ELECTRICAL AND COMPUTER ENGINEERING

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.
More Info (https://one.uf.edu/soc/)

Unless otherwise indicated in the course description, all courses at the University of Florida are taught in English, with the exception of specific foreign language courses.

Department Information

Electrical engineers study electricity and design electrical systems that solve problems—how to make your smartphones smarter; how to make your refrigerator run more efficiently; coming up with the optimal temperature to heat pizza in your microwave; designing the audio and visual technology that brings movies to life.
Website (https://www.ece.ufl.edu/)

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Map (http://campusmap.ufl.edu/#/index/0722)

Curriculum
- Combination Degrees
- Computer Engineering
- Electrical Engineering
- Electrical Engineering Minor

Although not specifically stated in each course description, the prerequisites for all courses, except those required by other departments, may include classification as an electrical engineering student in good standing. In order to use a course as a prerequisite for an EEE/EEL-prefixed course, a minimum grade of C is required in the prerequisite course.

Courses

CEN 3907C Computer Engineering Design 1 3 Credits
Grading Scheme: Letter Grade
Reinforce basic computer engineering skills; design, produce, and report on a computer engineering project, meeting defined specifications and using a structured design methodology and project management.
Prerequisite: CEN 3031 and EEL 3744C with minimum grades of C.
Corequisite: COP 4600

CEN 3908C Computer Engineering Design 2 3 Credits
Grading Scheme: Letter Grade
Selected capstone design projects involving engineering applications in the various areas of computer engineering. Must be taken prior to the semester of graduation .
Prerequisite: CEN 3907C with minimum grade of C and senior standing.

EEE 3308C Electronic Circuits 1 4 Credits
Grading Scheme: Letter Grade
Fundamentals of electronic circuits and systems. Laboratory.
Prerequisite: EEL 3111C with minimum grade of C.

EEE 3396 Solid-State Electronic Devices 3 Credits
Grading Scheme: Letter Grade
Introduces the principles of semiconductor electron device operation. Laboratory.
Prerequisite: EEL 3008.

EEE 3773 Introduction to Machine Learning 4 Credits
Grading Scheme: Letter Grade
Covers introductory topics in pattern recognition and machine learning and use of these methods towards a variety of real world applications. The focus of this course is to be introduced to basic machine learning concepts and how to use associated state-of-the-art machine learning tools.
Prerequisite: EEL 3135.

EEE 4210 Introduction to Biophotonics 3 Credits
Grading Scheme: Letter Grade
Introduces the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.
Prerequisite: EEL 3003 or EEL 3111C with minimum grade of C.

EEE 4222 Resonant MEMS 3 Credits
Grading Scheme: Letter Grade
Fundamentals of resonant micro-electro-mechanical systems (resonant MEMS) and their applications.
Prerequisite: EEE 3396C with a minimum grade of C or instructor permission.

EEE 4260 Bioelectrical Systems 3 Credits
Grading Scheme: Letter Grade
Covers the theoretical and quantitative perspective of bioelectrical signals reflecting the activity of the brain, the muscles, and the heart. Examines bases of modeling, measuring, processing and analyzing bioelectrical signals and systems, as well as common clinical applications. Laboratory.

EEE 4306 Electronic Circuits 2 3 Credits
Grading Scheme: Letter Grade
Design-oriented continuation of EEE 3308C; feedback, op amp circuits and applications, digital electronics.
Prerequisite: EEE 3308C and EEL 3008 and EEL 3112 with minimum grades of C.

EEE 4310 VLSI Circuits and Technology 1 3 Credits
Grading Scheme: Letter Grade
Introduction to VLSI circuit technology and manufacturing. Fabrication, device models, layout, parasitics, and simple gate circuits.
Prerequisite: EEE 3308C and EEL 3701C.

EEE 4329 Future of Microelectronics Technology 3 Credits
Grading Scheme: Letter Grade
Surveys state-of-the-art microelectronics technology and prospects for future technologies. Topics include nanoscale MOSFETs, strained Si, high-k gate dielectrics, carbon nanotubes, molecular electronics and single-electron devices.
Prerequisite: EEE 3396C or equivalent.

EEE 4331 Microelectronic Fabrication Technologies 3 Credits
Grading Scheme: Letter Grade
Principles of microelectronic device fabrication. Emphasis on the fundamentals of microfabrication processing and microelectronic device process flows.
Prerequisite: EEE 3396C.

