ELECTRICAL ENGINEERING (EENG)

EENG-COMP Senior Comprehensive Exam
(NULL credits) (Both Fall & Spring Semesters)
NULL

EENG-2010 Introduction to Digital Electronics
(2 credits) (Spring Semester)
Introduction to Digital Electronics (2) (S) This course introduces to the student the fundamental principles in digital circuit design, including Boolean algebra and other mathematical operations, Karnaugh maps, logic gates, flip flops, and counters. Circuits are implemented both with integrated circuits and with programmable logic devices configured by HDL.

EENG-2020 Digital Electronics Laboratory
(1 credit) (Spring Semester)
Digital Electronics Laboratory (1) (S) This course provides a hands-on experience in digital electronic circuit design and implementation.
Corequisite(s): EENG-2010.

EENG-2060 Linear Circuit Analysis I
(3 credits) (Fall Semester)
Linear Circuit Analysis I (3) (F) This is an introductory course in the electrical engineering analysis of circuits, including circuit theory, resistors, capacitors, inductors, and transformers; DC and sinusoidal steady state circuit analysis; and AC power. Students must earn a grade of "C-" or better to take subsequent electrical engineering courses at Benedictine College. Must be one of the declared Engineering majors.
Prerequisite(s): PHYS-2110.

EENG-3060 Circuits Laboratory I
(1 credit) (Fall Semester)
Circuits Laboratory I (1) (F) This laboratory course complements and reinforces the concepts taught in EENG-2060. Students will also learn how to properly use equipment to analyze circuits experimentally.
Corequisite(s): EENG-2060.

EENG-3070 Circuits Laboratory II
(1 credit) (Spring Semester)
Circuits Laboratory II (1) (S) This laboratory course complements and reinforces the concepts taught in EENG-3130. Students will also learn how to use properly equipment to analyze circuits experimentally.
Corequisite(s): EENG-3130.

EENG-3080 Electronics Laboratory I
(1 credit) (Fall Semester)
Electronics Laboratory I (1) (F) This laboratory course complements and reinforces the concepts taught in a first-year electronics course. Topics include semiconductor bias, bipolar, field effect, metal oxide semiconductor characteristics, circuit parameters; and circuit topologies such as filters and amplifiers. Circuits are constructed and measured containing diodes, transistors, and integrated circuits such as operational amplifiers. Students will also learn how to use equipment properly to analyze circuits experimentally.
Prerequisite(s): EENG-3070.

EENG-3090 Electronics Laboratory II
(1 credit) (Spring Semester)
Electronics Laboratory II (1) (S) This laboratory course complements and reinforces the concepts taught in a second-year electronics course. Topics include printed circuit board layout and design, and systems with feedback; and circuit topologies such as oscillators, receivers, current mirrors, power amplifiers, and differential amplifiers. Circuits are constructed and measured containing diodes, transistors, and integrated circuits such as operational amplifiers. Students will also learn how to use properly equipment to analyze circuits experimentally.
Prerequisite(s): EENG-3080.

EENG-3130 Linear Circuit Analysis II
(3 credits) (Spring Semester)
Linear Circuit Analysis II (3) (S) This course covers both transient and steady-state analyses of linear electric circuits, including two-port circuits, single and polyphase systems, operational amplifiers, LaPlace and Fourier transforms, Transfer Functions, and Fourier analysis. Must be a declared Elecrical or Mechanical Engineering major.
Prerequisite(s): EENG-2060.
Corequisite(s): MATH-3100.

EENG-3140 Signals & Systems
(3 credits) (Discretion of Department)
Signals and Systems (3) (F) This course is an introduction to signal processing that includes the following topics: passive filters, Laplace transform applications, Fourier transform, Z-transform, Nyquist sampling theorem, and other topics as time permits (possible topics include state variables; introduction to control and communications theory; discrete Fourier transform). Co-requisite: MATH-3100.
Prerequisite(s): EENG-3130.

EENG-3160 Electric & Magnetic Fields
(3 credits) (Discretion of Department)
Electric and Magnetic Fields (3) (F) This course covers fields produced by simple distributions of electric charges and magnetic poles, field mapping and application to engineering problems. Co-requisite: MATH-3100.
Prerequisite(s): EENG-2060.

EENG-3210 Electronics I
(3 credits) (Fall Semester)
Electronics I (3) (F) This course covers the fundamentals of electronic circuits, modeling circuits containing Diodes, BJT and MOSFET Transistors, voltage regulators, and Integrated Circuits like Operational Amplifiers. Topics include: semiconductor physics, I-V characteristics and circuit parameters of components; circuit topologies such as filters and amplifiers.
Prerequisite(s): EENG-3130.
Corequisite(s): EENG-3080.

EENG-4010 Electric Drives
(2 credits) (Fall Semester)
Electric Drives (2) (F) This course covers the following topics: power electronic circuits to drive and control motor and mechanical loads, power integrated circuits, variable speed drives and their electronic controls. It also includes mathematical definition of random and deterministic signals and a study of various modulation systems.
Prerequisite(s): EENG-3210.

EENG-4020 Electric Drives Lab
(1 credit) (Discretion of Department)
Electric Drives Laboratory (1) (F, D) This laboratory course complements and reinforces the concepts taught in EENG-4010. Topics explored in this laboratory include: Open-circuit and short circuit testing for transformers, single phase motor control modeling, control of stepper motors and servo motors using pulse-width modulation techniques. Co-requisite: EENG-4010.
Prerequisite(s): EENG-3210.

