COMPUTER SCIENCE (CS)

CS 116L Intro To Comp Science Lab I (1 Credits)
Introduction to Computer Science Laboratory I 1 (1) Laboratory course designed to complement CS 116 and focuses on the fundamental concepts of computing such as how computers work, what they can do, and how they can be used effectively. Two hours of laboratory per week. Co-requisite: CS 116.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 117 Intro To Comp Science II (3 Credits)
Introduction to Computer Science II (non-majors) (3) Introduction to World Wide Web applications and design, including Web scripting languages and HTML editors. Three hours of lecture per week.
Prerequisite(s): CS 116
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 117L Intro To Comp Science II (1 Credits)
Introduction to Computer Science Laboratory II† (1) Laboratory course designed to complement CS 117 and provides hands on activities that focus on World Wide Web applications and their design, including Web scripting languages and HTML. Two hours of laboratory per week. Co-requisite: CS 117.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 120 Introduction to Programming Using C++ (3 Credits)
This course covers algorithms, flowcharts, pseudo code, number systems, types, decision making, loops, strings, arrays, and functions. Three credit hours credit.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 120L Intro to Comp & Problem Lab (1 Credits)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 122 Microcomputer App (3 Credits)
Prerequisite(s): (CS 116)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 124 Fund Machine Computation (3 Credits)
Fundamentals of Machine Computation (3) Study of the theory and applications of discrete mathematical structures as a foundation for topics in computer science. Required for computer science majors and minors. Three hours of lecture per week. Prerequisite: MATH 136.
Prerequisite(s): MATH 136
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 140 Computer Programming in Java (3 Credits)
Computer Programming in Java (3) Introduction to the JAVA programming language that covers the use of object oriented programming methodologies such as class inheritance, polymorphism, multithreading, generics, GUI components, and exceptions. Required for computer science majors and minors. Three hours of lecture per week. Prerequisite: CS 120.
Prerequisite(s): CS 120
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 140L Computer Programming using Java Lab (1 Credits)
A laboratory course in computer programming in Java. Complements the concepts covered in CS 140. Helps students gain hands-on programming experience though examples and exercises tailored for CS 140 lectures. Topics include data types, variables, input/output, conditional statements, loops, arrays, and functions. Two contact hours per week. Co-Requisite: CS 140.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 216 Advanced Applications I (3 Credits)
Advanced Applications I (non-majors) (3) Designed for students interested in learning computer programming applications using VISUAL BASIC. Design, implementation, and testing of programs and graphical user interfaces. Process of using VISUAL BASIC to access object oriented model of other applications also considered. Three hours of lecture per week. Prerequisite: CS 117.
Prerequisite(s): CS 117
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 216L Advanced Applications I (1 Credits)
Advanced Applications Laboratory I 2 (1) Laboratory course designed to complement CS 216. Provides hands on experience that focuses on the study of computer programming using VISUAL BASIC. Two hours of laboratory per week. Corequisite: CS 216.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 217 Advanced Applications II (2 Credits)
Advanced Applications II (3) This course is a continuation of CS 216 providing advanced study of software application development in the WINDOWS environment. Students develop customized software products with applications related to subject area matter studied. Two hours of lecture and one hour of lab per week. Prerequisite: CS 216.
Prerequisite(s): CS 216
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 217L Advance Applications Lab II (1 Credits)
Advanced Applications Laboratory II‡ (1) Laboratory course designed to complement CS 217. Provides hands on experience that focuses on software application development in the WINDOWS environment. Two hours of laboratory per week. Co-requisite: CS 217.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 224 Prog PASCAL (3 Credits)
Prerequisite(s): (CS 120)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 241 Advanced OOP Using C++ (3 Credits)
Object Oriented Programming Using JAVA (3) The use of modern object oriented programming methodologies such as class inheritance, polymorphism, multithreading, generics, GUI components, and exceptions. JAVA programming language is used. Required for computer science majors and minors. Three hours of lecture per week. Prerequisite: CS 140.
Prerequisite(s): (CS 120)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 243 Computer Organization (3 Credits)
Computer Organization (3) Basic concepts of digital computers: Boolean algebra, combinatorial and sequential logic design, arithmetic/logic units, control units, memory units, and input/output units, flip flops, synchronized and asynchronized counters. Required for computer science majors and minors. Three hours of lecture per week. Prerequisites: CS 124 and CS 140.
Prerequisite(s): (CS 124)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 246 Data & File Structures (3 Credits)
Data and File Structures (3) Advanced programming techniques and data structures including tables, linked lists, queues and stacks. Abstract data types, recursion, searching and sorting, hashing, binary trees. External storage devices and sequential and direct file organization, file processing techniques. Required for computer science majors and minors. Three hours of lecture per week. Prerequisites: CS 124, CS 140.
