ELECTRICAL AND COMPUTER ENGINEERING

Electrical and Computer Engineering Department (http://www.csuchico.edu/eece/)
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Insight

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
- 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

According to the 2019 edition of the Occupational Outlook Handbook published by the Bureau of Labor Statistics of the U.S. Department of Labor,

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

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

EECE 211L Linear Circuits I Activity   **1 Unit**
Corequisites: EECE 211.
Typically Offered: Fall and spring
Experiments to reinforce the principles taught in EECE 211. 2 hours activity. (002520)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Lower Division

EECE 215 Practical Circuits and Electronics   **4 Units**
Prerequisite: MATH 109, MATH 119 (or high school equivalent), or MATH 120, or passing score on the Math department administered calculus readiness exam.
Typically Offered: Fall and spring
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. (022099)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Lower Division; