Computer engineering Program - Course Description

Microprocessor and Assembly Language 0104350 (3 Cr. H.)	This course covers the architecture of microprocessors, microprocessor instructions set, assembly language,macros and procedures, interrupts, basic I/O, interfacing a microprocessor with different peripherals, serial communication (8251 USART), and an introduction to modern microprocessors.
Microprocessor and Assembly Language Lab 0104351 (1 Cr. H.)	The goals of experiments are to introduce students to architecture of the microprocessor, microprocessor instructions, assembly language, basic I/O and memory interfaces. Also, to conduct experiments using Intel 8086 Microprocessor emulator to verify and test assembly programs. This emulator can run programs on a virtual machine, emulate real hardware including screen, memory, and input and output devices.
Control Systems 0104352 (3 Cr. H.)	This course provides an introduction to control systems, mathematical modeling, and characteristics and performance of feedback control systems. Topics also include stability with Routh-Hurwitz criterion and Root- Locus method, industrial controllers, time-domain and frequency-domain analysis, Nyquist criterion, Bode plot, and state variable concepts. Labs with Matlab and Simulink are an integral part of this course.
VLSI Systems Design 0104430 (3 Cr. H.)	This course introduces VLSI design in CMOS technology, and provides a background on CMOS layout and physical design. The theory of MOS transistors is addressed along with characterization and performance estimation of CMOS circuits. In addition, the course covers array subsystems including decoders and memory systems, and provides an introduction to Verilog or VHDL to be used to design and simulate a finite state machine. Lab sessions are required.
Digital Systems Design 0104440 (3 Cr. H.)	This course covers the concepts of sequential logic including Finite State Machine (FSM) models (Mealy and Moore), state transition tables and state diagrams. The course addresses FSM implementation with D and JK flip-flops, and design issues with regard of state reduction in FSMs and incompletely specified sequential circuits. The topic of Algorithmic State Machines (ASMs) is also addressed as well as asynchronous circuits and hazards. Throughout this course, the students learn a Hardware Description Language such as VHDL or Verilog to be used in designing with programmable logic (e.g. PLD, ROM, FPGA).
Advanced Computer Architecture 0104441 (3 Cr. H.)	This course covers advanced concepts in computer architecture. These topics include performance evaluation, instruction set architecture, pipelining, instruction-level parallelism (ILP) using Scoreboarding and Tomasulo's techniques, thread-level parallelism, network-oriented interconnections and multiprocessors caches coherency.
Embedded Systems 0104450 (3 Cr. H.)	Basic architecture and assembly language of a microcontroller, Principles of microprocessor serial and parallel interfacing, Counters, Timers, ADC and DAC relevant chips, Software and hardware interrupt handling routines, Data acquisition, Human and physical interfaces, Application of top-down design to microcontroller software development in assembly language and a high level language, Evaluation of hardware and software trade-offs.
CE Internship 0104580 (3 Cr. H.)	The Bachelor of Science in Computer Engineering internship course is designed to enable students to apply their knowledge of computer engineering in real world professional situations. The students work as interns and practice team-based activities related to computer engineering. The internship experience provides the students with an industrial training opportunity through cooperation between the university and the local industry, which can help them in choosing their career path based on hands-on industrial experience. The student should work on site for at least 480 hours (equivalent to 12 weeks of full-time work).
C E Capstone Project I 0104590 (1 Cr. H.)	This course provides our undergraduate engineering students with imperative design experience to prepare them for the Computer Engineering industry. The capstone project is intended to integrate and draw on the knowledge that students have acquired during their study. It also gives students an opportunity to improve their communication skills and work in a team.
C E Capstone Project I I 0104591 (2 Cr. H.)	This course is a continuing step for CE Capstone I (0104590). The course provides our undergraduate engineering students with imperative design experience to prepare them for the Computer Engineering industry. The capstone project is intended to integrate and draw on the knowledge that students have acquired during their study. It also gives students an opportunity to improve their communication skills and work in a team.

Course ID / Code	Brief Course Description
Circuit Analysis I 0104230 (3 Cr. H.)	This course is an introduction to linear circuit analysis. Topics include nodal and loop analysis techniques;linearity theorem; superposition theorem; source transformation; Thevenin's and Norton's theorems; maximum power transfer; capacitance and inductance; first- and second-order transient analysis; and operational amplifiers (op-amps).
Circuit Analysis Lab 0104231 (1 Cr. H.)	Introduction to electric circuits, Basic concepts of voltage and current; Kirchhoff's voltage and current laws;Ohm's law; voltage and current sources, Thevenin and Norton equivalent circuits, Superposition Theorem, Maximum Power Transfer Theorem, Time- and frequency-domain analysis of RLC circuits. Hands on experience on circuits and LTSpice Simulation software.
Digital Logic Design 0104240 (3 Cr. H.)	This course presents the theory of number systems, binary arithmetic, Boolean algebra, digital circuits and systems, combinational and sequential logic systems. Logic simplification techniques using both Boolean Algebra and K-maps with do not care. Logic gates operation. Combinational circuits: adders, subtractors,decoders, encoders, multiplexers, and de-multiplexers. Latches and flip-flops. State machines: Moore and Mealy finite state machines. Sequential circuits such as asynchronous counters and synchronous counters using FSM and Transition State Tables. Serial and parallel shift registers.
Digital Logic Design Lab 0104241 (1 Cr. H.)	This course introduces logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with the experiments of combinational logic: logic gates, minimization techniques, and arithmetic circuits. Then the course deals with latches, flip- flops and counters. Finally, design and simulation techniques are discussed using a suitable software.
Circuit Analysis II 0104330 (3 Cr. H.)	This course covers sinusoidal steady-state circuit analysis including phasors, impedance, admittance and analysis techniques; steady-state power analysis including instantaneous, average, and complex power; mutual inductance and transformers; frequency response; resonant circuits; passive filters; and two-port networks.
Database Systems 0102330 (3,1,3 CR.H.)	This course introduces the basic concepts of databases, which include database system architecture; entity-relationship model; hierarchical, network, and relational data models; functional dependencies and normal forms. Design, implementation, and optimization of SQL query languages with basic relational algebra; and security and integrity.
Electronic Circuits 0104331 (3 Cr. H.)	This course covers diode circuits and applications; Field-Effect Transistors (FET) and Bipolar JunctionTransistors (BJT); DC biasing of amplifiers; small signal models for transistors; the types of single-stageamplifiers; and multistage amplifiers.
Electronics Lab 0104332 (1 Cr. H.)	It covers the basic concepts of semi-conductor diode and its current-voltage relationship. Various applications of junction diode along with their various types are also demonstrated practically. Characteristics of Bipolar Junction Transistor, Field-Effect Transistor, and Operational Amplifiers are explained with the help of hands on experience and LTSpice Software simulations.
Digital Electronics 0104333 (3 Cr. H.)	This course discusses digital design techniques for integrated circuits. It covers the design of logic gates and circuits at the transistor level; the design of MOS memory and storage circuits; in addition to the description of different logic families, including CMOS, ECL, TTL, and BiCMOS.
Computer Architecture 0104340 (3 Cr. H.)	This course introduces the fundamental concepts of computer architecture. It covers computer abstractions, operations of the computer hardware, representing instructions in the computer, MIPS addressing for 32-Bit immediate and addresses, parallelism and instructions synchronization, arithmetic for computers, parallelism and computer arithmetic, building a data path, pipelined data path and control, data hazards, structural hazards, control hazards, memory technologies, basics of caches, measuring cache performance, and virtual memory.