSE 114 or permission of instructor
3 credits

ISE 331: Fundamentals of Computer Security
The course will introduce the concepts and terminology of computer security in addition to describing attacks against computer infrastructure and typical defenses against such attacks. The course will outline security policies and procedures used by enterprises and will introduce tools and techniques used by both attackers and defenders.
Prerequisite: ISE 218 or CSE 220 
Corequisite: ISE 316 or CSE 310 or CSE/ESE 346 
3 credits

ISE 332: Introduction to Visualization
This course is an introduction to both the foundations and applications of visualization and visual analytics, for the purpose of understanding complex data in science, medicine, business, finance, and many others. It will begin with the basics - visual perception, cognition, human-computer interaction, the sense-making process, data mining, computer graphics, and information visualization. It will then move to discuss how these elementary techniques are coupled into an effective visual analytics pipeline that allows humans to interactively think with data and gain insight. Students will get hands-on experience via several programming projects, using popular public-domain statistics and visualization libraries and APIs. This course is offered as both CSE 332 and ISE 332. 
Prerequisites: CSE 214 or CSE 260; MAT 211 or AMS 210; AMS 310; CSE or ISE major
3 credits

ISE 333: User Interface Development
Survey of user interface systems, with emphasis on responsive and adaptive strategies to accommodate cross-platform deployment across multiple devices such as desktops and mobile devices. Demonstration of the use of tool kits for designing user interfaces. Additional topics include human factors, design standards, and visual languages. Students participate in a project involving the design and implementation of user interface systems. This course is offered as both CSE 333 and ISE 333.
Prerequisite: CSE 214 or CSE 260; CSE or ISE major
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.
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.
Prerequisite: ISE major or ISE minor
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.
Prerequisite: ISE major or ISE minor
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 enterprise, public agencies, or nonprofit institutions. To obtain permission to register for the course, students are required to submit proof that the work is related to their studies and the work will include at a minimum of 180 hours during the semester. During the semester, the student will submit 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 can only be used once as a technical elective to satisfy ISE major requirements.
Prerequisites: ISE major; U3 or U4 standing; permission of faculty sponsor and department
SBC: EXP+
3 credits