ELECTRICAL AND COMPUTER ENGINEERING

Electrical and Computer Engineering Department (http://www.csuchico.edu/eece/)
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530-898-4956 (fax)
Email: eece@csuchico.edu
Chair: Kurtis Kredo II

Insight

The Department of Electrical and Computer Engineering offers accredited programs of study leading to a bachelor's degree in electrical/electronic engineering or 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 preparing 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, 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 (PE).

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:

- Institute of Electrical and Electronics Engineers
- Association for Computing Machinery
- National Society of Black Engineers
- Society of Women Engineers
- 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
- American Society of Mechanical Engineers
- Society of Manufacturing Engineers

The national honor societies Tau Beta Pi and Eta Kappa Nu are also available to qualified students.

Chico STEM Connections Engineering. This program is a comprehensive recruitment, retention, and graduation effort that 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

According to the Occupational Outlook Handbook published by the Bureau of Labor Statistics of the U.S. Department of Labor,

- "Overall employment in architecture and engineering occupations is projected to grow faster than the average for all occupations from 2022 to 2032."
- "About 188,000 openings are projected each year, on average, in these occupations due to employment growth and the need to replace workers who leave the occupations permanently."
- The Bureau of Labor Statistics stated that in May 2022 the median annual wage for architecture and engineering occupations was $83,700, which was higher than the median annual wage for all occupations of $46,310; for computer hardware engineers the median annual wage was $132,360; for electrical and electronics engineers it was $104,610.

The increasing demand for computer and electrical/electronic engineers is fueled, in part, by the explosive growth of cloud computing, the Internet of Things, machine learning, robotics and other autonomous systems, and clean energy systems.

Computer hardware engineers 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 are in demand by both industry and government. This demand is predicted to continue as electronic and embedded systems become more vital to business, industry, and consumer products.

Accreditation

The Computer Engineering and Electrical/Electronic Engineering programs at Chico State are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org, under the General Criteria and Similarly Named Program Criteria.
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/)

Minors

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

Graduate

Master’s

- 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 2 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, 1 hour lecture. (022027)

Grade Basis: Graded

Repeatability: You may take this course for a maximum of 2 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. (002612)

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 has 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Prerequisite(s)</th>
<th>Corequisite(s)</th>
<th>Typically Offered</th>
<th>Grade Basis</th>
<th>Repeatability</th>
<th>Course Attributes</th>
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</thead>
<tbody>
<tr>
<td>EECE 211</td>
<td>Linear Circuits I</td>
<td>3</td>
<td>MATH 109, MATH 119 (or high school equivalent), or MATH 120, or passing score</td>
<td></td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Lower Division; Laptop required</td>
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<td>on the Math department administered calculus readiness exam.</td>
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<td>for a maximum of 3 units</td>
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<tr>
<td>EECE 211L</td>
<td>Linear Circuits I Activity</td>
<td>1</td>
<td></td>
<td></td>
<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Lower Division</td>
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<td>for a maximum of 1 unit</td>
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<tr>
<td>EECE 215</td>
<td>Practical Circuits and Electronics</td>
<td>4</td>
<td>MATH 109, MATH 119 (or high school equivalent), or MATH 120, or passing score</td>
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<td>Fall and spring</td>
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<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>on the Math department administered calculus readiness exam.</td>
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<td>for a maximum of 4 units</td>
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<tr>
<td>EECE 237</td>
<td>Embedded Systems Development</td>
<td>3</td>
<td>CSCI 111.</td>
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<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>EECE 237X</td>
<td>Embedded Systems Development Problem Solving</td>
<td>1</td>
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<td></td>
<td>Fall and spring</td>
<td>Credit/No Credit</td>
<td>You may take this course</td>
<td>Lower Division</td>
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<td>for a maximum of 1 unit</td>
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<td>EECE 311</td>
<td>Linear Circuits II</td>
<td>4</td>
<td>EECE 211 with a grade C- or higher; MATH 260 (may be taken concurrently);</td>
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<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>PHYS 204B.</td>
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<td>for a maximum of 4 units</td>
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<td>EECE 314</td>
<td>Bioinstrumentation</td>
<td>3</td>
<td>EECE 211 and EECE 211L, or EECE 215, or PHYS 327; PHYS 204A.</td>
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<td>Fall only</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>for a maximum of 3 units</td>
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<td>EECE 314L</td>
<td>Bioinstrumentation Activity</td>
<td>1</td>
<td>CSCI 111 or MECH 208; EECE 314 (may be taken concurrently).</td>
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<td>Fall only</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>EECE 315</td>
<td>Electronics I</td>
<td>4</td>
<td>EECE 211, EECE 211L; EECE 311 and MATH 260 (may be taken concurrently).</td>
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<td>Fall and spring</td>
<td>Graded</td>
<td>You may take this course</td>
<td>Upper Division; Laptop required</td>
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<td>for a maximum of 4 units</td>
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EECE 316 Electronics II 4 Units
Prerequisite: EECE 311, EECE 315.
Typically Offered: Inquire at department
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. (002534)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

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; Laptop required

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. (002528)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 375 Fields and Waves 4 Units
Prerequisite: MATH 260, PHYS 204B.
Typically Offered: Inquire at department
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 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

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.  (002118)
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, and applications of probability and statistics in computer networking. 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
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 Solar Energy Devices and Systems 4 Units
Prerequisite: EECE 311 (may be taken concurrently). GE Physical Science (B1); MATH 120; EECE 215 (with a grade of C- or higher) or EECE 211 and 211L (both with grades of C- or higher).
Typically Offered: Fall only
This course is an introduction to the fundamentals of solar energy devices and systems and their impacts on society, economy, and the environment. Basic physics of semiconductors in solar devices, operation of solar devices, design and characteristics of common types of solar cells, and approaches to increase solar cell efficiency are discussed. The operation of DC-DC and DC-AC circuits, maximum power point tracking, and energy storage systems are evaluated. Economic regulatory, political, social, and environmental aspects of energy production, distribution, and consumption are explored. 2 hours activity, 3 hours lecture. (020499)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

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 490AW Engineering Profession and Design (W) 4 Units W, GW
Prerequisite: GE Oral Communication (A1) requirement, GE Written Communication (A2) requirement; EECE 343 (may be taken concurrently); EECE 344 for Computer Engineering majors; EECE 315, EECE 344, EECE 365 (all may be taken concurrently) for Electrical/Electronic Engineering majors.
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, testability, engineering standards, and costs. Students evaluate the impact of statistics and probabilistic events on project design, operation, and/or characterization. 3 hours lecture, 0 hours supervision. (002569)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required; Writing Course; Graduation Writing Assessment

EECE 490B Engineering Economics and Project Implementation 4 Units
Prerequisite: EECE 490AW (with a grade C- or higher); EECE 343 for Computer Engineering majors; EECE 315, EECE 344 for Electrical/Electronic Engineering majors.
Typically Offered: Spring only
Continuation of EECE 490AW, 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. 2 hours discussion, 0 hours supervision. (002570)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division; Laptop required

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 EE 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 certifies 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 440 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 444 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 or EECE 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 or EECE 365; 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 637  Advanced Embedded Systems  4 Units
Prerequisite: EECE 437 or EECE 537, or classified graduate standing.
Typically Offered: Inquire at department
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; Laptop required

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 644  Advanced Cryptographic Protocols for Secure Distributed Computing  4 Units
Prerequisite: EECE 344.
Typically Offered: Inquire at department
This course covers topics on information-theoretic secure multiparty
computation (ITS-MPC), homomorphic encryption (HE), functional
cryptography (FE), blockchain, and their applications to distributed
computing. All these protocols allow the outsourcing of sensitive data
to trusted third-party computing platforms. The discussion includes
their computing model, parameters chosen, and engineering application
deployment. 4 hours discussion. (022550)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division; Laptop required

EECE 653  Software Defined Radio  4 Units
Prerequisite: EECE 311 and EECE 315; or classified graduate standing.
Typically Offered: Inquire at department
This course provides the advanced concepts related to digital and
wireless communication. Introductions to the constraints in the practical
communication systems. Understanding the concept of SDR (Software
Defined Radio). Implementation of the signal generation, capture,
automatic gain control, and coherent, modulation, carrier synchronization,
and demodulation. Design and implementations of the transmitter and
receiver for SDR. 4 hours discussion. (021573)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division; Laptop required

