CS - COMPUTER SCIENCE (CS)

CS 1XX. Comp Science Elective. (1-3 Credits)

CS 101. Introduction to Computer Programming. (3 Credits)
A hands on, introductory computer programming course intended for students that are majoring in non-computing degree programs. Students use a modern programming language to learn basic programming principles including arithmetic, control structures, simple data structures and graphics. The course focuses on solving real-world problems. Prerequisites: Any area III math included in the General Education components, or a Math ACT score of 22 or higher. (Fall, Spring).

CS 135. Computer Skills for Problem-Solving. (3 Credits)
Using personal computers as effective problem-solving tools, this course will enhance analytical thinking and abstraction skills. Topics include problem specification, problem-solving techniques, and the interpretation of results to problems from scientific, business, and social domains. Students will utilize productivity software, the Internet, and programming principles to foster an understanding of the impact of computing technology on society and culture. (Fall, Spring, Summer)

CS 155. Computer Science I. (4 Credits)
An introduction to the theoretical foundations of computer science, the components of algorithms and the representation of these components using a high-level programming language. Special emphasis on software development and an introduction to object-oriented programming. Prerequisites: CS 135 and MA 112, or CS 135 and MA 115, or MA 125 with a grade of B or higher. (Fall, Spring, Summer)

CS 245. Introduction to Discrete Structures. (3 Credits)
Sets, functions and relations, basic logic, proof techniques, basics of counting, graphs and trees, discrete probability and number systems with applications to various areas of computer science. Prerequisite: MA 112; Prerequisite or Corerequisite: CS 155. (Fall)

CS 255. Computer Science II. (3 Credits)
Continuation of CS 155 with emphasis on advanced programming techniques, including recursion and pointers. Introduction to elementary data structures such as queues, stacks, lists, strings, and trees. Discussion of professional ethics. Programming methodology with emphasis on object-oriented programming. Prerequisite: CS 155 with a grade of C or higher. (Fall, Spring, Summer on sufficient demand)

CS 310. Computer Organization and Assembly Language Programming. (3 Credits)
Overview of computer hardware organization, machine representation of numbers and characters, memory system organization and architecture. Overview of system software. Programming experience in assembly language. Prerequisite: CS 245 with a grade of C or higher. (Spring)

CS 311. Computer Architecture. (3 Credits)
Review of Boolean algebra and the elements of logic design including a laboratory experience. Study of the theory and design of register transfer, bus structure, arithmetic unit, control unit and memory. Consideration of design options including array processors, stack-based processors, pipelining, multiprocessing and distributed systems. Prerequisite: CS 310 with a grade of C or higher. (Fall)

CS 315. Graphical User Interface Programming. (3 Credits)
Introduction to programming for modern graphical user interfaces using a visual programming tool. Topics include integrated development environments, object-oriented design, use of components and rapid application development. Prerequisite: CS 255 with a grade of C or higher. (Spring, Even-numbered years)

CS 325. Programming for the Web. (3 Credits)
Introduction to programming for the World Wide Web, using current technology. Prerequisite: CS 255 with a grade of C or higher. (Fall, Odd-numbered years)

CS 335. New Developments in Programming. (3 Credits)
An introduction to a topic of current interest in the field of Computer Science. Prerequisite: CS 255 with a grade of C or higher. (Spring, Odd-numbered years)

CS 355. Data Structures and Algorithms. (3 Credits)
Introduction to the analysis of algorithms with regard to time and space. Methods of sorting and searching. Basic design techniques like divide and conquer, dynamic programming and backtracking. Algorithms for manipulating trees and graphs with platform independent implementation. Prerequisite: CS 255 with a grade of C or higher. (Fall, Spring)

CS 359. Special Course. (1-6 Credits)
Course number reserved for special courses offered from time to time in response to special circumstances. The courses are discipline specific with variable credit and when offered, they are identified by department content and credit.

CS 410W. Programming Languages. (3 Credits)
Formal study of programming language concepts: syntax; characteristics of grammars such as context-free and ambiguous; Backus-Naur Form; organization of programming languages such as block structure, list processing, etc. Prerequisite: CS 355 with a grade of C or higher. (Spring)

CS 420. Operating Systems. (3 Credits)
History, overview, and principles of operating systems with emphasis on process, memory and device management, concurrency, system performance, file systems, and security. Contemporary operating systems will be investigated. Multi-processors, real-time and embedded systems, and distributed processing will also be presented. Prerequisites: CS 310 and CS 355 with a grade of C or higher in both. (Fall)

CS 421. Automata Theory and Compiler Construction. (3 Credits)
Definition of formal grammars, mathematical machines and their relationships. Description of compiler writing techniques and their application on a simple language. Prerequisites: CS 245 and CS 355 with a grade of C or higher in both. (Spring, Even-numbered years)

CS 430. Design and Analysis of Algorithms. (3 Credits)
Advanced asymptotic analysis of algorithms utilizing mathematical modeling with an emphasis on efficient methods for searching, sorting, trees, and graphs. Classic algorithm design techniques such as greedy, divide and conquer, dynamic programming, backtracking, and randomized algorithms will be investigated and analyzed. Study of the classification of the computational difficulty of problems: i.e. NP, intractable, and unsolvable. Prerequisites: CS 245 and CS 355 with a grade of C or higher in both. (Fall odd-numbered years)

CS 440. Computer Networking. (3 Credits)
Introduction to computer networking including basic networking concepts and components, architecture, protocols, server types, network operating systems and network security. Prerequisites: CS 245 and CS 355 with a grade of C or higher in both. (Spring, Odd-numbered years)

CS 447. Theory and Applications of Database Systems. (3 Credits)
Introduction to database systems, including the history of the development and basic concepts of the major types of database systems, inquiry systems and experience with a database model. Prerequisites: CS 255 with a grade of C or higher. (Fall, Even-numbered years)
CS 455. Software Engineering. (3 Credits)
A study of all the phases in a software systems life cycle including analysis, specification, design, implementation, testing, and maintenance. The application of these principles through the development of a networked, multi-tier software application that employs data persistence. An emphasis on problem solving concepts integrated within the treatment of the software life cycle, requirements specifications, and verification and validation issues. Prerequisites: CS 355 (with a grade of C or higher) and Senior standing. (Spring)

CS 470. Artificial Intelligence. (3 Credits)
A survey of topics including knowledge representation and reasoning, expert systems, informed and uninformed search algorithms, search and constraint satisfaction, and the use of artificial intelligence languages. Prerequisite: CS 355 (with a grade of C or higher). (Fall, Even-numbered years)

CS 480. CS Internship. (3 Credits)
A minimum 150-hour work related experience in the University or other public or private organization where the student will have hands-on experience in the day-to-day operation, development, or management of computer systems. The internship must occur in a work environment related to the computer science discipline. Application process is coordinated through Career Center. Must be a junior or senior and have a 3.0 overall grade point average. International students must receive approval from the Office of International Affairs prior to course registration. Prerequisites: CS 255 (with a grade of C or higher) and departmental approval. (Fall, Spring, Summer)

CS 490. Senior Seminar. (3 Credits)
Computer science topics selected according to the needs of the students. Prerequisite: departmental approval. (Offered on sufficient demand)