

ELECTRICAL AND COMPUTER ENGINEERING

Course Search

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.

[More Info](#)

Courses at the University of Florida, with the exception of specific foreign language courses and courses in the online Master of Arts in Mass Communication program, are taught in English.

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
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. Prereq: CEN 3031 and EEL 3744C with minimum grades of C	
CEN 3908C Computer Engineering Design 2	3 Credits
Selected capstone design projects involving engineering applications in the various areas of computer engineering. Must be taken prior to the semester of graduation. Prereq: CEN 3907C with minimum grade of C and senior standing	
EEE 3308C Electronic Circuits 1	4 Credits
Fundamentals of electronic circuits and systems. Laboratory. Prereq: EEL 3008 and EEL 3112	
EEE 3396C Solid-State Electronic Devices	4 Credits
Introduces the principles of semiconductor electron device operation. Laboratory. Prereq: EEL 3008	
EEE 4210 Introduction to Biophotonics	3 Credits
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. Prereq: EEL 3003 or EEL 3111C with minimum grade of C	
EEE 4222 Resonant MEMS	3 Credits
Fundamentals of Resonant Micro-Electro-Mechanical Systems (Resonant Mems) and Their Applications. Prereq: EEL 3135 and EEL 3112 or instructor permission	
EEE 4260C Bioelectrical Systems	4 Credits
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. Prereq: EEL 3008 and EEL3112	
EEE 4306 Electronic Circuits II	3 Credits
Design-oriented continuation of EEE 3308C; feedback, op amp circuits and applications, digital electronics. Prereq: EEE 3308C	
EEE 4310 Digital Integrated Circuits	3 Credits
Analysis and design of digital circuits using MOS and bipolar devices. Prereq: EEE 3308C and EEL3701C	
EEE 4329 Future of Microelectronics Technology	3 Credits
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. Prereq: EEE 3396 or equivalent	
EEE 4331 Microelectronic Fabrication Technologies	3 Credits
Principles of microelectronic device fabrication. Emphasis on the fundamentals of microfabrication processing and microelectronic device process flows. Prereq: EEE 3396	
EEE 4373 Radio-Frequency Electronics	3 Credits
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). Prereq: EEE 3308C	
EEE 4404 Mixed Signal IC Testing I	3 Credits
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. Prereq: EEE 3308C and EEL 3701C with minimum grades of C	
EEE 4420 Introduction to Nanodevices	3 Credits
Physical principles of modern solid-state devices and their applications, quantum mechanics and fundamentals of nanoelectronics. Prereq: EEE 3396	
EEE 4511C Real Time Digital Signal Processing Applications	4 Credits
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. Prereq: EEL 3135 and EEL 3744C	
EEE 4701 Automated Hardware/Software Verification	3 Credits
Develop modeling, formal specification, and automated verification skills for analyzing complex hardware and/Or software systems. Hands-on experience with model checking tools. Prereq: EEL 3744C or equivalent and COP 3530 or equivalent	
EEE 4714 Introduction to Hardware Security and Trust	3 Credits
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. Prereq: EEL 4712C with minimum grade of C	
EEE 4720 Acoustics	3 Credits
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. Prereq: MAP 2302 and either EEL 3111C or EEL 3003 all with minimum grades of C or instructor permission	

