

Computer

Code	Name	Course Description and strengths
CPE 100	Introduction to Computer Engineering	Programming concepts will be covered while the syntax and semantics of C language will be emphasized. Lab hours will focus on programming experience. Subject matter includes input, output, expression grammar, library function calls, selection structures, looping construction, arrays, writing functions, understanding pointers, file processing, and using structures. An introduction to object-oriented programming with C++ will also be covered.
CPE 110	Computer Engineering Exploration	Introduction to practical concepts of computer systems and its components including basic electric circuits, electronic devices, logic gates and digital circuits, and hardware interfacing. Hands-on experience focuses on computer simulations and experiments on the mentioned topics.
CPE 112	Discrete Mathematics for Computer Engineers	Basics of logic: relations, mathematical reasoning and logical reasoning, propositional logic, and predicate logic. Introduction to logic programming, graphs, trees, finite automata and context-free grammar, and the Turing machine. Introduction to the complexity analysis of algorithms and to number theory.
CPE 130	Algorithms and Data Structures	Introduction to data representation and structure, array, linked-listed, stacks and queues, trees, graphs, analysis of algorithms, recursion, sorting and searching algorithms, hashing, heap tree, binary search tree, AVL tree, breadth first search, dept first search, string processing, and data compression.
CPE 214	Signals and Systems	Introduction to signal and system. Continuous-time signals and systems: mathematical representation of signals, frequency-domain representation of signals, time-domain representation of systems, transform-domain representation of systems and continuous-time system architecture. Discrete-time signals and systems: mathematical representation of signals, frequency-domain representation of signals, time-domain representation of systems, transform-domain representation of systems and discrete-time system architecture. First order and higher order differential equations. Frequency response, Fourier analysis and Laplace transforms
CPE 220	Digital Systems Design	Number systems, codes, logic gates, Boolean algebra, logic functions, multi-level combinational logic and simplification, flip-flops and related devices, sequential logic design and optimization, types of registers and counters including design and implementation, programmable and steering logic, PALs and PLAs, multiplexers and selectors, logic design in computer simulation program.
CPE 221	Circuits and Electronics for Computer Engineers	Electrical units and definitions; fundamental laws; natural response; forced response; complete response; power; RMS value; AC circuits and polyphase circuits. Introduction to semiconductor devices; diodes, bipolar junction transistor(BJT), field-effect transistor(FET). DC biasing and AC small-signal analysis of BJT and FET amplifiers, frequency response consideration, operational amplifiers, basic DC power supply, A/D and D/A conversions, some useful circuits.
CPE 221	Digital System Laboratory	Experiments on digital circuit design using both simulation programs and actual circuits. The experiments consist of basic logic gates, clock generation circuits, counter circuits, encoder circuits, decoder circuits, shift register current, arithmetic circuits, multiplexer and demultiplexer circuits, digital-to-analog and analog-to-digital circuits, and design and implementation of Field Programmable Gate Array (FPGA) circuits.

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CPE 222	Circuit and Electronic Laboratory	Using some electronic measuring equipment with safety considerations to experiment on some useful electrical and electronic circuits that coincide with the CPE 221 course.
CPE 223	Computer Architecture and Systems	Topics cover processor technology, input and output, memory hierarchy, interleaved memory, bus, cache, pipelined architectures, computer arithmetic, and multiprocessors technology. The course will also discuss machine instructions and assembly language to be applied to actual microprocessor design for physical control and data communications. Experiments focus on microcomputer, microprocessor and microcontroller interfacing with physical devices.
CPE 223	Digital System Design	Number systems, codes, logic gates, Boolean algebra, logic functions, multi-level combinational logic and simplification, flip-flops and related devices, sequential logic design and optimization, types of registers and counters including design and implementation, programmable and steering logic, PALs and PLAs, multiplexers and selectors, logic design in computer simulation program.
CPE 231	Principles of Programming Languages	Programming language paradigms and the principle of programming language design are provided. The structure and design principles of programming languages consist of syntax and semantic, notion of type, role of variable declarations, bindings and scope, sequence control, subprogram control, and abstract data type. Four programming language paradigms include imperative programming, object-oriented programming, functional programming, and script programming.
CPE 301	Seminar	Under the supervision of faculty members, each student works independently, selects a topic from an academic paper in computer engineering, and prepares for a presentation and discussion in class. The selected topic may be related to the project topic in CPE 402.
CPE 325	Computer Architecture and Systems	Topics cover processor technology, Input and output, memory hierarchy, interleaved memory, bus, cache, pipelined architectures, computer arithmetic, and multiprocessors technology. The course will also discuss machine instructions and assembly language to be applied to actual microprocessor design for physical control and data communications.
CPE 332	Database and ERP Systems	Introduction to the practical concepts in database system analysis, design and implementation. Hands-on experience will also be emphasized in developing front-end software for a backend database of a client-server, 3-tier architecture with web browser interface. Theoretical aspects of relational databases general to all database products will be the focus, while specific database products including Microsoft SQL, Oracle, and MySQL will be covered. Database concepts covered include data modeling, SQL, database design, normalization, multi-user databases, access standards such as ODBC, ADO, and XML. Concepts in Enterprise Resource Planning will be covered throughout such as manufacturing, MRP, finance, human resource management, and inventory management.

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Code	Name	Course Description and strengths
CPE 333	Software Engineering	This course introduces students to principles and techniques used to create functionally correct, easy to use, robust, reliable, and maintainable software systems. The course covers all phases of the software development lifecycle, focusing on practical approaches that can be applied in each phase. Lectures are supplemented by homework assignments to encourage problem-based learning. The course also includes a team-based collaborative term project that requires students to analyze a proposed software system and produce a set of development artifacts typical of a real-world software development project.
CPE 334	Operating Systems	Theoretical aspects of Operating systems: memory management, process management, I/O management, and information management. Issues on Job Control Language, Assembler, Loader, and Linker are covered. Some operating systems, compilers, interpreters and utilities are studied in detail.
CPE 341	Computer Networks	Fundamental concepts and protocols in computer communication networks, particularly IP networks. Packet switching and circuit switching networks, layered network architectures. Application layer protocols, socket programming, TCP/IP protocol suite, unicast and multicast routing protocols, link layer protocols and multiple access networks. Wired and wireless local area network standards, and basic mobile Internet protocols.
CPE 342	Computer Network Laboratory	Experiments for supporting the study of computer networking protocols. Network protocol analyzer software, basic router configuration commands, network interface and routing protocol configuration in computers and routers for IP networking. Analysis of TCP protocols, IP routing and addressing protocols. Operations of application layer protocols and network management protocols.
CPE 403	Computer Engineering Project 2	Continuation and the completion of the project initiated in CPE 402 course.
CPE 442	Computer Engineering Project 1	Students work in groups of 1-3 persons under the supervision of faculty members. Each group is encouraged to develop and design a systematic method to investigate and solve computer and information technology related problems that demand theoretical backing. The objective is to have students gain experience in systems development for a relatively large size project.
CPE 442	Computer Network Laboratory	Experiments supporting the study of computer networking protocols. Network protocol analyzer software, basic router configuration commands, network interface and routing protocol configuration in computers and routers for IP networking. Analysis of TCP protocols, IP routing and addressing protocols. Operations of application layer protocols and network management protocols.