ELECTRICAL AND COMPUTER ENGINEERING

The Department of Electrical and Computer Engineering offers accredited programs of study leading to a bachelor’s degree in electrical/electronic engineering and computer engineering. All engineering curricula are based on a thorough foundation in communication skills, humanities, mathematics, natural and social sciences, and engineering disciplines. Program faculty are committed to prepare engineering graduates to work collaboratively with other engineers, scientists, and business professionals in developing innovative solutions to complex problems.

High school graduates planning to study engineering should complete three years of high school mathematics, including geometry, algebra, and trigonometry. In addition, courses in biology, English, computer programming, physics, and chemistry, should be taken to assist in transitioning into an engineering program. If these high school courses are not completed, additional time may be required to complete the requirements for an engineering degree.

Students are highly encouraged to take other courses related to engineering and technology such as mechanical drafting, computer-aided design, or Project Lead the Way courses, and/or participate in FIRST Robotics or other engineering-related clubs and activities, which help expose students to some of the concepts and practices that they will develop during their academic careers at California State University, Chico.

Experience

FE (EIT) Examination. Senior engineering students are encouraged to take the National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (Engineer-In-Training) exam, which is the first of two exams required to become a Licensed Professional Engineer (P.E.).

Student organizations. Several engineering professional societies have student chapters on campus. Student organizations sponsor guest speakers, social events, field trips, community service events, and organize teams to compete at regional and national engineering student competitions. Student organizations also offer peer advising and tutoring.

Active chapters on campus include

- American Society of Civil Engineers
- Structural Engineers Association of California
- Engineers for Alternative Energy
- Society of Plastics Engineers
- American Institute of Mechatronic Engineers
- Chico Rocketry and Aerospace Club
- Materials Research Society
- Association for Computing Engineers
- Institute of Electrical and Electronics Engineers
- American Society of Mechanical Engineers
- Society of Manufacturing Engineers
- Society of Manufacturing Engineers
- National Society of Black Engineers
- Society of Women Engineers.

The national honor societies Tau Beta Pi, Chi Epsilon, and Eta Kappa Nu are also available to qualified students. As no national society exists for mechatronic engineers, Chico State has formed a local club, the American Institute of Mechatronic Engineers.

Chico STEM Connections Engineering. This program is a comprehensive recruitment, retention, and graduation effort which assists underrepresented and disadvantaged students pursuing degrees in engineering and computer science. The program offers tutoring, academic advising, and counseling, and includes a study center.

Outlook


- “Employment of architecture and engineering occupations is projected to grow 3 percent from 2019–2029, about as fast as the average for all occupations”;
- This report projects adding 74,800 jobs. “Most of the projected job growth in this group is in the engineering occupations, as their services will be in demand in various areas such as rebuilding of infrastructure, renewable energy, oil and gas extraction, and robotics”;
- “The median annual wage for architecture and engineering occupations was $81,440 in May 2019. The median annual wages for all occupations in this group was higher than the median annual wage for all occupations in the economy, which was $39,810.”

Computer hardware engineers, with opportunities expected to grow in 2019–29, are some of the most recruited graduates on campus. Recent surveys indicate that the demand for engineers with computer hardware and software design experience will continue to increase in both private and government sectors.

Electrical/electronic engineers, with opportunities expected to grow in 2019–29, are in demand by both industry and government. This demand is predicted to continue as electronic equipment and embedded systems become more vital to business, industry, and consumer products.

Accreditation

Chico State engineering programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Programs

Undergraduate

Bachelor’s

- Computer Engineering BS (https://catalog.csuchico.edu/colleges-departments/college-engineering-computer-science-construction-management/electrical-computer-engineering/computer-engineering-bs/)
- Electrical/Electronic Engineering BS (https://catalog.csuchico.edu/colleges-departments/college-engineering-computer-science-
construction-management/electrical-computer-engineering/electrical-electronic-engineering-bs/)

**Minors**
- Biomedical Engineering Minor (https://catalog.csuchico.edu/colleges-departments/college-engineering-computer-science-construction-management/electrical-computer-engineering/biomedical-engineering-minor/)

**Graduate**
- Electrical and Computer Engineering MS (https://catalog.csuchico.edu/colleges-departments/college-engineering-computer-science-construction-management/electrical-computer-engineering/electrical-computer-engineering-ms/)

See Course Description Symbols and Terms (https://catalog.csuchico.edu/academic-standards-policies/course-description-symbols-terms/) for an explanation of course description terminology and symbols, the course numbering system, and course credit units.

