Computer Science (CS)

Courses

CS 118 Fundamentals of Computer Programming  3 Credits (3,0)
Introduction to basic concepts of structured programming with applications in business, technology, and engineering. This course is intended for the student with little or no experience in programming.

CS 121 Introduction to Computer Game Systems  3 Credits (2,2)
Principles of the elements of computer game design. The usage of computer games. Introduction to underlying technologies supporting modern computer games. Students design, implement, and critique several small games.

CS 125 Computer Science I  4 Credits (4,0)
Introduction to problem-solving methods, algorithm development, and software engineering; software development process, program design, coding, review, testing, and documentation; and programming using a modern programming language that supports modular development. The course has a closed laboratory that includes activities dealing with the computing environment, the software development process, and programming exercises.
Corequisites: CS 125L.

CS 199 Special Topics in Computer Science  1-6 Credit
Individual independent or directed studies of selected topics in computer science.

CS 213 Introduction to Computer Networks  3 Credits (3,0)
This course will focus on the principles and practice of computer networking, with emphasis on the Internet. The students will learn the structure and components of computer networks, packet switching, layered architectures, TCP/IP, physical layer, error control, window flow control, local area networks (Ethernet, Token Ring, FDDI), network layer, congestion control, quality of service, and multicast.
Prerequisites: CS 125.

CS 225 Computer Science II  4 Credits (3,3)
This course emphasizes program design, style, data abstraction, information hiding, and testing; advanced programming features; and introduction to object-oriented concepts, basics of algorithm analysis, exception handling, string processing, recursion, pointers, and simple data structures. The course has a closed laboratory that includes activities dealing with the computing environment, the software development process, and programming exercises.
Prerequisites: Student in CE/EE/SE majors must have a C or better in CS 125 Corequisites: CS 225L.

CS 233 Interactive Media I  3 Credits (3,0)
An introduction to the technologies needed for interactive media and game design. Concepts covered include web-based software systems, virtual world platforms, and game engines. Emphasis on conceptual aspects of these technologies.

CS 234 Modeling and World Building  3 Credits (2,2)
The use of 3D modeling software to design and create animated, textured models. The creation of virtual worlds incorporating objects, scenes, and venues for activity within online environments.

CS 299 Special Topics in Computer Science  1-6 Credit
Individual independent or directed studies of selected topics in computer science.

CS 303 Network Security  3 Credits (3,0)
This course introduces the principles and algorithms of modern encryption and some major issues and problems of computer security. Topics covered include the notion of block ciphers and implementations such as DES and Blowfish. Modern public key encryption techniques such as the RSA algorithm. Statistical attacks on encryption including traffic monitoring. Hash functions. Digital signatures and authentication methods. An introduction to some attacks and defenses such as viruses, worms, and firewalls. This course is intended to be a required course in an Cyber Security Engineering minor or a technical elective for students majoring in Computer Science or Computer Engineering.

CS 304 Introduction to Computer Forensics  3 Credits (3,0)
This course will give participants an introduction to the necessary skills to identify an intruder's footprints and to properly gather the necessary evidence to prosecute. The basic methodologies and techniques of forensics will be discussed during this course. This course is for individuals and organizations interested in an overview of the knowledge and skills needed to identify, track, and prosecute the cyber-criminal.

CS 315 Data Structures and Analysis of Algorithms  3 Credits (3,0)
This course emphasizes the design, implementation, and analysis of algorithms dealing with searching, sorting, graphs, trees, and disk files.
Prerequisites: Students in SE must have C or better in CS 125 and (CS 222 or MA 225)

CS 317 Files and Database Systems  3 Credits (3,0)
Introduction to file and database systems. The course will cover the theory of database systems, various database models, and the design of a database system. Course homework will reflect real-life problems requiring cooperation, problem formulation, and problem-solving skills. A team/group term project may be assigned.
Prerequisites: Students in SE major must have a C or better in CS 315.

CS 325 Programming in ADA  3 Credits (3,0)
Advanced systems concepts using the ADA language to implement software engineering, concurrent programming, and structured design techniques.
Prerequisites: Students in SE must have C or better in CS 125.

CS 332 Organization of Programming Languages  3 Credits (3,0)
A comparative study of different programming paradigms. Students program in several languages chosen to illustrate the essential features of the paradigms studied. Formal language concepts are also introduced.
Prerequisites: CS 225.