EEE 4373 Radio Frequency Integrated Circuits 1 3 Credits
Grading Scheme: Letter Grade
Fundamental RF theory (such as resonant circuits, matching, noise and transmission lines), radio operation and design of key RF circuit blocks (such as amplifiers, mixers, and oscillators).
Prerequisite: EEE 3308C.

EEE 4375 Introduction to RF Circuits 3 Credits
Grading Scheme: Letter Grade
Introduction to radio frequency (RF) fundamentals and related circuits with topics of impedance matching, Smith Chart, s-parameters, waveguides, resonators, filters, active devices, and amplifiers.
Prerequisite: EEE 3308C with a minimum grade of C and EEL 3472 with a minimum grade of C.

EEE 4404 Mixed Signal IC Testing I 3 Credits
Grading Scheme: Letter Grade
Fundamentals of testing IC devices and systems: test specifications, parametric training, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations. Circuit analysis and design with analog and mixed-signal systems. Labs on testing passive components, LDOs, Op-amps, DACS/ADCs, Mixed-Signal ICs LabVIEW and the National Instruments Savage Tester.
Prerequisite: EEE 3308C and EEL 3701C with minimum grades of C.

EEE 4414 Modern Memory Device Technologies 3 Credits
Grading Scheme: Letter Grade
State-of-the-art volatile and nonvolatile memory device technologies and their limitations. Emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages.
Prerequisite: EEE 3396C

EEE 4420 Introduction to Nanodevices 3 Credits
Grading Scheme: Letter Grade
Physical principles of modern solid-state devices and their applications, quantum mechanics and fundamentals of nanoelectronics.
Prerequisite: EEE 3396C.

EEE 4423 Introduction to Quantum Computing 3 Credits
Grading Scheme: Letter Grade
Introduces quantum computing concepts and hardware implementations in a self-contained manner and discusses fundamentals of quantum mechanics. Also introduces important concepts of superposition and entanglement, hardware realization of quantum computing technologies, and quantum computing algorithms.
Prerequisite: EEE 3396 with a minimum grade of C and (MAS 3114 with a minimum grade of C or EEL 3850 with a minimum grade of C).

EEE 4511C Real Time Digital Signal Processing Applications 4 Credits
Grading Scheme: Letter Grade
Real world digital signal processing (DSP) tasks are presented and solved in a lab environment that utilizes a Floating Point DSP and a development simulation and hardware emulation tool. Laboratory.
Prerequisite: EEL 3135 and EEL 3744C.

EEE 4701 Automated Hardware/Software Verification 3 Credits
Grading Scheme: Letter Grade
Develop modeling, formal specification, and automated verification skills for analyzing complex hardware and/Or software systems. Hands-on experience with model checking tools.
Prerequisite: EEL 3744C or equivalent and COP 3530 or equivalent.

EEE 4714 Introduction to Hardware Security and Trust 3 Credits
Grading Scheme: Letter Grade
Fundamentals of hardware security and trust for integrated circuits. Cryptographic hardware, invasive and non-invasive attacks, side-channel attacks, physically unclonable functions (PUFs), true random number generation (TRNG), watermarking of Intellectual Property (IP) blocks, FPGA security, counterfeit detection, hardware Trojan detection, and prevention in IP cores and integrated circuits.
Prerequisite: EEL 4712C with minimum grade of C.

EEE 4720 Acoustics 3 Credits
Grading Scheme: Letter Grade
Governing equations for wave theory of sound; Character of plane acoustic waves and 3-D acoustic fields; Sound transmission/reflection at an interface between two media; Waves transmission/attenuation inducts; Low frequency approximations (lumped-element modeling) and transducers; sources of sound.
Prerequisite: MAP 2302 and (EEL 3111C or EEL 3003) with minimum grades of C or instructor permission.

EEE 4740 Physical Attacks and Inspection of Electronics 3 Credits
Grading Scheme: Letter Grade
Focuses on the physical inspections, physical attacks, reverse engineering, counterfeit detection, etc. of electronics from the device to system level using advanced microscopy, failure analysis techniques combined with image analysis and machine learning. In additions, students will also learn about the associated countermeasures.
Prerequisite: EEL3112 with a minimum grade of C.

EEE 4773 Fundamentals of Machine Learning 3 Credits
Grading Scheme: Letter Grade
Overview of machine intelligence and the role of machine learning in a variety of real-world problems. Probability and statistics to handle uncertain data. Topics covered include: learning models from data in both a supervised and unsupervised fashion, linear models and non- linear models for classification, and linear dimensionality reduction.
Prerequisite: EEL 3135 and EEL 3850 with minimum grades of C.