## Electrical/Electronic Engineering

### EECE 101 Exploration of Electrical and Computer Engineering 3 Units
**Typically Offered:** Fall only
Discussions of electrical and computer engineering and their roles in society and your contributions to creating our exciting future. Exploration of the fields of electrical and computer engineering through demonstrations and hands-on projects. Development of skills and resources to launch a successful professional engineering career. 2 hours activity, 2 hours lecture. (022027)

**Grade Basis:** Graded
**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Lower Division; Laptop required

### EECE 110 Basic Electricity and Instruments 3 Units GE
**Typically Offered:** Spring only
The course introduces students to electricity and magnetism as applied in audio engineering. Connections between the fundamental concepts and the physical properties of materials to digital and analog electronic circuits that are used to pick up sound; filters to remove noise and other artifacts; to amplify and distort specific frequencies; to digitize and store audio files; and to produce sound will be described. Students develop the ability to identify components from circuit schematics, construct audio circuits, and quantify the characteristics of the circuits. 2 hours activity, 2 hours discussion. (002512)

**General Education:** Laboratory Activity (B3); Physical Science (B1)

**Grade Basis:** Graded
**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Lower Division; Laptop required

### EECE 111 Smart Electronics 3 Units GE
**Typically Offered:** Fall only
Innovations in the age of electronics have shrunk a room-size computer from the 1950s to today's hand-held devices that allow users to communicate with people around the world by text, voice, and/or streaming video. Sensors enable devices to monitor users so electronic systems can respond to voice and hand commands. To understand how these systems work, the course introduces students to concepts in electricity and magnetism. Applications of these concepts in electrical and electronic technology will be discussed including the operation of analog and digital circuits and systems in smart phones, robots, home automation systems, and other electronic systems that are designed to improve the quality of life. The impact of these systems on daily life, the economy, energy demand, and electronic waste, data privacy, and cybersecurity will be evaluated. 2 hours activity, 2 hours discussion. (022273)

**General Education:** Laboratory Activity (B3); Physical Science (B1)

**Grade Basis:** Graded
**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Lower Division; Laptop required

### EECE 144 Logic Design Fundamentals 4 Units
**Prerequisite:** GE Mathematics/Quantitative Reasoning Ready.
**Typically Offered:** Fall and spring
Definition and properties of switching algebra. Minimization of algebraic function. Use of Karnaugh maps for simplification. Design of combinational logic networks. Design of sequential logic devices including flip-flops, registers, and counters. Analysis and applications of digital devices. Analysis and design of synchronous and asynchronous sequential state machines, state table derivation and reduction. Use of such CAD tools for schematic capture and logic device simulations. 2 hours activity, 3 hours lecture. (002614)

**Grade Basis:** Graded
**Repeatability:** You may take this course for a maximum of 4 units

**Course Attributes:** Lower Division

### EECE 198 Special Topics 1-3 Units
**Typically Offered:** Inquire at department
This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 3 hours activity. (002094)

**Grade Basis:** Graded
**Repeatability:** You may take this course more than once

**Course Attributes:** Lower Division

### EECE 211 Linear Circuits I 3 Units
**Prerequisite:** PHYS 204B (may be taken concurrently).
**Corequisites:** EECE 211L.
**Typically Offered:** Fall and spring
This course introduces students to core concepts related to analysis and applications of linear circuits. Topics include electrical quantities and components; Kirchhoff's Laws and circuits analysis methods; Thevenin and Norton theorems; operational amplifiers and applications; first-order transient response of RC and RL circuits; AC steady-state analysis including phasors and impedance; circuit simulation and analysis using SPICE. 3 hours discussion. (002519)