Prerequisite(s): (CS 124 and CS 140)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 248 Theory of Computation (3 Credits)
Theory of Computation (3) Introduction to automata and languages, computability and complexity of algorithms. This course covers graph theory, finite state automata, determinism non-determinism, regular expressions, context free and non-context free grammars, algorithm definition, algorithm complexity, class P, class NP algorithms and NP-completeness. Required for computer science majors. Three hours of lecture per week. Prerequisites: MATH241, CS 243. Corequisite:CS246
Prerequisite(s): (MATH 241 and CS 243)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 250 Computer Networks Fundamentals (3 Credits)
Computer Networks Fundamentals (3) Introduction to the fundamental networking concepts and technologies focusing on both the conceptual and practical skills needed to understand basic networking. Students will gain an understanding of the "layered" approach to networks and examine the OSI and TCP/IP layers in detail to understand their functions and services. It provides an overview to various network devices, network addressing schemes and, finally, the types of media used to carry data across the network. Required for computer science majors and concentration II minors. Three hours of lecture per week. Prerequisite: CS 120.
Prerequisite(s): (CS 120)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 251 Internetworking & Routing (3 Credits)
Internetworking and Routing Basics (3) A comprehensive study of internetworking as well as routing concepts and protocols is presented to develop an understanding of how networks are linked together. An introduction to routers, their role in the network, their main hardware and software components, and the packet forwarding process is included. This course covers the foundations of static and dynamic routing protocols. It provides a detailed study of various Distance Vector as well as Link State protocols and examines their characteristics, operations, limitations, configuration, and troubleshooting techniques. Required for computer science concentration II majors and concentration II minors. Three hours of lecture per week. Prerequisite: CS 250.
Prerequisite(s): (CS 250)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 342 Prog Lang & Design (3 Credits)
Programming Languages and Design (3) Introduction to the structure and design of the programming language paradigm, formal specification of syntax, semantics, functional languages, logic languages, parallel languages, data types and interfacing procedures. Required for computer science majors. Three hours of lecture per week. Prerequisites: CS 241, CS 248.
Prerequisite(s): (CS 241 and CS 248)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 343 Assembly & Comp Archi (3 Credits)
Assembly and Computer Architecture (3) Rigorous study of the architecture, applications, programming, and interfacing of current microprocessors, co-processors, and controllers. Hardware and software structures found in modern digital computer systems. Parallel architectures included. Required for computer science majors. Three hours of lecture per week. Prerequisite: CS 243.
Prerequisite(s): (CS 243)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 344 Compiler Des & Const (3 Credits)
Compiler Design and Construction (3) Concepts, design, implementation and construction techniques for programming language translators, simple one-pass compiler; lexical analysis; semantics analysis, top-down, bottom-up and operator precedence parsing, left-left and left-right parser techniques. Three hours of lecture per week. Prerequisite: CS342
Prerequisite(s): CS 342
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 346 Database Mgmt System (3 Credits)
Database Management Systems (3) Theory and current practices in database management systems, data organizational models, including hierarchical and networked, with relational and semantic models stressed. Required for computer science majors. Three hours of lecture per week. Prerequisites: CS246, CS 248.
Prerequisite(s): (CS 246 and CS 248)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 350 LAN Fundamentals (3 Credits)
Local Area Network Fundamentals (3) This course covers an introduction to LAN switching and wireless LANs and. in depth examination of the underlying concepts and processes of the common Layer 2 switching protocols and technologies. It provides the necessary knowledge required to implement, verify, and troubleshoot Local Area Networks. It also covers wireless LAN standards and concepts required to design, implement and troubleshoot wireless LANs. Required for computer science concentration II majors and concentration II minors. Three hours of lecture per week. Prerequisite: CS 250.
Prerequisite(s): (CS 251)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 351 WAN Technologies (3 Credits)
Wide Area Network Technologies (3) This course is an introduction to the various wide area networks (WANs) access technologies used to connect small-to medium-sized business networks. This course introduces WAN converged applications and quality of service (QoS). It focuses on WAN technologies including PPP, Frame Relay, broadband links, and WAN security concepts. It covers the principles of traffic control and access control lists and describes how to implement IP addressing services for an Enterprise network, including how to configure NAT and DHCP. Finally, students learn how to detect, troubleshoot and correct common Enterprise network implementation issues. Required for computer science concentration II majors and concentration II minors. Three hours of lecture per week. Prerequisite: CS 251.
Prerequisite(s): (CS 350)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 354 Web Appl Development (3 Credits)
Logic Programming Using Prolog (3) A thorough introduction to logic programming using Prolog. Includes a description of Prolog data objects such as predicates, clauses, facts, and queries and introduces the concepts of goal resolution though unification and negation as failure. Programming techniques using control, meta-logical and extra-logical predicates and arithmetic operations are also studied. Three hours of lecture per week. Prerequisite: CS 342.
Prerequisite(s): (CS 250 and CS 346)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 356 Numerical Analysis (3 Credits)
Numerical Analysis (3) Numerical solution of nonlinear equations, integration, interpolation and data smoothing, systems of linear and nonlinear equations. Three hours of lecture per week. Prerequisites: MATH 242, MATH 330, and CS 140.