EECE 655  Topics in Computer Networking  4 Units
Prerequisite: CSCI 446 or EECE 446; EECE 555 recommended.
Typically Offered: Inquire at department
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; Laptop required

EECE 664  Machine Learning for Engineers  4 Units
Prerequisite: Graduate standing.
Typically Offered: Fall only
This course presents a hands-on approach of exploring machine learning
(ML) techniques and state-of-the-art tools for engineering problems.
Students gain the ability to identify types of data, formatting and cleaning
data for an ML model. Students build, train, and test machine learning
models using cutting-edge machine learning frameworks and modern
artificial intelligence (AI) development environments along with ML
deployment on hardware. 4 hours lecture. (022551)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division; Laptop required

EECE 665  Deep Learning Processing  4 Units
Prerequisite: EECE 465.
Typically Offered: Inquire at department
This course enables students to enter the field of artificial intelligence
(AI) in general and deep learning in particular for practical engineering
applications. Students develop deep convolutional neural networks for
pattern and image recognition and experience training and testing of
various deep learning models using state-of-the-art tools and modern
methods. 4 hours lecture. (022579)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division; Laptop required

EECE 682  Digital Control System Design Using Artificial Intelligence  4 Units
Prerequisite: Classified graduate standing.
Typically Offered: Inquire at department
This course presents fundamental techniques for designing digital
control systems using a hands-on approach and cutting edge artificial
intelligence (AI) tools for real-world applications. Knowledge of classical
control is assumed. Familiarity with linear algebra is assumed. 4 hours
lecture. (020259)
Grade Basis: Graduate Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Graduate Division; Laptop required

EECE 685  Adaptive Control Systems by Artificial Intelligence  4 Units
Prerequisite: EECE 482.
Typically Offered: Inquire at department
This course offers the foundation of adaptive control and discusses
its interconnections with machine learning. Topics include parameter
estimation, recursive algorithms, stability properties, and conditions
for convergence and their relationship with machine learning, including
the minimization of a performance error and fast convergence. 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 693  Research Methods in Electrical and Computer Engineering  
3 Units  
Prerequisite: Candidate status.  
Typically Offered: Fall and spring  
This course is designed to provide graduate students in the field of electrical and computer engineering with a comprehensive understanding of research methods, simulation and/or experimentation, technical writing, and communication skills. Through immersive learning experiences, students gain practical knowledge in conducting research, interpreting results, technical writing, and oral presentation of scientific ideas. The course culminates in a comprehensive research project with a final defense. 9 hours supervision. (022594)  
Grade Basis: Report in Progress: ABC/NC  
Repeatability: You may take this course for a maximum of 3 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  

The Faculty

Zahrasadat Alavi  2017  
Associate Professor  
Doctor of Philosophy Univ Of Wisconsin-Milwaukee  

Meghdad Hajimorad  2015  
Associate Professor  
Doctor of Science Univ Of Cal-Berkeley  

Mohammadreza Khani  2022  
Assistant Professor  
Doctor of Philosophy Western Michigan Univ  

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

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

Zhaohong Wang  2016  
Associate Professor  
Doctor of Science Univ Of Kentucky  

Donald R Wiley  2016  
Lecturer  
Bachelor of Science CSU-Chico  

Emeritus Faculty

Roy E Crosbie  1956  
Emeritus  
Doctor of Philosophy University of Liverpool (Liverpool, England)  

Glenn S Duncan  1970  
Emeritus  
Doctor of Philosophy The University of Calgary (Calgary, Alberta Canada)  

Adel A Ghandaakly  1956  
Emeritus  
Doctor of Philosophy The University of Calgary (Calgary, Alberta Canada)  

Louis R Harrold  1956  
Emeritus  
Doctor of Philosophy Univ Of Cal-Berkeley  

Ben-Dau Tseng  1956  
Emeritus  
Doctor of Philosophy University of Windsor (Windsor, Ontario–Canada)
Larry L. Wear  1972
Emeritus
Doctor of Philosophy Santa Clara Univ