CS 333 Interactive Media II  3 Credits (2,2)
This is a continuation of Interactive Media I. Technologies for interactive media and game design. Emphasis on architectural aspects of these technologies.
CS 335  Introduction to Computer Graphics  3 Credits (3,0)
Introduction to computer graphics, algorithms, graphics programming, graphics design, use of graphic packages, and applications of computer graphics to aviation, business, and scientific problems. A term project involving a graphics programming application may be assigned.
Prerequisites: MA 241.

CS 336  Graphics Processors  3 Credits (2,2)
Principles of computer architecture emphasizing hardware used with general purpose processor to support graphics engines.

CS 350  Computer Modeling and Simulation  3 Credits (3,0)
Introduction to the basic aspects of modeling and simulation. Topics include statistical models, queuing theory, random variate generation, simulation languages, object-oriented programming, graphic output with animation, design and analysis of experiments, and verification and validation of simulation models. A term project involving the simulation of an element of aviation or aerospace may be assigned.
Prerequisites: MA 241 or MA 222.

CS 399  Special Topics In Computer Science  1-6 Credit
Individual independent or directed studies of selected topics in computer science.

CS 415  Human-Computer Interfaces  3 Credits
This course introduces Computer Science students to several important aspects of how humans use computers and how software is designed for usability. Students are introduced to usability issues, graphical systems, and graphical interfaces.
Prerequisites: CS 225 and CS 225L.

CS 420  Operating Systems  3 Credits (3,0)
Development, structure, and functions of operating systems; demand service models; development of concurrent models. Pre-Requisite: Junior standing
Prerequisites: SE students must have a C or better in CS 125.

CS 425  Net-Centric Computing  3 Credits (3,0)
This course introduces Computer Science students and other engineering majors to areas of software and computer science that pertain to networks and network-based computation.
Prerequisites: SE students must have a C or better in CEC 320.

CS 432  Information and Computer Security  3 Credits (3,0)
The course will start with an overview of the larger context of information security, including the "softer" aspects of personnel and operational security, and then delve into the technical basis and practical difficulties of COMPUSEC itself. This course is intended to be a required course in an Cyber Security Engineering minor or a technical elective for students majoring in Computer Science or Computer Engineering.
Prerequisites: SE students must have a C or better in CS 420.

CS 434  Game Engine Laboratory  3 Credits (2,2)
The use of an open source game or graphics engine in the design and implementation of a computer game. Principles of game engine design. Students work on teams to design, implement, and evaluate new computer games based on an engine.

CS 437  Multiplayer Game Systems  3 Credits (2,2)
Foundations and technologies that enable multiuser, networked, and persistent virtual environments. Emphasis on database design and management, network protocols, and concurrency control to accommodate large numbers of simultaneous users.

CS 438  Visualization and Virtual Reality  3 Credits (2,2)
An introduction to the use of games, graphics, and visualization in engineering, science, and the military. An overview of the use of virtual reality in war gaming and military training. Flight Simulator development.

CS 455  Artificial Intelligence  3 Credits (3,0)
This course introduces students to the basic concepts of artificial intelligence with emphasis on knowledge engineering. Students gain experience, through individual and group exercises, in the various phases of system development: planning, requirements and specification, design, implementation, and testing. Students study and apply commercial tools to the development of knowledge-based systems in the aerospace and aviation domain.
Prerequisites: Students in SE must have C or better in MA 225.

CS 480  Simulation Science Preliminary Design  3 Credits (2,2)
This course introduces students to discussing issues of management, planning, task assignment, resource allocation, requirement collection, and system specification and design. Working as a team, students will develop a base for the implementation of a computer game or similar project. The artifacts developed during this course will be used as the foundation for further development during the second course in the sequence - CS 481.

CS 481  Simulation Science Detail Design  3 Credits (2,2)
This is the second course in the senior project sequence and is a continuation of CS 480. This course continues with project development, focusing on issues of detailed design, modularization, component selection, coding, assembling, and testing. Working as a team, students will implement and test a computer game or similar project.

CS 499  Special Topics in Computer Science  1-6 Credit
Individual independent or directed studies of selected topics in computer science.