- EEL 3000 Introduction to Electrical and Computer Engineering** 2 Credits
Introduces electrical and computer engineering tools, both hardware and software. Professional ethics, career development. Assemble and test hardware project to provide hands-on experience.
- EEL 3008 Physics of Electrical Engineering** 3 Credits
Introduces the fundamental physics underlying components and devices and their application to electronics, power, and wireless.
Prereq: EEL 3111C, MAC 2313, and MAP 2302
- EEL 3111C Circuits 1** 4 Credits
Basic analysis of DC and AC electric circuits. Laboratory.
Prereq: MAC 2312 and PHY 2049
- EEL 3112 Circuits 2** 3 Credits
Continuous-time signals and linear systems: Fourier series and transforms, frequency, response, Laplace transform and system function, analog filters; emphasis on electrical circuits. Sampling.
Prereq: EEL 3000, EEL 3111C, EEL 3135 and MAP 2302
- EEL 3135 Introduction to Signals and Systems** 4 Credits
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.
Prereq: MAC 2313
- EEL 3211C Basic Electric Energy Engineering** 4 Credits
Analysis and modeling of power system components. Magnetic circuits, energy conservation, transformers, and AC and DC rotating machines. Laboratory.
Prereq: EEL 3008
- EEL 3402 Remote Sensing in Engineering: Science, Sensors and Applications** 3 Credits
Remote sensing theory, systems and applications using information obtained from the visible/near infrared, thermal infrared and microwave regions of the EM spectrum.
Prereq: MAP 2302 or equivalent
- EEL 3472C Fundamentals of Electromagnetic Fields** 4 Credits
A review of the vector calculus needed for the study of electromagnetic fields and their applications. Both static and dynamic fields are considered, including radiation and propagation both in free space and in waveguide structures. The associated laboratory reinforces the classroom instruction.
Prereq: EEL 3008
- EEL 3701C Digital Logic and Computer Systems** 4 Credits
Overview of logic design, algorithms, computer organization and assembly language programming and computer engineering technology. Laboratory.
Prereq: Knowledge of a programming language
- EEL 3744C Microprocessor Applications** 4 Credits
Experience in the elements of microprocessor-based systems, hardware interfacing and software design for their application. Laboratory.
Prereq: EEL 3701C
- EEL 3834 Programming for Electrical and Computer Engineers** 3 Credits
Develops computer skills and the art of writing sound computer programs using examples and exercises relevant to electrical and computer engineering.
- EEL 3923C Electrical Engineering Design 1** 3 Credits
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.
Prereq: EEL 3008, EEL 3112, EEL 3744C and 1 course from breadth elective list
- EEL 4242C Power Electronic Circuits** 3 Credits
Circuit topologies, analysis, design and simulation of electronic circuits such as power supplies, and motor drives.
Prereq: EEL 3308C
- EEL 4251 Power System Analysis** 3 Credits
Development of power system equivalents by phase network analysis, load flow, symmetrical components, sequence networks, and fault analysis.
Prereq: EEL 3211C
- EEL 4271 Power System Protection** 3 Credits
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.
Prereq: EEL 4251 or instructor permission
- EEL 4287 Smart Grid for Sustainable Energy** 3 Credits
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.
Prereq: EEL 4657C
- EEL 4403 Computational Photography** 3 Credits
Fundamentals of computational photography, sensing, imaging and illumination.
Prereq: EEL 3135 with a minimum grade of C
- EEL 4412 Applied Magnetism and Magnetic Materials** 3 Credits
Introduces magnetism, magnetic materials, and magnetic devices; offers a balance of theory and application from an applied engineering perspective.
Prereq: EEL 3008 or instructor permission
- EEL 4421 RF/Microwave Passive Circuits** 3 Credits
Radio frequency (RF)/microwave passive components and circuits such as transmission lines, waveguides, couplers, filters, and resonators.
Prereq: EEL 3472C with a minimum grade of C
- EEL 4440 Optical Communication Systems** 3 Credits
Introduces electromagnetic waves, dielectric waveguides and fibers, propagation characteristics of fibers, characterization methods, LEDs and laser diodes, photodetector optical receivers and communication systems.
Prereq: EEL 3396 and EEL 3472C
- EEL 4446 Laser Theory and Design** 3 Credits
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.
Prereq: EEL 3008 or permission of instructor

