Department of Computer Engineering
Course Description

0907231 Digital Logic (3 Credit Hours)
Prerequisite: (1900100)

0907234 Logic Lab (1 Credit Hour)
Co requisite: (0907231)
Experiments on basic TTL and CMOS logic gates, including simulations to explore functionality and timing parameters. Experiments using both simulation and practical hardware implementation on CPLDs or FPGAs, using VHDL for combinational and sequential circuits including multiplexers, demultiplexers, decoders, encoders counters, shift registers, latches and memory. Experiments in logic design using state machines. Design project using CPLDs or FPGAs.
0907235  Assembly Language and Microprocessors  (3 Credit Hours)
Prerequisite: (0907231)

0907311  Computer Applications Lab  (1 Credit Hour)
Prerequisite: (1901102)

0907332  Microprocessor System Design  (3 Credit Hours)
Prerequisite: (0907235)
0907333  **Embedded Systems**  (3 Credit Hour)
**Prerequisite:** (0907261 and 0907231)

0907334  **Embedded Systems Lab**  (1 Credit Hour)
**Co requisite:** (0907333)
Introduction to embedded systems design tools and hardware programmers. Experiments using both simulation and practical implementation of the basic building blocks of a microcontroller including timers, counters, PWM generation, I/O techniques and requirements, A/D conversion, serial communications. Experiments to explore the system design process using hardware-software co design process. Design project.

0907335  **Computer Organization**  (3 Credit Hours)
**Prerequisite:** (0907231 and 1901102)
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<tr>
<td>0907337</td>
<td>Microprocessor Lab</td>
<td>1</td>
<td>0907235</td>
<td>Writing, assembling, executing, and debugging various x86 programs to cover the basic concepts of microprocessor usage. Designing, implementing, and troubleshooting various microprocessor-based applications. Experiments in building and programming microprocessor-based systems. Microcomputer interfacing experiments.</td>
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<td>0907342</td>
<td>Object-Oriented Problem Solving</td>
<td>3</td>
<td>1901102</td>
<td>Problem solving techniques for engineering problems, primarily from the fields of electrical and computer engineering; object-oriented programming concepts; object-oriented program development, editing, compiling, linking, and debugging using the Object Oriented Programming languages. Introduction to Object-oriented analysis and design (concepts, methodologies and UML).</td>
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0907433 Performance Evaluation and Modeling (3 Credit Hours)
Prerequisite: (0301131 and 0907432)

0907439 Computer Design Lab (1 Credit Hour)
Co requisite: (0907432)
Using CAD tools, the student designs and simulates the main parts of a computer: the ALU, registers, control unit, cache memory, system bus, memory, and I/O devices. Integration and simulation of computer design.

0907441 Software Engineering and Ethics (3 Credit Hour)
Prerequisite: (0907342)
0907461  Digital Electronics  (3 Credit Hours)
Prerequisite: (0903361)

0907521  Parallel and Distributed Systems  (3 Credit Hours)
Prerequisite: (0907432)
Introduction to parallel processing and distributed systems. Multicomputers, multiprocessors, network of workstations, and scalable systems. Interconnection networks: topologies, routing, and protocols. Distributed systems design for scalability, reliability, availability, and security. Communication paradigms including shared memory, message passing, RPC, and distributed objects. Distributed system services including replication, caching, file system management, naming, clock synchronization, and multicast communication. Sample applications. Development of programs and applications for parallel and distributed systems.

0907522  Networks and Internet Programming  (3 Credit Hours)
Prerequisite: 1901473 and 0907422
A review of basic networking principles: Protocol Stacks; The Transport Layer, TCP and UDP; The Network Layer, IP; The Link Layer, LANs; Application Protocols, HTTP, ftp; The Sockets interface, primarily on Unix/Linux; Advanced Sockets, select, socket options; Other socket types, Unix, Raw; Network programming methodologies and protocols, primarily for the World Wide Web: Name servers, DNS; IPv6; Server design, daemons, inetd; CGI; XML; Sockets in Java; Cookies, Javascript; Servlets, JSP; JDBC; Java RMI; Remote Procedure Calls; Network Security, firewalls, ssl, ssh; Grid computing, web spiders; Bluetooth; VoIP
0907528  Computer Networks Lab  (1 Credit Hours)
Prerequisite: (0907422)
The Computer Networks Lab consists of a Set of Experiments to Give the Student the Practical Experience on Building Basic Local Area Networks (LANs). Introduction to Personal Computers Hardware, Installing Network Interface Cards, Networks Cabling, Local Area Networks and Basic Topologies, Understanding Routers and Routing Principles, Configuring Routers and Routing Protocols, Securing Local Area Networks Using Access Lists, Understanding Switches and Switching Principles, Configuring Switches, Building Virtual Local Area Networks, Trunking Protocols, IP Networks Address Translation and Dynamic Host Control Protocol.

0907529  Advanced Networks Lab  (1 Credit Hours)
Prerequisite: (0907528)
A set of experiments to give the student the practical experience on the following components: wireless networks and networks security, installing wireless adapters, building adhoc wireless networks, configuring access points, configuring wireless bridges, basic wireless networks security, advanced router security, basic PIX firewall security, basic VPN configuration.

0907531  Special Topics in Computer Engineering  (3 Credit Hours)
Prerequisite: (0907432 or 1901473)
Special topics of current interest in computer engineering.
0907533 Real-Time Computer Control (3 Credit Hours)
Prerequisite: (0907332 and 0907333)

0907534 Digital System Design (3 Credit Hours)
Prerequisite: (0907333 and 0907335)
**0907541 Multimedia Engineering** (3 Credit Hours)  
**Prerequisite:** (0907343)  

**0907542 Pattern Recognition** (3 Credit Hours)  
**Prerequisite:** (0907343)  
0907543  Optimizing Compilers  (3 Credit Hours)
Prerequisite: (0907342)
Introduction to compiling techniques including parsing algorithms, semantic processing and optimization. In-depth study of compiler backend design for high-performance architectures. Topics include control-flow and data-flow analysis, optimization, instruction scheduling, register allocation. Advanced topics include memory hierarchy management, instruction-level parallelism, predicated and speculative execution.

0907544  Digital Image Analysis and Processing  (3 Credit Hours)
Prerequisite: (1901231)

This course introduces the basics of digital image analysis and processing with emphasis on both theory and implementation. Image representation, image types, intensity transformations and spatial filtering, image enhancement, frequency domain processing, image restoration, geometric transformations and image registration, color image processing, image compression and vector quantization, morphological image processing, image segmentation, edge detection, line detection using the Hough transform, representation and description, object recognition. Hands-on computer work using MATLAB will be a major part of the learning experience.
0907551  Neural Networks and Fuzzy Logic

(3 Credit Hours)

Prerequisite: (0907343)

0907561  VLSI Design  (3 Credit Hours)
Prerequisite: (0907461)

0907599  Project  (1 Credit Hours)
Prerequisite: Successfully passing 124 credit hours
Evaluation is in marks and not pass/fail. Project for two normal semesters.