ELECTRICAL AND COMPUTER ENGINEERING (ECE)

ECE 1101. Electrical and Computer Engineering Tools. (1 Credit)
An introduction to the modern computer tools used for circuit analysis, signal and system analysis, control, and data acquisition.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%201101)

ECE 1401. Programming for Electrical Engineers. (3 Credits)
An introduction to programming tools and languages for electrical engineers. Applications to various mathematical and engineering problems including data acquisition, data analysis, and simulation.
CSE 1010 or 1729.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%201401)

ECE 2000. Electrical and Computer Engineering Principles. (3 Credits)
Basic concepts of circuit analysis as applied to electronic circuits and electromechanical devices, including measuring instruments. Intended for non-ECE majors.
PHYS 1402Q or 1502Q or 1230 or 1530, which may be taken concurrently. Recommended preparation: MATH 2410Q. This course and ECE 2608 or ECE 2001W may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%202000)

ECE 2001. Electrical Circuits. (4 Credits)
Analysis of electrical networks incorporating passive and active elements. Basic laws and techniques of analysis. Transient and forced response of linear circuits. AC steady state power and three-phase circuits. Periodic excitation and frequency response. Computer analysis tools. Design projects are implemented and tested in the laboratory. Laboratory reports are required for each project.
MATH 2410Q or 2143Q and either PHYS 1402Q or 1502Q or 1602Q or 1230 or 1530, both of which may be taken concurrently. Not open for credit to students who have passed ECE 2000.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%202001)

ECE 2001W. Electrical Circuits. (4 Credits)
Analysis of electrical networks incorporating passive and active elements. Basic laws and techniques of analysis. Transient and forced response of linear circuits. AC steady state power and three-phase circuits. Periodic excitation and frequency response. Computer analysis tools. Design projects are implemented and tested in the laboratory. Laboratory reports with revisions are required for each project.
MATH 2410Q and either PHYS 1402Q or 1502Q or 1230 or 1530, both of which may be taken concurrently; ENGL 1007 or 1010 or 1011 or 2011. This course and ECE 2608 or ECE 2609 may not both be taken for credit.
Skill Codes: COMP. Writing Competency
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%202001W)

ECE 2193. International Study. (1-6 Credits)
Special engineering topics taken in an international study program. May count toward the major with consent of the advisor and approved plan of study.
May be repeated for a total of 6 credits
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%202193)

ECE 3001. Electromagnetic Fields and Waves. (3 Credits)
Application of electric and magnetic field theory to engineering problems involving conductors, dielectrics, semiconductors, magnetic materials, the motion of charged particles, and wave propagation. Relationship between fields and circuit parameters in the context of transmission lines and radiation.
PHYS 1402Q or 1502Q or 1230 or 1530; MATH 2110Q and 2410Q; open only to students in the School of Engineering. May not be taken out of sequence after passing ECE 4141.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203001)

ECE 3096. Directed Research in Electrical and Computer Engineering. (1-3 Credits)
Individualized or group research conducted under the supervision of the instructor.
Instructor consent required. Open only to students in the School of Engineering.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203096)

ECE 3101. Signals and Systems. (3 Credits)
(Also offered as ENGR 3101.) Representation of signals in the time and frequency domains. Fourier series. Fourier and Laplace transform methods for analysis of linear systems. Introduction to state space models. Introduction to sampling and discrete systems analysis via z transforms.
ECE 2000 or 2001W; open only to students in the School of Engineering. Recommended preparation: ECE 1401.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203101)

ECE 3111. Systems Analysis and Design. (4 Credits)
Modeling, analysis and design of control systems using frequency and time-domain methods. Differential equation, Transfer function, signal flow graph and state variable representations of continuous and discrete-time systems. Linearization of nonlinear systems. Transient and frequency response of second order systems. Stability of linear systems with feedback; Routh Hurwitz, Root locus, Bode and Nyquist methods. Controllability and observability. Computational methods for analysis of linear systems. Team-based design projects involving modeling, classical compensator design and state variable feedback design.
ECE 3101 or BME 3400; MATH 2210Q, which may be taken concurrently. Open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203111)