**Grade Basis:** Graded
**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Lower Division; Laptop required
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Prerequisites</th>
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<th>Corequisites</th>
<th>Grade Basis</th>
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<th>Course Attributes</th>
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<tr>
<td>EECE 211L</td>
<td>Linear Circuits I Activity</td>
<td>1</td>
<td>Corequisites: EECE 211.</td>
<td>Fall and spring</td>
<td>Experiments to reinforce the principles taught in EECE 211. 2 hours activity.</td>
<td>Lower Division</td>
<td>You may take this course for a maximum of 1 unit</td>
<td>Lower Division</td>
</tr>
<tr>
<td>EECE 215</td>
<td>Practical Circuits and Electronics</td>
<td>4</td>
<td>Prerequisite: MATH 109, MATH 119 (or high school equivalent), or MATH 120, or passing score on the Math department administered calculus readiness exam.</td>
<td>Fall and spring</td>
<td>Applications-based introduction to electricity, magnetism, and electrical and electronic components used in electromechanical and other engineering systems. Course topics include DC and AC circuit analysis; component selection and circuit design; applications of diodes, transistors, and operational amplifiers; logic gates and digital circuits; microcontroller applications and interfacing with external components; and three-phase circuits and ideal transformers. Instruments in basic electrical and electronic circuits are discussed, demonstrated, and employed. This course does not satisfy prerequisite requirements for EECE 311 or EECE 315. Mechanical Engineering majors may substitute EECE 211 and EECE 211L for this course. 2 hours activity, 3 hours discussion.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Low Division; Laptop required</td>
</tr>
<tr>
<td>EECE 237</td>
<td>Embedded Systems Development</td>
<td>3</td>
<td>Prerequisite: CSCI 111.</td>
<td>Fall and spring</td>
<td>This course presents the concepts and techniques associated with developing low level Embedded Systems Applications, using both Assembly Language and C. Topics include microprocessor architecture concepts, instruction set architectures, Assembly Language programming, data representations, interrupt handling and execution modes, low level C programming, and the use of on-chip and external peripherals. 3 hours lecture.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Lower Division</td>
</tr>
<tr>
<td>EECE 237X</td>
<td>Embedded Systems Development Problem Solving</td>
<td>1</td>
<td>Corequisites: EECE 237.</td>
<td>Fall and spring</td>
<td>Supplemental applications and explanations intended to facilitate student understanding of content from EECE 237. 2 hours activity.</td>
<td>Credit/No Credit</td>
<td>You may take this course for a maximum of 1 unit</td>
<td>Lower Division</td>
</tr>
<tr>
<td>EECE 311L</td>
<td>Linear Circuits II</td>
<td>4</td>
<td>Prerequisite: EECE 211 with a grade C- or higher; MATH 260 (may be taken concurrently).</td>
<td>Fall and spring</td>
<td>This course introduces students to advanced concepts related to analysis and applications of linear circuits. Topics include circuit analysis techniques for networks with both independent and dependent sources; Fourier Series and circuits response; transfer functions, poles and zeros; frequency response of passive and active circuits, Bode plots; frequency-selective circuits and applications; circuits analysis with Laplace Transforms; introduction to MATLAB. 4 hours discussion.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Upper Division</td>
</tr>
<tr>
<td>EECE 314</td>
<td>Bioinstrumentation</td>
<td>3</td>
<td>Prerequisite: EECE 211 and EECE 211L, or EECE 215, or MATH 327; PHYS 204A.</td>
<td>Fall only</td>
<td>An introduction to recording and analyzing electronic data collected from biological systems. Topics include measurement methods, design principles of biomedical instruments, bioelectronics, sensors, transducers, interface electronics, and embedded data acquisition systems. Explores sources of biomedical signals, bioelectrical signal monitoring, acquisition, processing, analysis, and interpretation of results. 3 hours discussion.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 3 units</td>
<td>Upper Division; Laptop required</td>
</tr>
<tr>
<td>EECE 314L</td>
<td>Bioinstrumentation Activity</td>
<td>1</td>
<td>Prerequisite: CSCI 111 or MECH 208; EECE 314 (may be taken concurrently).</td>
<td>Fall only</td>
<td>Experiments to reinforce the principles taught in EECE 314. 2 hours activity.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 1 unit</td>
<td>Upper Division</td>
</tr>
<tr>
<td>EECE 315</td>
<td>Electronics I</td>
<td>4</td>
<td>Prerequisite: EECE 211, EECE 211L; EECE 311 and MATH 260 (may be taken concurrently).</td>
<td>Fall and spring</td>
<td>Ideal diodes. Zener diodes and regulation. Photodiodes and solar cells. Biasing and DC behavior of bipolar transistors. JFETs and MOSFETs. Small-signal AC equivalent circuits. Single-state transistor amplifiers. Low-frequency response. Discrete feedback amplifiers. 3 hours laboratory, 3 hours lecture.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Upper Division; Laptop required</td>
</tr>
<tr>
<td>EECE 316</td>
<td>Electronics II</td>
<td>4</td>
<td>Prerequisite: EECE 311, EECE 315.</td>
<td>Inquire at department</td>
<td>Op Amp circuits, waveform generation and shaping, sinusoidal oscillators, high frequency amplifiers, active filters, power supply regulators, power electronics, advanced linear ICs. 3 hours discussion, 3 hours laboratory.</td>
<td>Graded</td>
<td>You may take this course for a maximum of 4 units</td>
<td>Upper Division; Laptop required</td>
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EECE 320  System Architecture and Performance  3 Units  
Prerequisite: CSCI 217, EECE 144, or MATH 217; CSCI 221 or EECE 237.  
Typically Offered: Fall and spring  
Study of computing architecture and how the structure of various hardware and software modules affects the ultimate performance of the total system. Topics include qualitative and quantitative analysis of bandwidths, response times, error detection and recovery, interrupts, and system throughput; distributed systems and coprocessors; vector and parallel architectures. 3 hours discussion.  (002104)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 3 units  
Course Attributes: Upper Division  