Prerequisite(s): (MATH 242 and MATH 330 and CS 140)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 415 Comp Ethics & Society (3 Credits)
Computer Ethics and Society (3) This course is a study of the ethical and social issues related to computers and computer networks. It provides an introduction to the legal, social, and ethical issues surrounding information technology and to the societal risks addressed in software testing and reliability standards. Safety and relevant legal cases will be covered. Required for computer science majors. Two hours of lecture per week. Prerequisite: Junior level standing.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 434 Wireless Programming (3 Credits)
Wireless Programming (3) This course involves a thorough introduction to wireless device programming with a focus on Wireless application development and Wireless Internet programming. After an overview of the elements and dynamics of the Wireless Internet landscape, the course focuses on the skills required for content development and management of wireless media applications. Emphasis is on developing applications that can be accessed remotely using the Wireless Application Protocol (WAP) and the Wireless Markup Language (WML) as well as standalone applications that run on platforms such as Android. Three hours of lecture per week. Prerequisite: CS 354 or instructor consent.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 444 Operating Systems (3 Credits)
Operating Systems (3) Introduction to the function, internal data structures, and operations of operating systems and their associated file systems. Required for computer science majors. Three hours of lecture per week. Prerequisites: CS 343 and CS 346
Prerequisite(s): (CS 343 and CS 346)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 445 Multimedia Applications (3 Credits)
Multimedia Applications (3) This course focuses on the fast emerging field of multimedia authoring and application development. It covers multimedia representation, storage, and communication. It provides students with the basics of integrating audio, video, and textual sources into multimedia objects. Software and hardware issues related to multimedia are studied in this class. Required for computer science concentration II majors. Three hours of lecture per week. Prerequisite: CS 354.
Prerequisite(s): (CS 354)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 448 Computer Networking (3 Credits)
Computer Networking (3) Study of current practices in computer networking including ISO standards, layered models, and protocols. Required for computer science majors. Three hours of lecture per week. Prerequisite: CS 444.
Prerequisite(s): (CS 444)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 450 Network Management & Security (3 Credits)
Network Management and Security (3) This course provides an introduction to the basic concepts of the network-management architectures and protocols. It covers, in detail, the implementation, operation, security, management and support of complex LAN and WAN networks to develop an understanding of the tools, procedures and standards needed for network administration. Students will learn common network management concepts and protocols such as Structure of Management Information (SMI), Management Information Base (MIB), Simple Network Management Protocol (SNMP), Remote Monitoring (Rmon), and Common Management Information Protocol (CMIP). Required for computer science concentration II majors. Three hours of lecture per week. Prerequisite: CS 351.
Prerequisite(s): (CS 351)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 451 Intro to Wireless&Mobile Nets (3 Credits)
Introduction to Wireless and Mobile Networks (3) This course provides an introduction to wireless and mobile networks and covers the following topics: mobile radio propagation; traffic engineering; cellular concepts; multiple radio access; multiple division techniques; channel allocation; mobile communication systems; existing wireless systems; network protocols; Ad Hoc and sensor networks; and wireless LANs and PANS. Required for computer science concentration II majors. Three hours of lecture per week. Prerequisite: CS 350.
Prerequisite(s): (CS 350)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 456 Soft Eng (3 Credits)
Software Engineering and Testing (3) Study of the principles and practices of software engineering. Topics include software quality concepts, process models, and analysis of software requirements, design methodologies, software testing, and software maintenance. Required for computer science majors. Three hours of lecture per week. Prerequisite: CS 444
Prerequisite(s): (CS 444)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 457 Artificial Intel (3 Credits)
Artificial Intelligence (3) Introduction to the fundamental theories, algorithms and representational structures underlying Artificial Intelligence and practice techniques for programming AI applications using Prolog. General areas covered include search techniques, production systems, planning, learning, and connectionist systems. Three hours of lecture per week. Prerequisites: CS 354 and CS 346
Prerequisite(s): (CS 342)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 460 Computer Graphics (3 Credits)
Computer Graphics (3) Basic concepts of computer graphics, including programming, hardware, display technology, and data structures for both micros and high-performance workstations. Three hours of lecture per week. Prerequisites: CS 248, CS 356 and MATH 333
Prerequisite(s): (CS 248 and CS 356)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 497 Adv Topics (3 Credits)
Advanced Topics (3) Presentation of advanced topics in computer science by faculty and students. Three hours of lecture per week. Corequisite: CS 456.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 498 Sen Comp (0 Credits)
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci

CS 499 Capstone Proj (3 Credits)
Capstone Project (3) A CS required capstone design course to encourage independent study, project design, and development. Proposal must be submitted and approved during term preceding enrollment. Required for computer science concentration I majors. Three hours of lecture per week. Prerequisites: Consent of the Faculty Chair and Senior Level standing.
College/School: Col of Science, Engr & Tech
Department: Department of Computer Sci