ELECTRICAL ENGINEERING (ELECTENG)

ELECTENG 1020 Electrical Engineering Projects and Tools 1 Credit
Hands-on electrical-engineering laboratory projects such as audio amplifiers, LEDs, digital logic, and electric-motor measurements.
Components: Laboratory
Typically Offered: Fall/Spring

ELECTENG 1210 Circuit Modeling I 3 Credits
Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in MATH 2640
Typically Offered: Fall/Spring

ELECTENG 2210 Circuit Modeling II 4 Credits
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 1210 and MATH 2740
Typically Offered: Fall/Spring

ELECTENG 3020 Analog Electronics 4 Credits
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 2210
Typically Offered: Fall/Spring

ELECTENG 3130 Solid State Electronic Devices 4 Credits
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 2210, PHYSICS 3140 and MATH 3630
Typically Offered: Fall/Spring

ELECTENG 3140 Electric and Magnetic Fields 4 Credits
Electrostatics, magnetostatics, Maxwell’s equations, plane waves, and transmission lines.
Components: Discussion, Class
Cross Offering: ELECTENG 3140, ENGRPHYS 3640
Prereqs/Coreqs: P: "C-" or better in ELECTENG 2210, MATH 2840, MATH 3630 and PHYSICS 2340
Typically Offered: Fall/Spring

ELECTENG 3210 Engineering Computation 3 Credits
Introduction to Matlab programming. Applications of Matlab to probabilistic analysis of communication systems, statistical analysis of product yields, matrix and state-space analyses of control systems and power systems, etc.
Components: Class
Prereqs/Coreqs: P: A grade of C- or better in MATH 3630 and ELECTENG 2210
Typically Offered: Spring

ELECTENG 3220 Signals and Systems 4 Credits
Linear time invariant (LTI) systems. Convolution, differential equations, Fourier Series, Fourier Transforms (with applications, eg. filtering, modulation, sampling), Laplace transforms. Transfer functions, frequency response, and Bode plots.
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 2210 and MATH 3630
Typically Offered: Fall/Spring

ELECTENG 3320 Automatic Controls 4 Credits
Analysis and synthesis of single-input, single output linear time-invariant systems are considered through classical Laplace transform methods such as root-locus and frequency-domain techniques. The computer simulations demonstrate practical application of the concepts.
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C" or better in ELECTENG 3220
Typically Offered: Fall/Spring
ELECTENG 3410 Introduction to Electrical Machines and Power Systems 4 Credits
Introduction to electromechanics, generators, transformers, transmission lines, motors and network analysis.
Components: Laboratory, Discussion, Class
Prereqs/Coreqs: P: ELECTENG 2210 with a "C-" or better or GENENG 2930 with a "B" or better and PHYSICS 2340 with a "B" or better
Typically Offered: Fall/Spring/Summer

ELECTENG 3770 Logic and Digital Design 4 Credits
Introduction to digital logic. Boolean algebra. MSI and LSI. Combinational and sequential network design, prototyping, and testing. State machine design and implementation. Introduction to HDL and programmable logic devices.
Components: Laboratory, Class, Discussion
Prereqs/Coreqs: P: "C-" or better in ELECTENG 1210 or (ELECTENG 1020 and COMPUTER 3230)
Typically Offered: Fall/Spring

ELECTENG 3780 Introduction to Microprocessors 4 Credits
Introduction to microprocessor assembly language programming. Fundamentals of microprocessor architecture, data representation, and arithmetic. System debugging. Interfacing and interrupts. Microprocessor- and microcontroller-based system design, testing, and implementation.
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in COMPUTER 1430 and ELECTENG 3770
Typically Offered: Fall/Spring

ELECTENG 3950 Electrical Engineering Cooperative Education 2 Credits
Work experience in industry under the direction of the College of Engineering, Mathematics and Science Cooperative Education and Internship Program. During co-op the student is expected to be away from his/her studies at UW-Platteville and work for an industry for a semester and summer. Credits do not fulfill graduation requirements.
Components: Field Studies
Typically Offered: Fall/Spring

ELECTENG 3970 Electrical Engineering Internship 1 Credit
Work experience in industry under the direction of the department chair and College of Engineering, Mathematics and Science Cooperative Education and Internship Program. NOTE: This program is separate and distinct from the cooperative education program and is principally designed to cover the summer work experience. Internship is designed to provide experiential learning experience to the student during the summer period. Credits do not fulfill graduation requirements.
Components: Field Studies
Prereqs/Coreqs: P: Junior standing
Typically Offered: Summer

ELECTENG 4020 UHF Oscillator Design 1 Credit
Scattering parameters, the Smith Chart, transistor characterization, device destabilization, lumped-element impedance matching, UHF CAD techniques, output power prediction, and transistor bias techniques.
Components: Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3020
Typically Offered: Occasional