EECE 335  Project Requirements, Design, and Testing  3 Units  
Prerequisite: CSCI 211, ENGL 130W.  
Typically Offered: Fall and spring  
Students are introduced to methodologies used to specify system descriptions. Hardware and software documentation standards are described. Methodologies for modeling systems and development of presentation materials are discussed, and students are required to make both written and oral presentations. 3 hours discussion.  (002099)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 3 units  
Course Attributes: Upper Division  

EECE 343  Computer Architecture Performance and Implementation  4 Units  
Prerequisite: EECE 144, EECE 237 (both with a C- or higher).  
Typically Offered: Fall only  
Exploration of computer architecture fundamentals through analysis and implementation in a hardware description language. Coverage includes instruction set architecture, macro and micro architecture, the memory hierarchy, and performance techniques. Implementation and testing occurs through the introduction of modern digital design techniques using a hardware description language and commercial tools. 2 hours activity, 3 hours lecture.  (002105)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 4 units  
Course Attributes: Upper Division  

EECE 343X  Advanced Logic Design Problem Solving Session  1 Unit  
Corequisites: EECE 343.  
Typically Offered: Fall and spring  
Supplemental applications and explanations intended to facilitate student understanding of content from EECE 343. 2 hours activity.  (021639)  
Grade Basis: Credit/No Credit  
Repeatability: You may take this course for a maximum of 1 unit  
Course Attributes: Upper Division  

EECE 344  Digital Systems Design  4 Units  
Prerequisite: EECE 144, EECE 237; EECE 110 or EECE 215 or EECE 211 and EECE 211L. (All with a grade C- or higher).  
Typically Offered: Fall and spring  
Extends the study of digital circuits to LSI and VLSI devices. Microcontrollers, architecture, bus organization and address decoding. Design concepts for microcontroller systems, including A/D and D/A conversion, serial communications, bus interfacing, interrupt processing, power regulations, timers, pulse width modulation, programmable I/O ports, and error control coding. 3 hours laboratory, 3 hours lecture.  (002102)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 4 units  
Course Attributes: Upper Division; Laptop required  

EECE 344X  Digital Systems Design Problem Solving Session  1 Unit  
Corequisites: EECE 344.  
Typically Offered: Fall and spring  
Supplemental applications and explanations intended to facilitate student understanding of content from EECE 344. 2 hours activity.  (021638)  
Grade Basis: Credit/No Credit  
Repeatability: You may take this course for a maximum of 1 unit  
Course Attributes: Upper Division  

EECE 345  Introduction to Internet of Things System Design  4 Units  
Prerequisite: CSCI 111; CINS 220, CSCI 221, or EECE 237 with a C- or higher.  
Typically Offered: Fall only  
This course introduces students to Internet of Things (IoT) systems using a project-based learning approach. Students learn programming skills in Python and apply these skills as they design, construct, and test IoT systems. Topics include the development of the field, IoT architecture, tools used in IoT system design, device interfacing, IoT platforms, and challenges in the field. 2 hours activity, 3 hours lecture.  (022316)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 4 units  
Course Attributes: Upper Division; Laptop required  

EECE 365  Signals, Systems, and Transforms  4 Units  
Prerequisite: EECE 211 (with a grade C- or higher), MATH 260.  
Typically Offered: Fall and spring  
Modeling and analysis of Signals and Systems both continuous and discrete, in the time and frequency domains. Topics include theory and application of Fourier series, Fourier transforms, Parseval’s Theorem and the Convolution, Laplace Transform Sampling Theorem, Z transform, discrete Fourier Transform and FFT. 4 hours discussion.  (002529)  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 4 units  
Course Attributes: Upper Division  

EECE 375  Fields and Waves  3 Units  
Prerequisite: MATH 260, PHYS 204B.  
Typically Offered: Inquire at department  
Grade Basis: Graded  
Repeatability: You may take this course for a maximum of 3 units  
Course Attributes: Upper Division; Laptop required  