EEL 4458 Fundamentals of Photonics	3 Credits	EEL 4610 State Variable Methods in Linear Systems	3 Credits
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.		Development of state-variable approach to linear continuous-time and discrete-time systems with emphasis on the design of feedback control systems.	
Prereq: EEL 3472C and EEE 3396		Prereq: EEL 4657C	
EEL 4461 Antenna Systems	3 Credits	EEL 4657C Linear Control Systems	4 Credits
Electromagnetic field theory and its application to antenna design.		Theory and design of linear control systems. Laboratory.	
Prereq: EEL 3472C		Prereq: EEL 3112 and EEL 3744C	
EEL 4473 Electromagnetic Fields and Applications	3 Credits	EEL 4665C Intelligent Machines Design Laboratory	4 Credits
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.		Design simulation, fabrication, assembly and testing of intelligent robotic machines. Laboratory.	
Prereq: EEL 3472C		Prereq: EEL 4744C, EML 3005, or instructor permission	
EEL 4495 Lightning	3 Credits	EEL 4712C Digital Design	4 Credits
Introduces lightning discharge processes. Electromagnetics relevant to lightning measurements. Applications for determining lightning charge, current, location and characteristics. Lightning protection.		Advanced modular logic design, design languages, finite state machines and binary logic. Laboratory.	
Prereq: EEL 3472		Prereq: EEL 3701C	
EEL 4514C Communication Systems and Components	4 Credits	EEL 4713C Digital Computer Architecture	4 Credits
Theory of communication and applications to radio, television, telephone, satellite, cellular telephone, spread spectrum and computer communication systems. Laboratory.		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.	
Prereq: EEL 3112		Prereq: EEL 3701C and EEL 4712C	
EEL 4516 Noise in Devices and Communication Systems	3 Credits	EEL 4720 Reconfigurable Computing	3 Credits
Origin, characterization and measurement of random noise. Calculation of signal-to-noise ratios and probability of errors in communication systems.		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.	
Coreq: EEL 4514		Prereq: EEL 4712C	
EEL 4523 Audio Engineering	3 Credits	EEL 4732 Advanced Systems Programming	3 Credits
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.		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.	
Prereq: EEL 3111C or EEL 3003, or instructor permission		Prereq: EEL 3701C, EEL 3834, and COP 4600 or equivalent	
EEL 4540 Introduction to Radar	3 Credits	EEL 4736 Principles of Computer System Design	3 Credits
Basic principles of cw and pulsed radar; angle, range, and Doppler tracking; accuracy and resolution; signal design.		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.	
Prereq: EEL 4514		Prereq: EEL 4712C and EEL 3834	
EEL 4598 Computer Communications	3 Credits	EEL 4750 Foundations of Digital Signal Processing	3 Credits
Introduces the principles and practice of computer networking, emphasizing data communication and the lower layers of the OSI and TCP/IP protocol architectures.		Analysis and design of digital filters for discrete signal processing, spectral analysis and fast Fourier transform.	
Prereq: EEL 3834, COP 2271 or equivalent and junior or senior standing		Prereq: EEL 3135	
EEL 4599 Wireless and Mobile Networks	3 Credits	EEL 4853 Cross Layered System Security	3 Credits
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.		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.	
Prereq: EEL 3701C		Prereq: EEL 3834 or equivalent and EEL 4736 or equivalent	
		EEL 4905 Individual Problems in Electrical Engineering	1-4 Credits
		Selected problems or projects in the student's major field of engineering study.	

EEL 4912 Integrated Product and Process Design 1 **3 Credits**

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.

Prereq: EEE 3308C and EEL 3701C

EEL 4913 Integrated Product and Process Design 2 **3 Credits**

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.

Prereq: EEL 4912

EEL 4924C Electrical Engineering Design 2 **3 Credits**

Selected design projects involving engineering applications in the various areas of electrical engineering. Laboratory.

Prereq: EEL 3923C, two courses from the breadth elective list, and one course from depth elective list

EEL 4930 Special Topics in Electrical Engineering **1-4 Credits**

Special courses covering selected topics in electrical engineering.

EEL 4948 Practical Work in Electrical and Computer Engineering **1 Credit**

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.

(S-U)

Prereq: 3EG classification

EEL 4949 Co-op Work Experience **1 Credit**

Practical co-op engineering work under approved industrial supervision.

(S-U)

Prereq: EG classification

EGN 1935 Special Topics in Freshman Engineering **1-3 Credits**

Laboratory, lectures or conferences cover selected topics in engineering.

EGN 4912 Engineering Directed Independent Research **3 Credits**

Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery or application. (S-U)

EGS 1005 Prep for Success **1-4 Credits**

Freshman success course that includes academic preparation in calculus, chemistry, student success and technical communications. (S-U)

(S-U)

Prereq: EG student