ECE 3161. Introduction to Robotics. (3 Credits)
(Also offered as ME 3161.) Fundamentals of mathematical modeling of robots commonly found in industrial and household domains. History of robots with multidisciplinary applications, robot classifications, coordinate frame transformations, modeling rigid body motions, forward and inverse kinematics, velocity kinematics. Course includes project work.
Corequisite: MATH 2210; Recommended preparation: ECE 1401 and either ECE 3101 or ME 3253 or ME 3254 or BME 3400.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203161)

ECE 3162. Robot Motion Planning. (3 Credits)
(Also offered as ME 3162.) The fundamentals of motion planning of robots. Topics include sensing systems for obstacle avoidance and environment mapping, robot localization, shortest path planning using potential field-based, grid-based and sampling-based methods, coverage path planning using cellular decomposition, spanning trees and potential fields, deep neural networks and their application to path planning, motion planning under constraints, adaptive planning in changing environments. Course includes project work.
Open only to students in the College of Engineering. Corequisite: MATH 2210Q. Recommended preparation: ECE/ME 3161; ECE 1401, 3411; CSE 2050, 3500; and either ECE 3101 or ME 3253 or 3254.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203162)

ECE 3163. Robot Control and Dynamics. (3 Credits)
(Also offered as ME 3163.) Basic concepts of robot manipulator modeling and control including joint space and task space control, Euler-Lagrange dynamics, independent joint control, whole robot manipulator control, robot control using visual feedback, robot control with trajectory planner. The course will include robot controller implementation via a course project and practical examples throughout the course.
ECE/ME 3161; ECE 3111 or ME 3253 or ME 3254; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203163)

ECE 3193. International Study. (1-6 Credits)
Credits and hours by arrangement. Special engineering topics taken in an international study program. May count toward the major with consent of the advisor and approved plan of study.
May be repeated for a total of 6 credits
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203193)

ECE 3201. Electronic Circuit Design and Analysis. (4 Credits)
Physical electronics underlying the operation of electronic devices. Diodes, diode models, and diode circuits. Transistors, transistor models, and transistor circuits. DC, small signal, and frequency analysis of transistor amplifiers. Compound transistor configurations. Computer analysis tools. Diode and transistor circuits are constructed and tested in the laboratory. A laboratory report is required for each experiment.
ECE 2001; open only to students in the School of Engineering. This course and ECE 3608 or ECE 3609 may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203201)

ECE 3211. Power Electronics. (4 Credits)
Power converters for power processing, regulation, and control as applied to computer and telecommunication systems, transportation systems, industrial drives, and renewable power conversion systems. Power semiconductor device characteristics, transformers, and dc/dc converters including design projects.
ECE 3201; open only to students in the School of Engineering. This course and ECE 3610 may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203211)

ECE 3212. Electric Machines and Drives. (4 Credits)
Fundamental operation, equivalent circuit models, physical structure, and control of electric machinery; basic power electronic drives, three-phase systems, magnetic circuit equivalents, basic electro-mechanics, transformers, basic rotating machines; different electric machines including switched reluctance machines, stepper motors, three-phase synchronous machines, induction or asynchronous machines, and DC machines; Basic electronic drives for each machine type along with open-loop control strategies. Weekly laboratory experiments accompany the lectures to demonstrate most of these concepts.
ECE 3201
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203212)

ECE 3221. Digital Integrated Circuits. (3 Credits)
Switching, timing, wave shaping, and logic circuits to generate waveforms and functions used in pulse systems, instrumentation and computers. Emphasis is on integrated circuits.
ECE 3201; CSE 2300W or 2301; open only to students in the School of Engineering. This course and ECE 3222 may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203221)

ECE 3222. Digital Integrated Circuit Design and Analysis. (4 Credits)
Fabrication, testing, and yield of digital integrated circuits. Design and analysis of bipolar and MOS digital integrated circuits. Bistable circuits and digital memories. System implementation with digital integrated circuits. Layout of digital integrated circuits. Integrated circuit packages. Computer analysis tools. Design and laboratory evaluation of digital electronic circuits.
ECE 3201; open only to students in the School of Engineering. This course and ECE 3221 may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203222)