EENG-4050 Control Systems I
(3 credits) (Spring Semester)
Control Systems I (3) (S) This course is an analysis of control systems and their performance. Topics include mathematic modeling and dynamic response of linear control systems, stability analysis, design of linear controllers using the root locus, and frequency response techniques.
Prerequisite(s): EENG-3140 and MATH-3100.

EENG-4060 Control Systems Laboratory
(1 credit) (Spring Semester)
Control Systems Laboratory (1) (S) This laboratory course complements and reinforces the concepts taught in EENG-4050. Laboratory exercises will allow students to operate control systems while visualizing the effect of varying parameters on system behavior. techniques. Co-requisite: EENG-4050.

EENG-4090 Applied Electromagnetics
(3 credits) (Discretion of Department)
Applied Electromagnetics (3) (S) This course provides an introduction to the design and implementation of distributed networks. Topics include time domain solution of Maxwell's Equations, electromagnetic waves in matter, and the fundamentals of transmission lines.
Prerequisite(s): EENG-3130 and EENG-3160.

EENG-4210 Electronics II
(3 credits) (Spring Semester)
Electronics II (3) (S) This course covers the design of electronic circuits using diodes, BJT and MOSFET Transistors, and Integrated Circuits. Topics include: feedback, active filters, precision signal and amplifier circuits, difference amplifier, instrumentation amplifier, low noise signal and amplifier circuits, oscillators, power converters (AC/DC), current mirrors, and current steering circuits. Co-requisite: EENG-3090.
Prerequisite(s): EENG-3210.

EENG-4510 Computer Hardware
(3 credits) (Discretion of Department)
Computer Hardware (3) (D) This course is the study of the complete computer system including the digital hardware interconnection, organization, and the various operation and control methods necessary for realizing digital computers and analog systems.
Prerequisite(s): EENG-2010, CSCI-2300.

EENG-4520 Embedded Systems
(2 credits) (Discretion of Department)
Embedded Systems (2) (S) This course is the study of microcontroller hardware and software, with an emphasis on interfacing the microcontroller with external electronic devices such as transceivers, sensors, and actuators for communications and control within an embedded system.
Prerequisite(s): EENG-2010, CSCI-2300, and EENG-3210.
Corequisite(s): EENG-4530.

EENG-4530 Embedded Systems Laboratory
(1 credit) (Spring Semester)
Control Systems Laboratory (1) (S) This laboratory course complements and reinforces the concepts taught in EENG-4050. Laboratory exercises will allow students to operate control systems while visualizing the effect of varying parameters on system behavior. Co-requisite: EENG-4520.

EENG-4600 Electrical Engin Design I
(3 credits) (Fall Semester)
Electrical Engineering Design I (3) (F) This is the first course in the two-semester capstone design experience for the electrical engineering undergraduate degree. It emphasizes design methodologies, communications, and teamwork. Students will select an electronic system to design, capture end-user requirements, perform component trade studies, and lead a critical design review at the end of the semester. (OC, VC, WC).
Prerequisite(s): EENG-4050, EENG-4210, EENG-4520.
General Education Categories: Oral Communication, Visual Communication, Written Communication

EENG-4610 Electrical Engin Design II
(3 credits) (Spring Semester)
Electrical Engineering Design II (3) (S) This is the second course in the two-semester capstone design experience for the electrical engineering undergraduate degree, emphasizing design methodologies, communications, and teamwork. Students will be required to build and test a prototype of the electronic system designed in EENG-4610, Electrical Engineering Design I. Students will prepare written reports and deliver oral presentations on their design choicees with critique by the instructor. (WC).
Prerequisite(s): EENG-4600.
General Education Categories: Written Communication

EENG-4810 Microwave Systems
(3 credits) (Discretion of Department)
Microwave Systems (3) (D) This course provides students with the tools needed to analyze and design microwave systems and antennas for wireless communication. Topics in microwave systems include transmission line theory, two-port network analysis, S-parameters, and microwave power dividers. The study of antennas begins with an examination of fundamental antenna parameters. Other topics include dipole antennas, antenna arrays, wideband microstrip antennas, aperture antennas, matching techniques, and antenna measurement theory.
Prerequisite(s): EENG-3210, EENG-4090 (each completed with a C or better).

EENG-4820 Communication Systems
(3 credits) (Discretion of Department)
Communication Systems (3) (D) This course provides an introduction to the fundamentals of analog and digital communications systems including signal transmission and reception. Topics include: filtering, sampling, modulation/demodulation, broadcasting, satellite communications and cellular communications.
Prerequisite(s): EENG-3130.

EENG-4910 Power Electronics
(3 credits) (Discretion of Department)
Power Electronics (3) (D) This course applies the principles of electronics to energy conversion and power control. Topics include: characteristics of power electronics, modeling and analysis of power systems, control techniques, power electronics circuit design such as inverters, rectifiers, power amplifiers, DC-DC, DC-AC and AC-DC converters and other applications.
Prerequisite(s): EENG-4210.

EENG-4940 Digital Signal Processing
(3 credits) (Discretion of Department)
Digital Signal Processing (3) (D) This course is an introduction to the analysis and processing of signals using both continuous time and discrete time analysis tools. The course will cover the following topics: signal classifications, discrete Fourier transforms, Z-transform, digital filters and practical applications.
Prerequisite(s): EENG-3140.