ELECTRONICS ENGINEERING (EEN)

EEN 100 Introduction to Engineering (3 Credits)
Activity-based course with a number of life skills, exercises, and hands-on activities integrated into the lectures. Familiarizes students with many of the skills that engineers must perform on a daily basis in the workplace with emphasis on engineering ethics and introductory concepts in electronics and optical engineering.

EEN 101 Engineering Problem Solving (2 Credits)
Provides an overview of the salient math topics most heavily used in the core sophomore-level engineering courses, including algebraic manipulation of engineering equations, trigonometry, vectors, and complex numbers.

EEN 102 Engineering Use of Computers (3 Credits)
Introduction to the use of computers to model systems and solve engineering problems using a high-level language. Flowcharts and algorithms will be used in the process of program design.
Prerequisites: Take MTH-153

EEN 201 Electrical Network Theory I (3 Credits)
Introduction to the basics of DC electrical circuit theory for electrical engineering and other technology majors. Study of methods for analyzing resistive circuits. Circuits incorporating independent and dependent energy sources are studied. Methods covered include Ohm's Law, Kirchhoff's Laws, nodal analysis, loop analysis, superposition, Thevenin's Theorem, Norton's Theorem, and the maximum power transfer principle. Computer software tools such as MATLAB and MultiSim will be introduced.
Prerequisites: Take PHY-161. Take PHY-161l. Take MTH-251.

EEN 201L Electrical Network Theory I Laboratory (1 Credits)
This course provides hands-on experience in constructing, troubleshooting, and testing simple DC electrical circuits. The student experiences circuit theory in action by performing a series of increasingly difficult experiments. Basic instruments such as the digital multimeter DC power supply and laboratory breadboard are introduced and utilized.

EEN 202 Electrical Network Theory II (3 Credits)
Introduction to the application of unit-step as forcing function, power and energy, polyphase circuits, complex frequency and frequency response transformers and other two-part networks, linear network analysis using Laplace transform methods, and Fourier transformation.

EEN 202L Electrical Network Theory II Laboratory (1 Credits)
This is the laboratory that accompanies EEN 202 Electrical Networks II. This course provides the students with hands-on experience with advanced electrical circuit components, measurement techniques, and data collection. The student will construct advanced electrical circuits that illustrate principles covered in the lecture. To successfully complete the course, the student will be required to perform a series of experiments of increasing difficulty. A formal report is required for each experiment.

EEN 203 Electronic Principles (3 Credits)
This is the second engineering course for second year optical engineering majors. This course provides students with advanced concepts of circuit theory as well as an introduction to the theory and application of electronic devices. Topics include first and second order transient circuits, AC circuit analysis, diodes, transistors, and operational amplifier. Computer modeling of electronic circuits will be introduced.
Prerequisites: Take EEN-201

EEN 211 Materials Science & Engineering (3 Credits)
This course introduces students in optical and electronics engineering programs to concepts that are necessary to understand important ideas in materials science and engineering. This course relates these concepts to engineering design and manufacturing of electronic and photonic devices.

EEN 231 Digital Electronics Logic Design (3 Credits)
Study of number systems, binary arithmetic and codes, Boolean algebraic simplification, Quine-McCluskey method and Karnaugh Maps, Diode and transistor logic flip-flops, and sequential networks.
Prerequisites: Take EEN-201. Take EEN-201L.

EEN 231L Digital Logic Design Laboratory (1 Credits)
This is a laboratory course that accompanies EEN 231 Digital Logic Design. The goal of this course is to provide the student with hands-on experience with the design and analysis of combinational and sequential logic design. Topics include code converters, multiplexer design, synchronous and asynchronous sequential circuits design including counters and shift registers.
Prerequisites: Take EEN-201L.

EEN 301 Electronic Devices (3 Credits)
This is the laboratory that accompanies EEN 301 Engineering Electronics I. The goal of this course is to provide the student with hands-on experience with electronic components such as BJTs, FETs and diodes. The student will design and construct electronic circuits that will illustrate principles covered in the lecture. This course includes practical examinations, laboratory experiments, and report preparation.
Prerequisites: Take EEN-202.

EEN 301L Electronic Devices Laboratory (1 Credits)
This is the laboratory that accompanies EEN 301 Engineering Electronics I. The goal of this course is to provide the student with hands-on experience with electronic components such as BJTs, FETs and diodes. The student will design and construct electronic circuits that will illustrate principles covered in the lecture. This course includes practical examinations, laboratory experiments, and report preparation.
Prerequisites: Take EEN-202L.

EEN 302 Microelectronics (3 Credits)
This is the second course in electronics for electronics engineering and technology majors. The goal of this course is to provide the student with an understanding of advanced electronics concepts. The following topics are covered: multistage amplifiers, frequency response using Bode plots, feedback, oscillators, and active filters. To successfully complete this course, the student must demonstrate a working knowledge of the concepts covered through assignments and written examinations.
Prerequisites: Take EEN-301.

EEN 302L Microelectronics Laboratory (1 Credits)
This is the laboratory that accompanies EEN 302 Microelectronics. The goal of this course is to provide the student with additional hands-on experience with more advanced electronic circuits. The student will construct advanced electronics circuits that will illustrate principles covered in the lecture. To successfully complete this course, the student will be required to perform a series of experiments of increasing difficulty. A formal report is required to be turned in one (1) week after performing an experiment.

EEN 305 Signals and Systems (3 Credits)
This course is an introduction to system representations and analysis, representation of signals, methods of linear system analysis using convolution, Fourier series and transforms, and Z-transforms. Formulation and solution of state-variable equations as well as introduction to amplitude and analog pulse modulation are also studied. A design project is required.
Prerequisites: Take EEN-202. Take EEN-302l. Take MTH-372.

EEN 311 Engineering Economics (3 Credits)
Introduction to economic principles and techniques used in making decisions about the acquisition and retirement of capital goods by government and industry. Emphasis on methods of analysis based on the mathematics of compound interest. Study of time value of money, annual cost, present worth, future value, capitalized cost, break-even analysis, evaluation, depreciation, and ethics in economics. Includes entrepreneurial topics, such as business plans, sources of capital, and marketing strategies.

EEN 321 Electromagnetic Field Theory (3 Credits)
This course involves the study of static and propagating electro-magnetic fields, a review of Maxwell's equations, propagation of EM-fields in dielectric waveguides, transmission theory, and an introduction of antennas.
Prerequisites: Take PHY-161. Take PHY-161l. Take MTH-372.

EEN 321H Honors Electromagnetic Field Theory (3 Credits)
This course involves the study of static and propagating electro-magnetic fields, a review of Maxwell's equations, propagation of EM-fields in dielectric waveguides, transmission theory, and an introduction of antennas.
Prerequisites: Take PHY-161. Take PHY-161l. Take MTH-372.

EEN 333 Digital Integrated Circuits (3 Credits)
This course involves the study of digital CMOS circuits, MOSFET transistors, combinational circuits, and sequential circuits. The design of simple digital gates and circuits at the transistor level and simulation of designed circuits for performance verification are also studied.

EEN 333L Digital Integrated Circuits Laboratory (1 Credits)
Laboratory work and a design project are intended verification of CMOS logic circuits. Laboratory exercises to cover CMOS propagation Delay and Layout Parasitics, Gate Styles, CMOS Arithmetic Blocks, Bipolar Devices, Bipolar Devices Propagation Delay, Very High Speed Combinational Logic, Sequential Circuits, Sequential Circuits and Timing Issues, Memory and Array Structures are also done.

EEN 350 Scientific Instrumentation (3 Credits)
This course covers integrated hardware and software applications to communicate and control instruments. Communication interface standards such as IEEN-GPIB and RS232, and use of data acquisition (DAQ) boards will be studied. Timing issues, real-time data acquisition and instrument control will also be covered.

