CS. COMPUTER SCIENCE

CS-198, CS-298, CS-398. TOPICS IN COMPUTER SCIENCE
Credits: Variable
Study of one or more special topics in computer science. May be repeated for credit if different topics are emphasized. Offered when demand warrants.

Pre-Requisites
Varies with topic

CS-115. COMPUTERS AND APPLICATIONS
Credits: 3
An introduction to computers and computing, with emphasis on personal computing in both the Windows and OS X operating systems. Extensive hands-on experience will involve the application of current commercial software (including word processing, database, and spreadsheet). Not open to students who have received credit in any 200-level CS course. Students majoring in either Computer Science or Computer Information Systems will not receive credit for this course.

CS-125. COMPUTER SCIENCE I
Credits: 4
Introduction to information technology and programming (history of computing, text editors, word processing, spreadsheets, introduction to programming), basic data types, functions, decision structures, loops, one- and two-dimensional list structures, testing, debugging, and an introduction to computer graphics. Three hours of lecture and two hours of lab per week. Offered every fall and spring.

Pre-Requisites
Secondary mathematics, including geometry and algebra II.

CS-126. COMPUTER SCIENCE II
Credits: 4
A study of advanced programming concepts, structures, and techniques (professional and ethical issues, testing and debugging, fundamentals of programming, basic data structures—strings, lists, multidimensional arrays, objects, hashes, inheritance, polymorphism, recursion, divide and conquer, machine representation of data, hardware components, machine instructions). Three hours of lecture and two hours of lab per week. Offered every fall and spring.

Pre-Requisites
CS-125 with grade of 2.0 or better OR equivalent programming experience.

CS-225. COMPUTER SCIENCE III
Credits: 3
A study of the use of a high-level language to implement basic data structures such as strings, lists, arrays, objects, and hashes, and their application to searching, sorting, and hashing. Representation of numbers and strings at the machine level. The course will also include an introduction to the concepts of algorithm design and problem solving with an emphasis on algorithm development, analysis, and refinement. Offered every fall.

Click here for course fee.

Pre-Requisites
CS-126 with grade of 2.0 or better

CS-226. COMPUTER SCIENCE IV
Credits: 3
A continuation of CS-225. Topics include programming language paradigms, advanced use of word processors and spreadsheets, including macros, linked data structures, and an introduction to discrete mathematics, including counting, probability, and graphs. Offered every spring.

Click here for course fee.

Pre-Requisites
CS-225 with grade of 2.0 or better

CS-246. C AND UNIX
Credits: 3
An introduction to using Unix operating systems, including shells, file manipulation, text editors, filters, and regular expressions. Fundamentals of C programming, including loops, arrays, functions, recursion, pointers, structures, unions, input/output, and system calls.

Click here for course fee.

Pre-Requisites
CS-125 with grade of 2.0 or better

CS-265. MEDICAL INFORMATICS
Credits: 3
This course will cover basic principles of computer use and information management in health care (including general medicine, dentistry, optometry, and pharmacy). Topics will include basic computing concepts, the characteristics of medical data, and the use of computers in the administrative, diagnostic, and research oriented medical tasks. The course is primarily directed towards students who intend to pursue careers in health-related fields. Offered every spring.

Click here for course fee.

CS-283. WEB DEVELOPMENT I
Credits: 3
An introduction to the development of interactive web sites, including HTML, JavaScript, forms and CGI programs; server side includes cookies, web server configuration and maintenance. Offered in the fall semester of odd-numbered years when demand warrants.

Click here for course fee.

Pre-Requisites
CS-126.
CS-285. MOBILE APPLICATIONS  
Credits: 3  
An introduction to programming mobile application development, including dragging, rotating, scaling, file manipulation, and navigation.  
Click here for course fee.  

Pre-Requisites  
CS-126 and CS-246.  

CS-317. SOFTWARE INTEGRATION  
Credits: 3  
An introduction to the integration of application programs, including email clients, word processors, spreadsheets, and database systems using Microsoft Office and Visual Basic.  
Click here for course fee.  

Pre-Requisites  
CS-126.  

CS-319. PRINCIPLES OF PROGRAMMING LANGUAGES  
Credits: 3  
A study of the principles that govern the design and implementation of programming languages. Topics include language structure, data types, and control structures. Programming projects will familiarize students with features of programming languages through their implementation in interpreters.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-321. SIMULATION AND DATA ANALYSIS  
Credits: 3  
Methods of handling large databases, including statistical analysis and computer simulations. The emphasis will be upon discrete simulation models with a discussion of relevant computer languages: ARENA, GPSS, and SIMSCRIPT.  
Click here for course fee.  

Pre-Requisites  
CS-125 and MTH-111.  

CS-323. THEORY OF COMPUTATION  
Credits: 3  
This course formalizes many topics encountered in previous computing courses. Topics include languages, grammars, finite automata, regular expressions and grammars, context-free languages, push-down automata, Turing machines, and computability.  
Click here for course fee.  

Pre-Requisites  
CS-126 and MTH-232.  

CS-324. SYSTEMS ANALYSIS  
Credits: 3  
A study of the design and implementation of large computer projects. Special emphasis is placed on applications to business systems. Students will use a CASE tool for automated systems analysis and design.  
Click here for course fee.  

Pre-Requisites  
CS-225.  

CS-325. DATABASE MANAGEMENT  
Credits: 3  
Practical experience involving a large-scale computer problem, including determination of data requirements, appropriate data organization, data manipulation procedures, implementation, testing, and documentation.  
Click here for course fee.  

Pre-Requisites  
CS-126.  

