EE. ELECTRICAL ENGINEERING

EE-211. ELECTRICAL CIRCUITS AND DEVICES
Credits: 3

Co-Requisites
MTH-112

EE-241. DIGITAL DESIGN
Credits: 3
The electronics of digital devices, including Bipolar TTL and CMOS, digital logic functions (e.g., AND, OR, INVERT), Boolean algebra, combinational logic, minimization techniques, digital storage devices, synchronous sequential design, state machines, programmable logic. Three one-hour lectures and one two-hour lab per week.

Click here for course fees.

EE-247. PROGRAMMING FOR EMBEDDED APPLICATIONS
Credits: 3
Microcontroller hardware structures. Basic software concepts such as constants, variables, control structures and subroutine calls, based on the 'C' language and as translated to machine language. Mapping of compiled software to the memory of a microcontroller. Embedded programming principles. Basic interactions with peripherals. Interrupts and their use. Debugging. Three hours of lecture and lab per week.

Click here for course fees.

Pre-Requisites
EGR-140 or CS-125.

EE-251. ELECTRONICS I
Credits: 3
Circuit concepts involving nonideal components, particularly diodes, bipolar transistors, and MOS transistors. Bias, load line and signal amplification principles. Analysis and design of power supply and amplifier circuits, including power amplifiers. Simulation of circuits for design and analysis.

Pre-Requisites
EE-211.

EE-252. ELECTRONICS II
Credits: 4
Multi-transistor amplifiers, operational amplifiers. Frequency response and the design of filters and amplifiers to meet frequency specifications. Feedback in amplifier design and oscillators. Three one-hour lectures and one three-hour lab per week.

Click here for course fees.

Pre-Requisites

EE-271. SEMICONDUCTOR DEVICES
Credits: 3
Basic properties of semiconductors and their conduction processes, with special emphasis on silicon and gallium arsenide. Physics and characterizations of p-n junctions. Homojunction and heterojunction bipolar transistors. Unipolar devices including MOS capacitor and MOSFET. Microwave and photonic devices.

Pre-Requisites

EE-283. ELECTRICAL MEASUREMENTS LAB
Credits: 1
A laboratory for the development of measurement techniques and use of electrical instruments for the measurement of various electrical quantities. One two-hour lab per week.

Click here for course fees.

Co-Requisites
EE-211

EE-298. TOPICS IN ELECTRICAL ENGINEERING
Credits: 1-3
Selected topics in the field of electrical engineering. Requirements: Sophomore standing and permission of the instructor.

Click here for course fee for lab courses.

Pre-Requisites
Sophomore standing and permission of the instructor.

EE-314. CONTROL SYSTEMS
Credits: 3

Click here for course fees.

Pre-Requisites
EE-211 and EGR-214 (or PHY-214)

EE-325. ENERGY CONVERSION DEVICES
Credits: 3
Magnetic circuit calculations. Principle of operation and applications of transformers, DC machines, synchronous machines, and induction motors. Applications of power electronics. Direct energy conversion schemes. Lecture and lab.

Pre-Requisites
EE-251.
Electrical Engineering

EE-337. ENGINEERING ELECTROMAGNETICS I
Credits: 3
Waves and phasors; concepts of flux and fields; transmission line, Smith chart, and impedance matching; vector calculus; Maxwell’s equations for electrostatic and magnetostatic fields. 
Click here for course fees.

Pre-Requisites
EGR-214 (or PHY-214), PHY-202.

EE-339. ENGINEERING ELECTROMAGNETICS II
Credits: 4
Maxwell’s equation for time-varying fields; boundary conditions and boundary value problems; plane wave propagation; reflection, refraction, and wave guides; stripline; s-parameters and microwave devices; directional coupler, attenuator; radiation and antennas; satellite communication systems and radar sensors. Three hours of lecture and one three-hour lab per week.
Click here for course fees.

Pre-Requisites
EE-337.

EE-342. MICROCONTROLLER BASED SYSTEM DESIGN
Credits: 3
Microprocessor architecture, the microcontroller based system design context, and peripheral interfacing. C and machine language programming and debugging, and embedded applications. Associated laboratory exercises include topics such as stand-alone system programming, interfacing to peripherals, interrupts, timers, analog data acquisition, and intercomputer communications. Two hours of lecture and one two-hour lab per week.
Click here for course fees.

Pre-Requisites
EE-241, and either EE-247 or CS-126 as corequisites.

EE-345. COMPUTER ORGANIZATION
Credits: 3
Number representation, digital storage devices, and computational units, bus structures; execution sequences and assembly language concepts; control units with horizontal and vertical microcoding; addressing principles and sequencing; microprocessors; basic input and output devices; interrupts; survey of RISC principles including pipelined execution. Lecture and lab.
Click here for course fees.

Pre-Requisites
EE-241.

EE-381. MICROFABRICATION LAB
Credits: 3
The theoretical and practical aspects of techniques utilized in the fabrication of bipolar junction transistors (BJTs). Includes crystal characteristics, wafer cleaning, oxidation, lithography, etching, deposition, diffusion, metallization, process metrics, and device characterization. One-and-a-half hour lecture and one four-hour lab per week. Requirement: Junior engineering standing
Click here for course fees.

EE-382. MODERN COMMUNICATION SYSTEMS
Credits: 4
Introduction to probability and statistics and their use in communication systems. Fundamental properties of signals, principles of signal processing, multiplexing, modulator-demodulator design, noise and its effects. Sampling theorem and Nyquist’s criteria for pulse shaping; signal distortion over a channel; line coding; signal to noise ratios, and performance comparison of various communication systems.
Click here for course fees.

Pre-Requisites
EE-252, EE-337, EGR-214 (or PHY-214)

EE-391. SENIOR PROJECTS I
Credits: 1
Design and development of selected projects in the field of electrical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required. Requirement: Senior standing in engineering.
Click here for course fees.

EE-392. SENIOR PROJECTS II
Credits: 2
Design and development of selected projects in the field of electrical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. This is a continuation of the EE-391. A professional paper to be presented and discussed in an open forum is required.
Click here for course fees.

Pre-Requisites
EE-391.

EE-398. TOPICS IN ELECTRICAL ENGINEERING
Credits: 3
Requirement: Junior standing in engineering.