EEN 351 Communications Engineering I (3 Credits)
This course consists of the study of the following concepts: amplitude, frequency, phase, frequency modulation, phase modulation, sampling, pulse modification, time division multiplexing, detection, frequency mixing, filters, receivers, transmitters, and noise analysis.

EEN 371 Control Systems (3 Credits)
Introduction to control systems, mathematical models, feedback control systems characteristics and stability, root locus, frequency responses, stability in the frequency domain analysis.

EEN 401 Electronics Engineering Seminar (1 Credits)
This course provides an introduction to various aspects of engineering practice and engineering ethics.

EEN 431 Microcontrollers (3 Credits)
This course is a study of microcontrollers and microcontroller-based systems including the description of hardware architecture, assembly, language programming, and system interfacing through hands-on projects.
Prerequisites: Take EEN-231. Take EEN-231l.

EEN 431H Honors Microcontrollers (3 Credits)
This course is a study of microcontrollers and microcontroller-based systems including the description of the hardware architecture, assembly, language programming, and system interfacing through hands-on projects.
Prerequisites: Take EEN-231. Take EEN-231L.

EEN 451 Communications Engineering (3 Credits)
Introduction to wireless communication technologies. Topics covered include transmission fundamentals, signal encoding techniques, coding and error control, cellular wireless networks, Mobile IP and wireless access protocols.

EEN 462 Semiconductor Processing Technology (3 Credits)
This course presents the fundamentals of semiconductor processing technology, including semiconductor substrates, microfabrication techniques, and process integration. Lithography, oxidation, diffusion, ion implantation, methods of film deposition and etching, metal interconnections, measurement techniques and packaging will be discussed.
Prerequisites: Take EEN-211. Take EEN-211. Take EEN-200. Take EEN-301.

EEN 471 3D Game Programming (3 Credits)
This is a project-oriented course on 3D Game Programming. Students will work in teams to design, implement and test a 3D game with interactivity, game state diagrams, animation, sound, and constraints.
Prerequisites: Take EEN-470.

EEN 475 Design of Robotic Systems (3 Credits)
This course will focus on core principles in the design and development of robotic systems. The course will build upon principles in electrical engineering, mechanics, and computer science.
Prerequisites: Take EEN-305. Take PHY-365. Take CSC-170.

EEN 475H Honors Design of Robotic Systems (3 Credits)
This course will focus on core principles in the design and development of robotic systems. The course will build upon principles in electrical engineering, mechanics, and computer science.
Prerequisites: Take EEN-305. Take PHY-365. Take CSC-170.

EEN 476 Renewable Bio Energy (3 Credits)
This course presents an overview of our present status of knowledge on renewable bio energy. This course will cover the processes for recovery, production, and usage of bio fuels and bio products generated from biomasses to ultimately produce heat, electricity, transportation fuel, chemicals, and materials. The types of bio-waste and their use for energy and product generation will also be examined. The economic and environmental aspects of global bioenergy markets will also be examined.

EEN 481 Biomedical Eng Micro-Devices/Systems (3 Credits)
This course introduces the concepts of biomedical engineering devices, especially for sensing and modulation applications. The course covers electronic or optical transduction techniques for applications such as neurochemicals, biopotentials, and cellular ions. The course also includes a laboratory component for the design and fabrication of microscale biomedical sensors.

EEN 482 Bioelectrics (3 Credits)
Basic electrical engineering will be applied to understand how electrical signals are generated in a biological cell and their role in proper functioning of various bioelectrical systems in our body. This course covers the important concepts of bioelectrics, bioelectric system modeling, and diagnosis. Although emphasis will be given to cardiovascular system, students will be able to apply the principles of bioelectricity to any bioelectrical system.
Prerequisites: Take EEN-202. Take MTH-251.

EEN 498 Sr Project I (3 Credits)
In this course students plan and design capstone engineering projects incorporating realistic and diverse constraints of technical, budgetary, and social aspects. Both written reports and oral presentations are required.

EEN 499 Sr Project II (3 Credits)
This course is the implementation phase of capstone projects designed in EEE 498. Demonstration of the final working project is required along with a written report and oral presentation.