EEE 4800 Neural Signals, Systems, and Technology 3 Credits
Grading Scheme: Letter Grade
Biophysical principles of neural signaling; characterization of neural circuits and systems; technology design principles for interfacing with biological neural systems; overview of clinical and consumer applications for neurotechnology and artificial intelligence.
Prerequisite: EEL 3850 with a minimum grade of C.

EEL 3000 Introduction to Electrical Engineering 2 Credits
Grading Scheme: Letter Grade
Introduces the profession of electrical engineering. Presents career development and enhancement, professional codes of conduct, ethics, entrepreneurship, intellectual property, professional societies. Projects provide hands-on experience with soldering, MATLAB programming, and microcontrollers.
Prerequisite: MAC 2311 with minimum grade of C or appropriate AP/IB score and Electrical Engineering majors only.

EEL 3008 Physics of Electrical Engineering 3 Credits
Grading Scheme: Letter Grade
Introduces the fundamental physics underlying components and devices and their application to electronics, power, and wireless.
Prerequisite: EEL 3111C and MAC 2313 and MAP 2302.

EEL 3111C Circuits 1 4 Credits
Grading Scheme: Letter Grade
Basic analysis of DC and AC electric circuits. Laboratory.
Prerequisite: MAC 2312 and PHY 2049.

EEL 3112 Circuits 2 3 Credits
Grading Scheme: Letter Grade
Continuous-time signals and linear systems: Fourier series and transforms, frequency, response, Laplace transform and system function, analog filters; emphasis on electrical circuits. Sampling.
Prerequisite: EEL 3000 and EEL 3111C and EEL 3135 and EGN 2020C and MAP 2302, all with minimum grades of C.

EEL 3135 Introduction to Signals and Systems 4 Credits
Grading Scheme: Letter Grade
Continuous-time and discrete-time signal analysis including Fourier series and discrete-time and discrete Fourier transforms; sampling; discrete-time linear system analysis with emphasis on FIR and IIR systems: impulse response, frequency response, and system function; MATLAB-based programming for Signals and Systems.
Prerequisite: MAC 2313 and (EEL 3834 or COP 3503Cor COP 3504C or COP 2274) all with minimum grades of C.

EEL 3211C Basic Electric Energy Engineering 4 Credits
Grading Scheme: Letter Grade
Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, and AC and DC rotating machines. Laboratory.
Prerequisite: EEL 3008.

EEL 3402 Remote Sensing in Engineering: Science, Sensors and Applications 3 Credits
Grading Scheme: Letter Grade
Remote sensing theory, systems and applications using information obtained from the visible/near infrared, thermal infrared and microwave regions of the EM spectrum.
Prerequisite: MAP 2302 or equivalent.

EEL 3472 Fundamentals of Electromagnetic Fields 3 Credits
Grading Scheme: Letter Grade
Transmission lines, vector analysis, electrostatics, magnetostatics, time-varying fields, plane waves.
Prerequisite: EEL 3008.

EEL 3701C Digital Logic and Computer Systems 4 Credits
Grading Scheme: Letter Grade
Overview of logic design, algorithms, computer organization and assembly language programming and computer engineering technology. Laboratory.
Prerequisite: Knowledge of a programming language.

EEL 3834 Programming for Electrical Engineering 1 3 Credits
Grading Scheme: Letter Grade
Develops computer skills and the art of writing sound computer programs using examples and exercises relevant to electrical and computer engineering.

EEL 3850 Data Science for ECE 4 Credits
Grading Scheme: Letter Grade
Analysis, processing, simulation, and reasoning of data. Includes data conditioning and plotting, linear algebra, statistical methods, probability, simulation, and experimental design.
Prerequisite: MAC 2312 and (EEL 3834 or COP 3503 or COP 3504C or COP 2274), all with minimum grades of C.

EEL 3923C Electrical Engineering Design 1 3 Credits
Grading Scheme: Letter Grade
Teams design, produce, and report on a hardware prototype, meeting defined specifications and using a structured design methodology. Includes project management, hardware prototyping, and project reporting.
Prerequisite: (EEE 3308C and EEL 3112 and EEL 3701C with minimum grades of C) and 2 courses from breadth elective list.