EECE 389  Intern in Elect & Comp Engr  1-3 Units  
Typically Offered: Inquire at department  
This internship is offered for 1.0-3.0 units. Students must register directly with a supervising faculty member. 9 hours supervision.  (002106)  
Grade Basis: Credit/No Credit  
Repeatability: You may take this course for a maximum of 15 units  
Course Attributes: Upper Division; Laptop required  

EECE 398  Special Topics  1-3 Units  
Typically Offered: Fall and spring  
This course is for special topics offered for 1.0-3.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 3 hours supervision.  (002541)  
Grade Basis: Graded  
Repeatability: You may take this course more than once  
Course Attributes: Upper Division
EECE 399  Special Problems  1-3 Units
Typically Offered: Fall and spring
This course is an independent study of special problems offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 3 hours supervision.  (002542)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

EECE 416  CMOS Digital Integrated Circuits Design  4 Units
Prerequisite: EECE 144, EECE 315.
Typically Offered: Inquire at department
This course provides an introduction to the design of CMOS digital integrated circuits. Topics include CMOS devices and integrated circuit fabrication, static CMOS inverters and gates, pass-transistor and dynamic-logic gates, propagation delay, power, scaling, and sequential circuits. CAD tools for simulation and layout are used for assignments and a course design project. 4 hours lecture.  (021718)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

EECE 437  Real-Time Embedded Systems  4 Units
Prerequisite: EECE 344. Recommended: EECE 320.
Typically Offered: Fall only
This course presents the concepts and techniques associated with designing, developing, and testing real-time and embedded systems. Topics include the nature and uses of real-time systems, architecture and design of real-time systems, embedded development and debugging environments, embedded programming techniques, real-time operating systems and real-time scheduling and algorithms. Special attention is given to the study of real-time process scheduling and performance, including mathematical analysis of scheduling algorithms. 4 hours discussion.  (022118)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 446  Introduction to Computer Networks and Network Management  3 Units
Prerequisite: CSCI 211; CINS 220, CSCI 221, or EECE 237 all with a C or higher.
Typically Offered: Fall and spring
This course is an introduction to basic networking technologies and network management concepts, including major network operating systems, communication architecture focusing on ISO and Internet models with discussion of current standards and protocols. Significant laboratory work using current networking equipment reinforces lectures and provides fundamental experience with router and switch management. 3 hours laboratory, 2 hours lecture.  (002340)
Cross listing(s): CSCI 446
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

EECE 450  Optics  3 Units
Prerequisite: PHYS 204A, PHYS 204B, PHYS 204C.
Typically Offered: Fall only
Geometrical and physical optics, interference, diffraction, reflection, dispersion, resolution, polarization, fiber optics, laser optics, and holography. 2 hours discussion, 3 hours laboratory.  (002549)
Cross listing(s): PHYS 450
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

EECE 451  Lasers and Their Applications  3 Units
Prerequisite: PHYS 204C. Recommended: EECE 450 or PHYS 450.
Typically Offered: Spring only
The theory and mechanism of laser action, various types of lasers and their applications and future use. Laboratory involves measurements with lasers, fiber optics, data transmission, and holography. 2 hours discussion, 3 hours laboratory.  (002550)
Cross listing(s): PHYS 451
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division

EECE 453  Communication Systems Design  4 Units
Prerequisite: EECE 365 or MATH 350.
Typically Offered: Inquire at department
Introduction to the principles of functional communication systems, design and performance analysis. Analog and digital modulation techniques. Information measures. Application of probability theory to the analysis of communication systems performance. Transmission and encoding of information. Spread spectrum systems. 4 hours discussion.  (002548)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 465  Digital Signal Processing  4 Units
Prerequisite: EECE 365.
Typically Offered: Fall only
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 481  Electromechanical Conversion  4 Units
Prerequisite: EECE 211 (with a grade of C- or higher) or EECE 215 (with a grade of C- or higher).
Typically Offered: Spring only
Principles of electromechanical conversion, traditional and renewable energy sources, magnetic circuits and steady state performance of synchronous, dc and induction motors, state space models and dynamic performance of electric motors, linearized models and common control schemes for various motors. 4 hours lecture.  (020256)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required
EECE 482 Control System Design  4 Units
Prerequisite: EECE 365.
Typically Offered: Inquire at department
Modeling and simulation of dynamic system performance. Control system design for continuous systems using both analog and digital control techniques. 4 hours lecture. (002577)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

EECE 483 Power Systems Operation  4 Units
Prerequisite: EECE 311 (may be taken concurrently).
Typically Offered: Fall only
Power system structure, components and single line diagrams, per unit calculations, transmission line modeling, network matrices and Y-bus, load flow, economic power dispatch, basic relays and system protection schemes. 4 hours lecture. (020499)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 484 Power System Distribution and Analysis  4 Units
Prerequisite: EECE 311 (may be taken concurrently).
Typically Offered: Spring only
Power system symmetrical components, fault analysis, transient stability analysis, sequence impedances of transmission systems, and distribution networks. 4 hours lecture. (020500)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 489 Internship in Comp Engineering  1-3 Units
Typically Offered: Inquire at department
This internship is offered for 1.0 - 3.0 units. Students must register directly with a supervising faculty member. 3 hours lecture. (002124)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 15 units
Course Attributes: Upper Division

EECE 490A Engineering Profession and Design (W)  4 Units W, GW
Prerequisite: GE Written Communication (A2) requirement; EECE 343, EECE 344 (either may be taken concurrently). EECE 315 for Electrical/ Electronic Engineering students (may be taken concurrently).
Typically Offered: Fall only
Exploration of engineering as a profession over an entire career, including technical, sociological, physiological, and psychological aspects. Readings and discussions explore the importance of life-long learning to engineering professionals. Students prepare, plan, design, present, and document a senior project. Design requirements address human factors, safety, reliability, maintainability, and customer cost. 2 hours activity, 3 hours lecture. (002569)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Writing Course; Graduation Writing Assessment

EECE 490B Engineering Economics and Project Implementation  4 Units
Prerequisite: EECE 343, EECE 344, EECE 490AW; EECE 316 for Electrical/ Electronic Engineering students (may be taken concurrently).
Typically Offered: Spring only
Continuation of EECE 490A, where students implement, construct, test, and demonstrate their senior design projects. A survey of economic analysis and technology markets, including market organization and regulation, incumbent and startup actors, engineering costs and return on investment, entrepreneurship, patents, and investment and funding avenues. Contemporary issues provide a framework for discussion and analysis based on professional, ethical, and economic concerns. 4 hours activity, 2 hours discussion. (002570)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 498 Advanced Topics  1-5 Units
Prerequisite: To be established when courses are formulated.
Typically Offered: Inquire at department
This course is for special topics offered for 1.0-5.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 1 hour discussion. (002582)
Grade Basis: Graded
Repeatability: You may take this course more than once
Course Attributes: Upper Division

EECE 499 Special Problems  1-3 Units
Typically Offered: Fall and spring
This course is an independent study of special problems and is offered for 1.0-3.0 units. You must register directly with a supervising faculty member. 1 hour supervision. (002583)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division

EECE 499HW Honors Project (W)  3 Units W, GW
Prerequisite: GE Written Communication (A2) requirement, faculty permission.
Typically Offered: Inquire at department
Completion of all junior-level EECE courses required in the major; This course may be taken twice for a maximum of 6 units. Prerequisite to the second semester is a "B" or higher in the first semester. Open by invitation to E E and CMPE majors who have a GPA among the top 5% of ECE students based upon courses taken at CSU, Chico. This is an "Honors in the Major" course; a grade of "B" or higher in 6 units of EECE 499H certify the designation of "Honors in the Major" to be printed on the transcript and the diploma. Each 3-unit course will require both formal written and oral presentations. 9 hours supervision. (002584)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Upper Division; Writing Course; Graduation Writing Assessment
EECE 525  High Performance Computing  4 Units
Prerequisite: EECE 343.
Typically Offered: Spring only
The course covers high performance computer architecture including: branch prediction, out-of-order execution, cache coherence and consistency, many-core processors, vector processing, dynamic scheduling, instruction level parallelism, thread level parallelism, and memory hierarchy design. 4 hours lecture. (002110)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

EECE 537  Smart Device Security  4 Units
Prerequisite: CSCI 111 and EECE 237 or equivalent for all majors; EECE 344 or equivalent for computer, electrical/electronic, and mechatronic engineering majors; CSCI 340 or equivalent for CSCI and CINS majors.
Typically Offered: Spring only even years
This course presents the concepts and techniques associated with designing, developing, and testing secure smart devices, such as smartphones, smartwatches, and implantable medical devices. Smart devices usually have limited computing resources but may send data to cloud computing data centers. Topics in this course include preventing hackers from stealing our password by measuring them physically from our devices, selecting appropriate encryption algorithms for resource-constraint devices, and understanding the limit in protecting your secret data during wireless network transmission. Particular attention focuses on the study of hardware security in smart embedded systems. 4 hours discussion. (022223)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