ECE 3223. Optical Engineering. (3 Credits)
Principles and techniques of optical engineering, including geometrical optics, optical fibers and systems, sources and detectors, measurements, imaging, lenses, wave optics, polarization, interference, diffraction, optical Fourier transforms, holography, interferometry, integrated optics, frequency conversion, interaction of light and matter.
ECE 3001 or PHYS 3201; open only to students in the School of Engineering. Not open to students who have passed ECE 4231.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203223)

ECE 3225. Optical Engineering Laboratory. (3 Credits)
Hands-on design and measurement of optical systems and components. Lens systems and imaging, fiber-optic communications and fiber-optic sensors, diffraction and Fourier Optics, interferometry, etc. Structured experiments and design projects centered on available equipment.
ECE 3223, which may be taken concurrently; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203225)

ECE 3231. Introduction to Modern Power Systems. (3 Credits)
Fundamentals of power system planning, operation, and management. Power generation, transmission and distribution. Sustainable energy sources such as photovoltaics, solar-thermal power, wind farms, and their grid integration. Modern power system monitoring/control, fault analysis, and transient stability analysis using computer tools. Use of power system simulation tool e.g. PSS/E for power system planning.
ECE 2000 or 2001/W; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203231)

ECE 3243. Introduction to Nanotechnology. (3 Credits)
Basic concepts of nanoscience; new physical properties at these scales (~1-100 nm); different approaches to fabricate, image, characterize and manipulate nanostructures and nanodevices; current and potential applications in areas as diverse as electronics, health and energy; societal impacts of nanotechnology.
Open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203243)

ECE 3401. Digital Systems Design. (3 Credits)
(Also offered as CSE 3302.) Design and evaluation of control and data structures for digital systems. Hardware design languages are used to describe and design alternative register transfer level architectures and control units with a micro-programming emphasis. Consideration of computer architecture, memories, digital interfacing timing and synchronization, and microprocessor systems.
CSE 2300W or 2301; open only to students in the School of Engineering and declared Computer Science minors.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203401)

ECE 3411. Microprocessor Applications Laboratory. (3 Credits)
Design of software and interface hardware to use a microcomputer as an on-line, real-time element in data acquisition, filtering and control systems. Use of clocks, DAC's, ADC's, speech synthesis modules, and movement generators. Design project. Written and oral presentations of laboratory results.
CSE 3100 or ECE 1401; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203411)

ECE 3421. Very Large Scale Integrated (VLSI) Design and Simulation. (4 Credits)
Design of MOS transistors, including short channel effects in sub-micron devices; scaling laws; design rules. Layout of NMOS and CMOS logic gates; power-delay calculations. Design of static and/or dynamic memories. Laboratory emphasizes schematic capture, simulation, timing analysis and testing; layout of custom IC's; use of VHDL.
CSE 2300W or 2301; ECE 3201; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203421)

ECE 3431. Numerical Methods in Scientific Computation. (3 Credits)
(Also offered as CSE 3802.) Introduction to the numerical algorithms fundamental to scientific computation. Equation solving, function approximation, integration, difference and differential equations, special computer techniques. Emphasis is placed on efficient use of computers to optimize speed and accuracy in numerical computations. Extensive digital computer usage for algorithm verification.
CSE 1729 or 2050; MATH 2110Q and 2410Q; MATH 2210Q, which may be taken concurrently; open only to students in the School of Engineering, Cognitive Science majors, and declared Computer Science and Cognitive Science minors.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%203431)

ECE 4079. Independent Design Laboratory. (1-3 Credits)
Experimental design project undertaken by the student by special arrangement with a faculty member of the Department of Electrical and Computer Engineering.
Instructor consent; open only to students in the School of Engineering.
May be repeated for a total of 6 credits
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204079)

ECE 4095. Special Topics in Electrical and Computer Engineering. (1-6 Credits)
Classroom and/or laboratory course in special topics as announced in advance for each semester.
Open only to students in the School of Engineering.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204095)