EEL 4242C Power Electronic Circuits 3 Credits
Grading Scheme: Letter Grade
Circuit topologies, analysis, design and simulation of electronic circuits such as power supplies, and motor drives.
Prerequisite: EEL 3308.

EEL 4248 Fundamentals of RF and Power Electronic Devices 3 Credits
Grading Scheme: Letter Grade
Introduces important semiconductor device technologies for high speed electronics, power electronics, and energy harvesting applications.
Prerequisite: EEE 3396C.

EEL 4251 Power System Analysis 3 Credits
Grading Scheme: Letter Grade
Development of power system equivalents by phase network analysis, load flow, symmetrical components, sequence networks, and fault analysis.
Prerequisite: EEL 3211C.

EEL 4271 Power System Protection 3 Credits
Grading Scheme: Letter Grade
Power systems protection analytical methodologies and algorithms. Analyzes different methods for equipment and systems protection and discusses wide-area monitoring techniques, which allow real-time operation and control. Introduces cyber-physical security approaches for the smart grid and realizes numerical construction of protection methods considering realistic engineering hypothesis.
Prerequisite: EEL 4251 or instructor permission.

EEL 4287 Smart Grid for Sustainable Energy 3 Credits
Grading Scheme: Letter Grade
Survey of power grid operations and markets for students with interest in power systems and/or sustainable energy. Characteristics of traditional and new energy resources; how resources impact the grid; control on many time-scales; how the power grid and power markets of tomorrow will differ from those of today.
Prerequisite: EEL 4657C.

EEL 4403 Computational Photography 3 Credits
Grading Scheme: Letter Grade
Fundamentals of computational photography, sensing, imaging and illumination.
Prerequisite: EEL 3135 with a minimum grade of C.

EEL 4412 Applied Magnetics and Magnetic Materials 3 Credits
Grading Scheme: Letter Grade
Introduces magnetism, magnetic materials, and magnetic devices; offers a balance of theory and application from an applied engineering perspective.
Prerequisite: EEL 3008 or instructor permission.

EEL 4421 RF/Microwave Passive Circuits 3 Credits
Grading Scheme: Letter Grade
Radio frequency (RF)/microwave passive components and circuits such as transmission lines, waveguides, couplers, filters, and resonators.
Prerequisite: EEL 3472C with a minimum grade of C.

EEL 4440 Optical Communication Systems 3 Credits
Grading Scheme: Letter Grade
Introduces electromagnetic waves, dielectric waveguides and fibers, propagation characteristics of fibers, characterization methods, LEDs and laser diodes, photodetector optical receivers and communication systems.
Prerequisite: EEE 3396C and EEL 3472C.

EEL 4446 Laser Theory and Design 3 Credits
Grading Scheme: Letter Grade
Studies the field of semiconductor optoelectronics and the physics of optoelectronic devices including the interaction of photons with electrons and holes in a semiconductor leading to the realization of optoelectronic devices such as photon amplifiers, LEDs, diode lasers, electro-absorption modulators, and detectors, including their design and application-specific characteristics.
Prerequisite: EEL 3008 or instructor permission.

EEL 4458 Fundamentals of Photonics 3 Credits
Grading Scheme: Letter Grade
Reviews electromagnetic fields and waves, energy bands in semiconductors, p-n junctions and optical properties of semiconductors. Fundamentals of optical modulators and waveguides and photonic applications.
Prerequisite: EEL 3472C and EEE 3396C.

EEL 4461 Antenna Systems 3 Credits
Grading Scheme: Letter Grade
Electromagnetic field theory and its application to antenna design.
Prerequisite: EEL 3472C.

EEL 4473 Electromagnetic Fields and Applications 3 Credits
Grading Scheme: Letter Grade
Rigorously develops the properties of electric and magnetic fields. Maxwell's Equations form the foundation for understanding the fundamental nature and application-driven aspect of static and dynamic fields and their derivation from scalar and vector potentials. Fields in media is examined along with energy considerations and propagation effects.
Prerequisite: EEL 3472C.

EEL 4495 Lightning 3 Credits
Grading Scheme: Letter Grade
Introduces lightning discharge processes. Electromagnetics relevant to lightning measurements. Applications for determining lightning charge, current, location and characteristics. Lightning protection.
Prerequisite: EEL 3472C.

EEL 4514C Communication Systems and Components 4 Credits
Grading Scheme: Letter Grade
Theory of communication and applications to radio, television, telephone, satellite, cellular telephone, spread spectrum and computer communication systems. Laboratory.
Prerequisite: EEL 3112 (with minimum grade of C) and EEL 3850 (with minimum grade of C).

EEL 4516 Noise in Devices and Communication Systems 3 Credits
Grading Scheme: Letter Grade
Origin, characterization and measurement of random noise. Calculation of signal-to-noise ratios and probability of errors in communication systems.
Corequisite: EEL 4514C.

EEL 4523 Audio Engineering 3 Credits
Grading Scheme: Letter Grade
Introduces audio and sound engineering that includes the underlying theory of acoustics, electronics and signal processing; demonstrates modern audio engineering practice as applied to music, home audio, recording and sound reinforcement.
Prerequisite: EEL 3111C or EEL 3003, or instructor permission.

EEL 4540 Introduction to Radar 3 Credits
Grading Scheme: Letter Grade
Basic principles of cw and pulsed radar; angle, range, and Doppler tracking; accuracy and resolution; signal design.
Prerequisite: EEL 4514C.

EEL 4598 Computer Communications 3 Credits
Grading Scheme: Letter Grade
Introduces the principles and practice of computer networking, emphasizing data communication, and the lower layers of the OSI and TCP/IP protocol architectures.
Prerequisite: (EEL 3834 or COP 3503C or COP 3504C or COP 2274 or equivalent), all with minimum grades C and junior standing or higher.

EEL 4599 Wireless and Mobile Networks 3 Credits
Grading Scheme: Letter Grade
Senior-level study of wireless and mobile networks. Investigates telecommunication architectures and protocols for wireless sensor networks and wireless embedded systems; Wi-Fi and wireless local area networks; mobile ad-hoc networks; next generation cellular systems and satellite networks.
Prerequisite: EEL 3701C.

EEL 4610 State Variable Methods in Linear Systems 3 Credits
Grading Scheme: Letter Grade
Development of state-variable approach to linear continuous-time and discrete-time systems with emphasis on the design of feedback control systems.
Prerequisite: EEL 4657C.

EEL 4651 Control of Biological Systems 3 Credits
Grading Scheme: Letter Grade
The automatic control principles that govern critical processes in human biology are explored. Through the development of mathematical models of biological systems, the course creates an understanding of metabolic, immunologic, and genetic processes. Applications include the manufacture of vaccines, monoclonal antibodies, cancer treatments, insulin, and many others.
Prerequisite: (BSC 2005 with a minimum grade of C or AP Biology) and (EEL 4657C with a minimum grade of C or EEL 4610 with a minimum grade of C or EEL 3135 with a minimum grade of C).

EEL 4657C Linear Control Systems 4 Credits
Grading Scheme: Letter Grade
Theory and design of linear control systems. Laboratory.
Prerequisite: EEL 3112 (with minimum grade of C) and EEL 3850 (with minimum grade of C)..

EEL 4665C Intelligent Machines Design Laboratory 4 Credits
Grading Scheme: Letter Grade
Design simulation, fabrication, assembly and testing of intelligent robotic machines. Laboratory.
Prerequisite: (EEL 3744C or EML 3005) or instructor permission.

EEL 4712C Digital Design 4 Credits
Grading Scheme: Letter Grade
Advanced modular logic design, design languages, finite state machines and binary logic. Laboratory.
Prerequisite: EEL 3701C.

EEL 4713C Digital Computer Architecture 4 Credits
Grading Scheme: Letter Grade
The use of electronic digital modules to design computers. Includes the organization and operation of computers, hardware/software trade-offs and design of computer interfacing. Laboratory.
Prerequisite: EEL 3701C and EEL 4712C.

EEL 4720 Reconfigurable Computing 3 Credits
Grading Scheme: Letter Grade
Fundamental concepts at advanced undergraduate level in reconfigurable computing based upon advanced technologies in field-programmable logic devices. Topics include general concepts, device architectures, design tools, metrics and kernels, system architectures and application case studies.
Prerequisite: EEL 4712C.

EEL 4732 Advanced Systems Programming 3 Credits
Grading Scheme: Letter Grade
Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.
Prerequisite: EEL 3701C and (EEL 3834 or COP 3503C or COP 3504C or COP 2274) and COP 4600, all with a minimum grades of C.

