COMPUTER SCIENCE COURSES (C S)

C S 100   INTRODUCTION TO COMPUTER CONCEPTS (3) Two hours lecture and one hour lab. This hands-on computer literacy course is designed to introduce students to computer concepts and applications in today's world. Topics include word processing, spreadsheet software, database management, computer communications, and networking. Important historical, moral, and social issues related to computing are covered.

C S 115   USING THE INTERNET (1) Combined one-hour lecture/laboratory. This five-week hands-on course will teach non-computer professionals basic use of the Internet. Topics may include use of E-Mail, use of a World Wide Web browser, telneting, file transfer protocol (FTP), and HTML authoring to create home pages on the World Wide Web.

C S 131   FUNDAMENTALS OF PROGRAMMING IN BASIC (3) Three hours lecture. This course is an introduction to the high-level programming language BASIC. Students learn fundamentals of programming, including use of variables, arrays, various control structures, subroutines, and file I/O. (Strongly recommended before C S 141 for students with no previous programming experience who are considering a major in computer science.)

C S 141-142   INTRODUCTION TO COMPUTER SCIENCE AND STRUCTURED PROGRAMMING (4, 4) Three hours lecture and two hours lab. This introduction to computer science course sequence focuses on programming, problem solving, and algorithm development with implementation on a computer using a structured programming language. Topics include computer organization, debugging and testing techniques, structured programming, string processing, searching and sorting techniques, an introduction to data structures, and recursion. It is strongly recommended that students without any prior programming experience complete C S 131 before enrolling in C S 141.

C S 201   SYSTEM AND NETWORK ADMINISTRATION (3) *Prerequisite: C S 131 or 141.* Three hours lecture. Students experience a hands-on approach to system and network administration. General network and system administration is explored using two or more operating systems. Topics include system configuration, network planning, routine system maintenance, firewalls and security, Internet connectivity, system optimization, troubleshooting, and scripting languages.

C S 220   BUSINESS COMPUTER PROGRAMMING AND FILE SYSTEMS (4) *Prerequisite: C S 131 or 141.* Three hours lecture and two hours lab. The student studies a programming language appropriate for a business environment and uses this language to write programs that have applications to business and information systems. The student studies the creation and use of sequential, direct access, indexed, and indexed-sequential files.

C S 235   COMPUTER NETWORKS (3) Three hours lecture. This course is a study of the design, use and analysis of computer networks. Topics include the major theoretical aspects of computer, network protocols, routing algorithms, and computer security.

C S 241-242   DATA STRUCTURES AND ABSTRACTION I, II (4,4) *Prerequisites: C S 142 for C S 241; C S 241 for C S 242.* Three hours lecture and two hours lab. These courses combine a study of data structures and data abstraction as they relate to the efficient storage and retrieval of data in digital computer systems. Topics may include lists and inverted lists, queues, stacks, trees, networks, hashing, various key

structures, and the use of data structures to implement common file organizations, along with techniques of object-oriented analysis and programming.

C S 271 **COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE PROGRAM-MING (4)** *Prerequisite: C S 131, 141 or 220.* Three hours lecture and two hours lab. This course introduces the concepts of machine and assembly language programming and computer architecture. The student studies the syntax of assembly language and becomes proficient in writing programs in assembly language.

C S 298 **SPECIAL TOPICS IN COMPUTER SCIENCE (3)** Appropriate for freshman and sophomores, this course can focus on a wide variety of topics that provide detailed explorations of technologies of particular interest to computer science majors and minors. Topics will frequently incorporate preparation for professional certification.

C S 322 **PROGRAMMING LANGUAGES (3)** *Prerequisite: C S 142.* Three hours lecture. This course is a comparative study of modern high-level programming languages, their syntax, and acceptors. The student is expected to write programs in any of the languages studied which may include PASCAL, LISP, BASIC, FORTRAN, COBOL, ALGOL, ADA, APL, SNOBOL, PROLOG, and MODULA II.

C S 335 **COMPUTER NETWORKS (3)** *Prerequisite: C S 142.* Three hours lecture. This course is a study of the design, use, and analysis of computer networks. Topics include the major theoretical aspects of computer networks and the algorithms used in their implementation and the major networks currently in use. Students can experiment in a laboratory setting.

C S 345 **WINDOWS PROGRAMMING (3)** *Prerequisites: C S 141, 142.* Three hours lecture. This course will provide the student with the tools needed to create modern graphical user interfaces using a number of different tools and paradigms. Core topics include the event-driven programming model, graphical coordinate systems, libraries for creating, managing and rendering windows, and simple animation and graphics. Students will create graphical user interfaces for a number of programs.