EECE 544  Embedded Systems Design  4 Units
Prerequisite: EECE 144, EECE 211 (both with a grade C- or higher).
Typically Offered: Fall only
An accelerated discussion of embedded systems design, including C programming, HDI, design, embedded systems, hardware and software debugging, and system design and implementation. Coverage of advanced digital design topics including hardware/software co-design, embedded and soft-core processors, multiprocessor architectures, and concurrent/parallel programming. Not available for students with credit for EECE 344 or equivalent. 2 hours activity, 3 hours lecture. (021523)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 555  Advanced Computer Networks  4 Units
Prerequisite: CSCI 446.
Typically Offered: Spring only
Examination of computer network protocol design issues and a selection of advanced computer networking topics, such as multimedia networking, wireless networks, optical networks and network security, using current and proposed standards as examples. 3 hours discussion, 3 hours laboratory. (002560)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

EECE 565  Bioimaging Systems  4 Units
Prerequisite: PHYS 202A or PHYS 204A; EECE 314, and Senior Standing.
Typically Offered: Inquire at department
Fundamentals of bioimaging, signals and systems, tomography modalities, pattern recognition, and computer vision methods as applied to clinical diagnostics. Optics and photonics techniques, digital signal and imaging data processing, analysis, and characterization. Introduction to research methodologies and research on optical imaging systems and applications. Students presentations and written reports in cutting edge technologies. 4 hours lecture. (022132)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 566  Applied Digital Image Processing  4 Units
Prerequisite: MATH 120; PHYS 202B or PHYS 204B.
Typically Offered: Inquire at department
This course covers image processing principles, techniques, and algorithms. Topics in image acquisition, representation, analysis, filtering, segmentation, and feature extraction. use of image processing software tools for assignments and projects. 4 hours lecture. (022109)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 598  Special Topics  1-4 Units
Typically Offered: Fall and spring
This course is for special topics offered for 1.0-4.0 units. Typically the topic is offered on a one-time-only basis and may vary from term to term and be different for different sections. See the Class Schedule for the specific topic being offered. 0 hours supervision. (021268)
Grade Basis: Graded
Repeatability: You may take this course more than once
Course Attributes: Upper Division

EECE 615  High-Frequency Design Techniques  4 Units
Prerequisite: EECE 315.
Typically Offered: Fall only
Study of the problems associated with passive components at high frequencies, high-frequency measurement techniques, transmission lines, line reflections, matching and terminations, scattering parameters, ground and power planes, and printed circuit board design considerations. 4 hours discussion. (002625)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 637  Advanced Embedded Systems  4 Units
Prerequisite: EECE 320, EECE 437.
Typically Offered: Spring only
This course focuses on high performance and multicore systems. Prerequisite knowledge includes extensive C programming experience, exposure to real-time operating systems concepts and development, extensive embedded systems development experience, and knowledge of computing architecture concepts. 4 hours lecture. (021524)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division
EECE 643 Digital Design 4 Units
Prerequisite: EECE 343.
Typically Offered: Spring only
Design and implementation of large digital systems through computer-aided tools. Study of algorithms and techniques used for architectural design, synthesis, optimization, placement, routing, timing analysis, and verification in programmable logic and VLSI implementations. 4 hours discussion. (002629)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 653 Topics in Optical Communications 4 Units
Prerequisite: EECE 311, EECE 315.
Typically Offered: Fall only
Provides an introduction to optical communications and optical computing system design to graduate students. Photonic phenomena in optical materials. Formulate specifications for optical wireless communication systems and integrated circuits for optical communications systems. Design techniques for light sources, optical receivers, and optical amplifiers. Design techniques for integrated circuits used in optical communications and optical computing. Students presentations and written reports in state of the art optical communication technologies. Experimental research on a given topic including optical logic system design and optical wireless communications as the final project. 4 hours lecture. (021573)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 655 Topics in Computer Networking 4 Units
Prerequisite: CSCI 446; EECE 555 recommended.
Typically Offered: Spring only
Further study of selected topics from current networking research as presented in recently published journals. 4 hours seminar. (002626)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 675 Electromagnetic Compatibility 4 Units
Prerequisite: EECE 615.
Typically Offered: Spring only
Analysis of cabling and grounding problems in high-frequency systems. Circuit layout for high-frequency applications. Electromagnetic discharge problems. Radio-frequency emissions from electronic devices. Shielding techniques to prevent ESD and EMI. 4 hours discussion. (002628)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 682 Computer Control of Dynamic Systems 4 Units
Prerequisite: EECE 482 or MECA 482.
Typically Offered: Spring only
Fundamental techniques for designing computer control systems for Single Input Single Output (SISO) and Multiple Input Multiple Output (MIMO) dynamic systems, introduction to adaptive control and self tuning regulators. 4 hours lecture. (020259)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 685 Adaptive Control Systems 4 Units
Prerequisite: EECE 682.
Typically Offered: Inquire at department
Schemes of adaptive control systems, MIT rule for Model Reference Adaptive Control, self Tuning regulator systems, Recursive Least Squares for system real time identification, Minimum Variance, PID and other controller design techniques for STR systems. 4 hours lecture. (020722)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division