ELECTENG 4040 Analog IC Design 4 Credits
Design of integrated electronic circuits such as operational amplifiers, oscillators, modulators, and A/D converters.
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3220 and ELECTENG 3020 and ELECTENG 3130
Typically Offered: Fall-ODD

ELECTENG 4060 Electronic Communications 4 Credits
The overall goal of the course is to present the topics of analog and digital communication. Among the topics covered are: signal spectra, transceiver architecture, output amplifier, oscillators, AM and FM systems, base-band and pass-band digital communication.
Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: ELECTENG 3220 and ELECTENG 3020
Typically Offered: Fall-EVEN
ELECTENG 4260 Measurements and Instrumentation 4 Credits
The overall goal of the course is to present the topics of sensors and instrumentation, and their use within measurement systems, as an integrated and coherent subject. Among the topics covered are: measurement characteristics, error analysis, noise and interference in instrumentation systems, signal conditioning and filtering, transducers, sensor applications, data acquisition, and digital interfaces.

Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: 'C-' or better in (ELECTENG 3020, ELECTENG 3210, ELECTENG 3220) and senior standing
Typically Offered: Spring

ELECTENG 4310 Modern Control Systems 4 Credits
Analysis and synthesis of linear-time invariant (LTI) continuous-time systems are considered using the techniques of matrix theory, linear algebra and Laplace transform. Among topics to be discussed are: Jacobian linearization technique; Concepts of Lyapunov stability; Kalman controllability and observability; Linear quadratic optimal control regulator; Duality; Static state feedback and observer-based compensation techniques.

Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in (ELECTENG 3210 and ELECTENG 3320)
Typically Offered: Spring-ODD

ELECTENG 4320 Digital Signal Processing 4 Credits

Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in (ELECTENG 3220, ELECTENG 3020 and COMPUTER 1430)
Typically Offered: Spring-EVEN

ELECTENG 4350 Discrete Time Control Systems 4 Credits
Analysis and synthesis of discrete-time and sampled-data systems are considered using Z-transform methods, matrix theory, and linear algebra. Among the topics discussed are: Discrete equivalence of continuous-time transfer functions; Stability theory of discrete-time and sampled-data systems; Frequency-domain analysis and design of sampled-data systems; Digital control design using state-space methods.

Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in (ELECTENG 3210, ELECTENG 3320) and Senior Standing
Typically Offered: Fall

ELECTENG 4430 Power Electronics 4 Credits
Power electronic switches, converter systems: AC-to-AC, AC-to-DC, DC-to-DC, and DC-to-AC; harmonics; real and complex power in power electronic systems.

Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3220 and ELECTENG 3020 and ELECTENG 3410 and ELECTENG 3770
Typically Offered: Fall-ODD

ELECTENG 4440 Electric Motor Drives 4 Credits
Theory and operation of modern AC electric motor drives, multiple reference frame theory for three-phase AC system, dynamic modeling of induction machines, operation of the fully controlled three-phase power converters, speed and torque control of induction motors, Voltage/Hertz control, permanent magnet synchronous motor drives, DC motor drives.

Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3020 and ELECTENG 3320 and ELECTENG 3410
Typically Offered: Fall-ODD

ELECTENG 4450 Power Systems Analysis and Design 4 Credits
Power systems modeling, load flow, economic dispatch, stability, fault analysis, computer simulation and systems analysis.

Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3410 and ELECTENG 3210) and senior standing
Typically Offered: Fall-EVEN

ELECTENG 4620 Optical Systems 4 Credits
Geometric and physical optics, lasers, light emitting diodes, optical detectors, optical signal processing, holography, nonlinear optics, integrated optics, optical fibers, optical communications systems.

Components: Discussion, Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3140, ELECTENG 4610 and PHYSICS 3140 or consent of instructor
Typically Offered: Spring
ELECTENG 4720 Microcomputer Architecture and Interfacing 4 Credits
Computer architecture including processor design, microprogrammed control, memory organization, interconnection structures, input/output, interfacotechniques, and parallel processing.
Components: Laboratory, Class
Prereqs/Coreqs: P: "C-" or better in ELECTENG 3780
Typically Offered: Spring

ELECTENG 4750 Advanced Digital Design 4 Credits
Introduction to semi-custom integrated circuit design; design methodology (design entry, simulation, cell placement, and macro libraries); optimization of designs based on macro libraries; design for testability; logic simulation; placement and routing algorithms for gate arrays and standard cells; PLA-based programmable logic devices; programmable gate arrays; design projects using CAD systems.
Components: Laboratory, Class
Prereqs/Coreqs: P: a "C-" or better in ELECTENG 3780 and senior standing
Typically Offered: Fall

ELECTENG 4980 Current Topics in Engineering 1-4 Credits
In depth study of a current topic of interest to the engineering profession. The topic to be covered will be identified in the course title.
Components: Class

ELECTENG 4990 Independent Study 1-3 Credits
Advanced study in area of specialization selected by student and approved by faculty member.
Components: Independent Study
Typically Offered: Fall/Spring/Summer