EEL 4736 Principles of Computer System Design 3 Credits
Grading Scheme: Letter Grade
Broadly introduces the main principles and abstractions for engineering hardware and software systems. Includes in-depth studies of their use on computer systems across a variety of designs, be it an operating system, a client/server application, a database server or a fault-tolerant disk cluster.
Prerequisite: EEL 4712C and (EEL 3834 or COP 3503C or COP 3504C or COP 2274 or equivalent), all with minimum grades of C.

EEL 4744C Microprocessor Applications 4 Credits
Grading Scheme: Letter Grade
Experience in the elements of microprocessor-based systems, hardware interfacing and software design for their application. Laboratory.
Prerequisite: EEL 3701C (with minimum grade of C) and (EEL 3834 or COP 3503C or COP 3504C or COP 2274 or equivalent with minimum grades of C).

EEL 4745C Microprocessor Applications 2 4 Credits
Grading Scheme: Letter Grade
Implementation of a Real-Time Operating System on an ARM Cortex M processor to create more robust and complex microprocessor applications. Introduction to IoT applications.
Prerequisite: EEL 3744C with minimum grade of C and proficiency in programming in C.

EEL 4750 Foundations of Digital Signal Processing 3 Credits
Grading Scheme: Letter Grade
Analysis and design of digital filters for discrete signal processing, spectral analysis and fast Fourier transform.
Prerequisite: EEL 3135.

EEL 4837 Programming for Electrical Engineering 2 3 Credits
Grading Scheme: Letter Grade
Fundamentals of data structures and algorithms, including lists, queues, stacks, divide-and-conquer, dynamic programming, trees, tables, graphs and recursive techniques. The role of specific data structures in electrical engineering applications.
Prerequisite: EEL 3834 or COP 2274 or COP 3503C or COP 3504C or equivalent, all with minimum grades of C.

EEL 4853 Cross Layered System Security 3 Credits
Grading Scheme: Letter Grade
Develop an understanding of the principles of computer security, as it crosses layers of abstraction (application, operating system, hardware, and network). Learn the challenges of building secure computer systems with examples and hands-on assignments. Current research on these challenges will be discussed. Students will review and present conference papers.
Prerequisite: (EEL 3834 or COP 3503C or COP 3504C or COP 2274 or equivalent) and (EEL 4736 or equivalent), all with a minimum grades of C.

EEL 4905 Individual Problems in Electrical Engineering 1-4 Credits
Grading Scheme: Letter Grade
Selected problems or projects in the student's major field of engineering study.

EEL 4912 Integrated Product and Process Design 1 3 Credits
Grading Scheme: Letter Grade
First part of two in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes, on time and within budget. Working closely with industry liaison engineers and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: EEE 3308C and EEL 3701C.

EEL 4913 Integrated Product and Process Design 2 3 Credits
Grading Scheme: Letter Grade
Second part of two in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes, on time and within budget. Working closely with industry liaison engineers and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: EEL 4912.

EEL 4924C Electrical Engineering Design 2 3 Credits
Grading Scheme: Letter Grade
Selected design projects involving engineering applications in the various areas of electrical engineering. Laboratory.
Prerequisite: EEL 3923C and two breadth electives and one depth elective.

EEL 4930 Special Topics in Electrical Engineering 1-4 Credits
Grading Scheme: Letter Grade
Special courses covering selected topics in electrical engineering.

EEL 4948 Practical Work in Electrical and Computer Engineering 3 Credits
Grading Scheme: S/U
One term industrial employment, including extra work according to a pre-approved outline. Practical engineering work under industrial supervision, as set forth in the Herbert Wertheim College of Engineering regulations.
Prerequisite: EEL 3111C and EEL 3701C and sophomore standing or consent of undergraduate coordinator/supervising faculty mentor. Must have a full time internship defined as working for a minimum of 40 hours per week for a minimum of 10 weeks (400 hours).

EEL 4949 Co-op Work Experience 1 Credit
Grading Scheme: S/U
Practical co-op engineering work under approved industrial supervision.
Prerequisite: Engineering major.

EGN 1935 Special Topics in Freshman Engineering 1-3 Credits
Grading Scheme: Letter Grade
Laboratory, lectures or conferences cover selected topics in engineering.

EGN 4912 Engineering Directed Independent Research 0-3 Credits
Grading Scheme: S/U
Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery, or application.
Prerequisite: Department permission.

EGS 1005 Prep for Success 1-4 Credits
Grading Scheme: S/U
Freshman success course that includes academic preparation in calculus, chemistry, student success, and technical communications.
Prerequisite: EG student.