C S 350 **SOFTWARE SYSTEMS ANALYSIS AND DESIGN (3)** *Prerequisite: C S 142 or 220.* Three hours lecture. This course involves the study and implementation of the strategies and techniques of structured software systems development. Topics include system specification and documentation. Data management systems, structures, and applications are also covered.

C S 355 **COMPUTER FORENSICS (3)** *Prerequisite: C S 142 or 235.* Securing relevant evidence from computer systems and other electronic devices requires a range of skills and a deep understanding of how data is stored and organized electronically. This course serves as an introduction to the technologies relevant to computer forensics and provides the student with hands-on experience collecting and analyzing electronic data.

C S 360 **OPERATING SYSTEMS AND COMPUTER ORGANIZATION (3)** *Prerequisite: C S 142.* Three hours lecture. This course is a study of the hardware and software systems and subsystems that make the basic components of a computer system accessible to the managers and users of that system. Topics include processes, scheduling, resource allocation, protection, virtual memory, parallel processing, input/output processing, data encoding, accessing techniques, communications, compilers, and utilities.

C S 365 **GAME PROGRAMMING (3)** *Prerequisite: C S 142.* Three hours lecture. This course introduces the concepts of 3-D graphics and modeling and realtime interaction in an event-driven environment. Topics include geometric transformations, light models, texture mapping, special effects, 3-D sound, physics modeling, and graphics engines.

C S 370 **DATABASE MANAGEMENT SYSTEMS (3)** *Prerequisite: C S 142 or 220.* Three hours lecture. This course studies the fundamental principles and roles of database management systems. Database models covered include the relational, entity-relationship, hierarchical, and network models with primary emphasis on the relational model. Other topics include database design and physical storage management. Although database theory is an important part of this course, students are expected to become proficient in an actual DBMS.

C S 375 **PRINCIPLES OF DIGITAL SYSTEMS (4)** Three hours lecture and two hours lab. The principal concepts of digital systems and their applications to computer science are studied. Topics in-

clude number representations, codes, switching theory, sequential circuits, comparators, arithmetic circuits, counters, memory implementation, and integrated circuit logic families.

C S 380 **ARTIFICIAL INTELLIGENCE (3)** *Prerequisite: C S 241.* Three hours lecture. This course is a study of the theoretical issues and programming techniques involved in artificial intelligence. Core topics include search, knowledge representation, and reasoning. Additional topics may include game theory, planning, understanding, natural language processing, machine learning, neural networks, genetic algorithms, expert systems, and real-time systems. Students develop competence in a language widely used for A.I. programming, typically LISP or PROLOG.

C S 385 **INTERNET-BASED SYSTEMS (3)** *Prerequisite: C S 370.* Three hours lecture. In this course students develop an intermediate-level proficiency in the use of HTML, Access, Visual Basic, VBScript, and SQL as applied to accessing databases over the World Wide Web. The student uses these development tools together to develop interactive web-based applications that access databases. Applications developed in the course utilize graphic images, tables, forms, frames, ASP, CGI programming and database interfaces in an interactive GUI environment.

C S 397 **INDEPENDENT STUDY IN COMPUTER SCIENCE (1-3)** *Prerequisites: Approval of faculty sponsor and school dean; junior or senior standing.* This course provides students the opportunity to pursue individual study of topics not covered in other available courses. The area for investigation is developed in consultation with a faculty sponsor and credit is dependent on the nature of the work. May be repeated for no more than six credits.

C S 398 **SPECIAL TOPICS IN COMPUTER SCIENCE (1-3) [credit depends on topic]** *Prerequisite: A background of work in the discipline.* This course will focus on an aspect of the discipline not otherwise covered by the regularly offered courses. The topic will vary according to professor and term; consequently, more than one may be taken by a student during his/her enrollment.

C S 399 **INTERNSHIP IN COMPUTER SCIENCE (1-12)** *Prerequisites: Juniors or seniors with a 2.25 minimum QPA; approval of written proposal by internship coordinator, and supervising faculty prior to registration.* Internships occur in businesses or other institutions involved in computer science-related work. (See "Internships.")

C S 451-452 **SENIOR PROJECT (2,2)** *Prerequisites: C S 242 and senior standing.* This is a capstone course in which the student proposes and completes an independent research or development project. Research projects involve review of significant literature and the writing of a major technical paper, which may require design, implementation, and evaluation of experimental systems. Development projects require full system specifications, system design and analysis, user documentation, and complete, well documented source code.