ECE 4096. Independent Research in Electrical and Computer Engineering. (1-3 Credits)
Independent student-initiated research conducted under the supervision of the instructor.
Instructor consent required. Open only to students in the School of Engineering.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204096)

ECE 4097. Thesis in Electrical and Computer Engineering. (1-3 Credits)
Introduction to research through literature review and preparation of a research thesis, execution of the research proposed, and completion of written report and oral defense.
Instructor consent required. Open only to students in the School of Engineering.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204097)

ECE 4099. Independent Study in Electrical and Computer Engineering. (1-4 Credits)
Individual exploration of special topics as arranged by the student with course instructor.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204099)

ECE 4099W. Independent Study in Electrical and Computer Engineering. (1-4 Credits)
Individual exploration of special topics as arranged by the student with course instructor.
ENGL 1007 or 1010 or 1011 or 2011; open only to students in the School of Engineering.
May be repeated for credit
Skill Codes: COMP. Writing Competency
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204099W)

ECE 4111. Communication Systems. (3 Credits)
Communication of information over noisy channels. Fourier transform review, spectral analysis, and sampling. Amplitude, phase, and frequency modulation of a sinusoidal carrier. Time and frequency division multiplexing. Random processes and analysis of communication of systems in noise. Elements of digital communication systems.
ECE 3101 or BME 3400; STAT 3345Q or MATH 3160; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204111)

ECE 4112. Digital Communications and Networks. (3 Credits)
Fundamentals of communication systems. Encoding of analog signals for digital transmission. Basic information theory. Source encoding techniques. Baseband data transmission. Digital carrier modulation schemes. Multiplexing techniques. Basic error control coding. Random processes and analysis of communication of systems in noise.
ECE 3101 or BME 3400; STAT 3345Q or MATH 3160; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204112)

ECE 4113. Communications Systems Design Laboratory. (3 Credits)
Design and experimental evaluation of circuits and systems useful in communication, control, and other applications. Typical subject areas are, transmission lines, microwaves, antennas, AM/FM transmitters and receivers, TV cameras and receivers, communication between computers, laser communication, fiber-optics, pulse-code modulation, acoustics, hearing, rotating machines, servomechanisms, and microprocessors.
ECE 3001; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204113)

ECE 4114. Software-Defined Radio Design Laboratory. (3 Credits)
Design and experimental evaluation of analog and digital communication systems based on software defined radio platforms. Typical subject areas are amplitude modulation (AM), frequency modulation (FM), amplitude shift keying (ASK), frequency shift keying (FSK), and phase shift keying (PSK), orthogonal frequency division multiplexing (OFDM), channel equalization, wireless local area networks, and ad hoc networks.
ECE 3101, and ECE 4111 or 4112 either of which may be taken concurrently; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204114)

ECE 4121. Digital Control Systems. (3 Credits)
Analysis and design of control systems incorporating a digital computer as the controlling element. Building blocks of digital control. Measures of control system performance. Frequency domain and state variable methods of control design. Optimal control methods. State variable estimation. Implementation issues. Use of computer-aided software tools for simulation and design.
ECE 3111; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204121)

ECE 4122. Systems Laboratory. (3 Credits)
Real-time digital control and signal processing of cyber-physical systems. Typical topics include control of inverted pendulum and magnetic levitation systems, velocity and position control of motors, robot path planning and control. Written and oral presentations of laboratory results.
ECE 3111; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204122)

ECE 4131. Introduction to Digital Signal Processing. (3 Credits)
Discrete-time signals and systems. The z-transform. Digital filters; stability, frequency response, canonic realizations and state equations. Fourier methods for discrete signal representation; Fourier transform of sequences, the discrete Fourier transform, and the FFT. Design of linear digital filters in time and frequency domains. Spectrum analysis and filtering via the FFT.
ECE 3101 or BME 3400; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204131)