CS-326. OPERATING SYSTEM PRINCIPLES  
Credits: 3  
Analysis of the computer operating systems, including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-327. COMPILER DESIGN  
Credits: 3  
A study of compiler design, including language definition, syntactic analysis, lexical analysis, storage allocation, error detection and recovery, code generation, and optimization problems.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-328. ALGORITHMS  
Credits: 3  
Theoretical analysis of various algorithms. Topics are chosen from sorting, searching, selection, matrix multiplication of real numbers, and various combinatorial algorithms.  
Click here for course fee.  

Pre-Requisites  
CS-226 and MTH-232.
CS-330. COMPUTER ARCHITECTURE  
Credits: 3  
A study of the design, organization, and structure of computers, ranging from the microprocessors to the latest 'supercomputers.' An emphasis will be placed on machine language, instruction formats, addressing modes, and machine representation of numbers.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-334. SOFTWARE ENGINEERING  
Credits: 3  
A course in 'programming in the large.' Topics include software design, implementation, validation, maintenance, and documentation. There will be one or more team projects.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-335. ADVANCED DATABASE CONCEPTS  
Credits: 3  
Practical experience involving unstructured data collections. Topics cover big data, data mining, predictive modeling, decision analysis and indexing and retrieval including probabilistics, clustering, thesauri and passage based retrieval strategies.  
Click here for course fee.  

Pre-Requisites  
CS-325 or CS-340  

CS-340. ARTIFICIAL INTELLIGENCE  
Credits: 3  
This course will provide an overview of artificial intelligence (AI) application areas and hands-on experience with some common AI computational tools. Topics include search, natural language processing, theorem proving, planning, machine learning, robotics, vision, knowledge-based systems (expert systems), and neural networks.  
Click here for course fee.  

Pre-Requisites  
CS-126.  

CS-350. OBJECT-ORIENTED PROGRAMMING  
Credits: 3  
Object-oriented concepts and their application to human-computer interaction. Concepts to be covered include objects, classes, inheritance, polymorphism, design patterns, GUI interface guidelines, and design of interfaces. There will be programming projects in one or more object-oriented languages using one or more GUI interface guidelines.  
Click here for course fee.  

Pre-Requisites  
CS-226.  

CS-355. COMPUTER NETWORKS  
Credits: 3  
This course introduces basic concepts, architecture, and widely used protocols of computer networks. Topics include the Open System Interconnection (OSI) model consisting of physical link layer, data layer, network layer, transport layer, session layer, presentation layer, and application layer, the medium access sublayer and LAN, various routing protocols, Transmission Control Protocol (TCP), and Internet Protocol (IP) for internetworking.  
Click here for course fee.  

Pre-Requisites  
CS-225 and CS-246  

CS-363. OPERATIONS RESEARCH  
Credits: 3  
A survey of operations research topics such as decision analysis, inventory models, queuing models, dynamic programming, network models and linear programming. Cross-listed with MTH-363.  
Click here for course fee.  

Pre-Requisites  
CS-125, and MTH-111.  

CS-364. NUMERICAL ANALYSIS  
Credits: 3  
An introduction to numerical algorithms as tools to providing solutions to common problems formulated in mathematics, science, and engineering. Focus is given to developing the basic understanding of the construction of numerical algorithms, their applicability, and their limitations. Cross-listed with MTH-364. Offered Spring odd years.  

Pre-Requisites  
MTH-211 and CS-125 (or equivalent programming experience).  

CS-366. 3 DIMENSIONAL ENVIRONMENTS AND ANIMATION  
Credits: 3  
This course will explore the foundations of 3-dimensional animation processes as they apply to multiple mediums. Students will build computer-based models and environments, texture, light, animate, and render content for Integrative Media projects or as stand-alone pieces. Cross-listed with IM-350.  
Click here for course fee.  

Pre-Requisites  
CS-126 or IM-201.
CS-367. COMPUTER GRAPHICS
Credits: 3
Fees:
Introduction to equipment and techniques used to generate graphical representation by computer. Discussion of the mathematical techniques necessary to draw objects in two- and three-dimensional space. Emphasis on application programming and the use of a high-resolution color raster display.
Click here for course fee.

Pre-Requisites
CS-226.

CS-368. 3 DIMENSIONAL GAME DEVELOPMENT
Credits: 3
An overview of simulation, engine-based, and real-time game systems with a focus on theory, creation, and animation of three-dimensional models used within a game context. Cross-listed with IM-368.
Click here for course fee.

Pre-Requisites
CS-366/IM 350 or CS-367.

CS-370. SPECIAL PROJECTS
Credits: variable
Requirements: Senior standing and approval of the department chairperson.

CS-383. WEB DEVELOPMENT II
Credits: 3
An introduction to the development of dynamic, database-driven sites, including active server pages, PHP, authentication, session tracking and security, and the development of shopping cart and portal systems.
Click here for course fee.

Pre-Requisites
CS-283. CS-325.

CS-391. SENIOR PROJECTS I
Credits: 1
Design and implementation of a software project under the direction of a faculty member. Students will normally work in teams. Detailed requirements and design documents are required and will be presented at the end of the semester. Offered every fall.
Click here for course fee.

Pre-Requisites
CS-334 or CS-324.

CS-392. SENIOR PROJECTS II
Credits: 2
Design and implementation of a software project under the direction of a faculty member. Students will normally work in teams. Production of a finished product, including software and documentation, is required. There will be an open forum presentation of the project at the end of the semester. Offered every spring.
Click here for course fee.

Pre-Requisites
CS-391.

CS-399. COOPERATIVE EDUCATION
Credits: 1-6
Professional cooperative education placement in a private or public organization related to the student’s academic objectives and career goals. In addition to their work experiences, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student’s discipline. See the Cooperative Education section of this bulletin for placement procedures. Requirements: Sophomore standing; minimum 2.0 cumulative GPA; consent of the academic advisor; and approval of placement by the department chairperson.