EECE 697 Independent Study 1-6 Units
Typically Offered: Fall and spring
This course is a graduate-level independent study offered for 1.0-6.0 units. You must register directly with a supervising faculty member. Independent study and investigation of special problems in the student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. 9 hours supervision. (002592)
Grade Basis: Report in Progress: Graded
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

EECE 698 Seminar in Advanced Topics 1-4 Units
Typically Offered: Fall and spring
This course is offered for 1.0-3.0 units. Typical subjects that will be taught include embedded systems design, high-speed networking, program management, and fault-tolerant system design. Consult the Class Schedule for listings. 3 hours lecture. (002630)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 12 units
Course Attributes: Graduate Division

EECE 699P Master's Project 1-6 Units
Typically Offered: Fall and spring
This course is offered for 1.0-6.0 units. Independent study and investigation of special problems in student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. 9 hours supervision. (002139)
Grade Basis: Report in Progress: CR/NC
Repeatability: You may take this course for a maximum of 6 units
Course Attributes: Graduate Division

EECE 699T Master's Thesis 1-6 Units
Prerequisite: Classified graduate standing and completion of graduate literacy requirement, faculty permission.
Typically Offered: Fall and spring
This course is offered for 1.0-6.0 units. You must register directly with a supervising faculty member. Independent study and investigation of special problems in the student's area of concentration. Both registration and study plan must have approval of the instructor and the student's graduate advisory committee chair. Master's Thesis courses earn a Credit grade upon completion. 3 hours supervision. (002137)
Grade Basis: Report in Progress: CR/NC
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Graduate Division

Electrical and Computer Engineering Department

The Faculty
Zahrasadat Alavi 2017
Assistant Professor
Doctor of Philosophy Univ Of Wisconsin-Milwaukee
Meghdad Hajimorad  2015  
Associate Professor  
Doctor of Science Univ Of Cal-Berkeley

Kurtis B Kredo  2010  
Professor  
Doctor of Philosophy Univ Of Cal-Davis

Ghang-Ho Lee  2011  
Associate Professor  
Doctor of Philosophy Purdue Univ Main Campus

Robert J Marsden  2009  
Lecturer  
Bachelor of Science CSU-Chico

Kathleen Meehan  2017  
Chair  
Doctor of Engineering Univ Of Illinois Urbana Campus

Kathleen Meehan  2017  
Professor  
Doctor of Engineering Univ Of Illinois Urbana Campus

Hadil S Mustafa  2014  
Associate Professor  
Doctor of Engineering; Doctor of Philosophy Univ Of Cal-Irvine; Univ Of Cal-Irvine

Hassan Shahidi Salehi  2018  
Assistant Professor  
Doctor of Philosophy Univ Of Connecticut

David Silveira  2015  
Lecturer  
Bachelor of Science CSU-Chico

Zhaohong Wang  2016  
Assistant Professor  
Doctor of Science Univ Of Kentucky

Emeritus Faculty

Roy E Crosbie  
Emeritus  
Doctor of Philosophy University of Liverpool (Liverpool, England)

Robert W Donoho  
Emeritus

Glenn S Duncan  1956  
Emeritus

Adel A Ghandakly  2005  
Professor  
Doctor of Philosophy The University of Calgary (Calgary, Alberta Canada)

Louis R Harrold  
Emeritus

Philip H Hoff  1970  
Emeritus  
Doctor of Philosophy Univ Of Cal-Berkeley

Ben-Dau Tseng  
Emeritus

Larry L Wear  1972  
Emeritus  
Doctor of Philosophy Santa Clara Univ

Emeritus Faculty