ECE 4132. Image Processing Systems Laboratory. (3 Credits)
Laboratory experiments in image processing, imaging systems, data acquisition using detectors, pattern recognition, image restoration, image enhancement, signal processing, frequency plane filters, system performance evaluation, and metrics. Emphasis is on hands-on experiments with image processing systems with interface between image sensors and computer/processors. Applications, implementation and testing of image processing systems.
ECE 4131, which may be taken concurrently (or instructor consent); open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204132)

ECE 4141. Introduction to RF/Microwave Wireless Systems. (3 Credits)
An introduction to the general hardware components, system parameters, and architectures of radio-frequency (RF) and microwave wireless systems. Practical examples will be drawn from communication as well as radar/sensor systems.
ECE 3001; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204141)

ECE 4161. Robotics Systems Laboratory. (3 Credits)
(Also offered as ME 4161.) Hands on introduction to autonomous robotics emphasizing the synergy between hardware (microprocessors, sensors,#actuators), technology (optimization, control system, machine learning) and systems (integration, programming) to achieve perception, action, and behavior in real#world environment. Students will be able to apply principles of robot modeling, planning and control to the real-world platforms.
ECE/ME 3162; open only to students in the College of Engineering. Corequisite: ECE/ME 3163.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204161)

ECE 4201. Electronic Circuits and Applications. (3 Credits)
Analysis and design of linear amplifiers. The effects of feedback in tuned, video, and operational amplifiers. Noise, stability, and frequency compensation. Applications encompass active filters, oscillators, phase lock loops and nonlinear operations such as multiplication, modulation, sampling, and analog-to-digital conversion.
ECE 3201; ECE 4211 or ECE 4225 which may be taken concurrently. Recommended preparation: ECE 3111.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204201)

ECE 4211. Semiconductor Devices and Nanostructures. (3 Credits)
Principles and applications of contemporary solid state devices such as light-emitting diodes, injection lasers, solar cells, p-n-p-n diodes, SCRs and Triacs, transistors, MESFETs and MODFETs, and fundamentals of integrated circuits. Impact of nanostructures on devices.
ECE 3201; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204211)

ECE 4223. Nanophotonics. (3 Credits)
Principles and applications of nanophotonics with focus on optical metamaterials, plasmonics, and photonic bandgap crystals. Topics covered include electric plasma, magnetic plasma, optical magnetism, negative index metamaterials, localized and non-localized surface plasmon polaritons, photonic bandgap structures, superlens, optical cloaking.
ECE 3223; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204223)

ECE 4225. Fundamentals of Electron Device Design and Characterization. (3 Credits)
Design of micro/nano electronic devices using state-of-the-art computer simulation tools, experimental electrical characterization of semiconductor devices and introduction to modern electronic devices such as high-performance MOSFETs, TFTs, solar cells, non-volatile memories, CCDs, and thermoelectric power generators.
ECE 3201; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204225)

ECE 4242. Micro/Opto-electronic Devices and Circuits Fabrication Laboratory. (3 Credits)
Semiconductor wafer preparation and characterization including: determination of carrier concentration, mobility, and lifetime; oxidation, diffusion, metallization, mask layouts, and photolithographic techniques as employed in the realization of discrete devices (e.g., bipolar and MOS transistors, solar cells) and integrated circuits; design of basic IC components such as transistors, resistors, and capacitors; monolithic fabrication of simple digital/analog circuits. Design project. Written and oral presentations of laboratory results.
ECE 4211 or 4225; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204242)

ECE 4243. Nanoscience and Nanotechnology I. (3 Credits)
(Also offered as ENGR 4243.) Fundamentals of electron and hole confinement in quantum well, wire and dot heterostructures, confinement of photons in photonic band gap structures, density of states in quantum wires; transport in quantum wires and dots, and single wells (SWNT) and multi-wall carbon nanotubes; operation of nano field-effect transistors; absorption and emission in quantum wires and dot structures; fabrication methodology to grow and assemble quantum wires and dots including self-assembly techniques for light-emitting diodes, transistors, lasers, and nanoelectromechanical (NEM) structures.
ECE 4211 or 4225 or PHYS 2300 or 3401 or MSE 4001; CHEM 1127Q or equivalent; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204243)

ECE 4244. Nanotechnology II. (3 Credits)
(Also offered as ENGR 4244.) Growth and characterization of cladded Si and Ge quantum dots (QDs), carbon nanotube using vapor phase nucleation; characterization using AFM and TEM and dynamic scattering techniques; device processing using nanolithography and QD self-assembly techniques; project work involving fabrication of devices such as quantum dot gate FETs, inverters and SRAMs, QD LEDs, carbon nanotube based FETs, and sensors using self-assembled quantum dots.
ECE 4211 or 4225 or ECE/ENGR 4243; open only to students in the College of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204244)

ECE 4261. Introduction to Memory Device Technologies. (3 Credits)
Introduction to current and future digital solid-state memory device technologies including DRAM, SRAM, flash memory, ferroelectric memory, magnetoresistive memory, phase-change memory and resistive memories, with an emphasis on the underlying physical mechanisms.
ECE 3201 or ECE 3421 or ECE 4225. This course and ECE5261 may not both be taken for credit.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204261)

ECE 4401. Digital Design Laboratory. (3 Credits)
(Also offered as CSE 3350.) Digital designing with PLA and FPGA, A/D and D/A conversion, floating point processing, ALU design, synchronous and asynchronous controllers, control path; bus master; bus slave; memory interface; I/O interface; logic circuits analysis, testing, and trouble shooting; PCB; design and manufacturing.
CSE 3302 or ECE 3401, which may be taken concurrently; open only to students in the School of Engineering and declared Computer Science minors.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204401)

ECE 4402. Digital Hardware Laboratory. (3 Credits)
(Also offered as CSE 4901.) Advanced combinational and sequential circuit design and implementation using random logic and microprocessor based system. Hardware and software interface to the basic system. Serial communication, user program loading and execution. Microcontrollers - familiarization and inclusion in design.
CSE 4302; ECE 3401 or CSE 3302; open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204402)

ECE 4451. 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, watermarking of Intellectual Property (IP) blocks, FPGA security, counterfeit detection, hardware Trojan detection and prevention in IP cores and integrated circuits.
Open only to students in the School of Engineering.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204451)

ECE 4550. Microgrids. (3 Credits)
Techniques useful for the grid modernization from a unique angle of microgrid design, analysis and operation. Smart inverters, microgrid architectures, distributed energy resources modeling, microgrid hierachical control, microgrid stability, fault management, resilient microgrids through programmable networks, reliable networked microgrids, and cyber security.
ECE 3231.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204550)

ECE 4900W. Communicating Engineering Solutions in a Societal Context. (1 Credit)
Analysis of engineering design solutions in a broader context. Written and oral technical communication.There are two writing assignments and one oral presentation. Class time will be divided between lectures, group discussions/exercises, and student oral presentations.
ENGL 1007 or 1010 or 1011 or 2011; open to junior or higher Electrical Engineering, Computer Engineering, and Robotics Engineering majors.
Skill Codes: COMP. Writing Competency
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204900W)

ECE 4901. Electrical and Computer Engineering Design I. (2 Credits)
(Also offered as CSE 4950.) Discussion of the design process; project statement, specification, project planning, scheduling and division of responsibility, ethics in engineering design, safety, environmental considerations, economic constraints, liability, manufacturing, and marketing. Projects are carried out using a team-based approach. Selection and analysis of a design project to be undertaken in CSE 4951/ECE 4902 is carried out. Written progress reports, a proposal, an interim project report, a final report, and oral presentations are required.
ECE 3101; ECE 3201; open only to seniors in the School of Engineering and declared Computer Science minors.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204901)

ECE 4902. Electrical and Computer Engineering Design II. (3 Credits)
(Also offered as CSE 4951.) Design of a device, circuit, system, process, or algorithm. Team solution to an engineering design problem as formulated in CSE 4950/ECE 4901, from first concepts through evaluation and documentation. Written progress reports, a final report, and oral presentations are required.
ECE 4901; open only to students in the School of Engineering and declared Computer Science minors.
View Classes (https://catalog.uconn.edu/course-search/?details&code=ECE%204902)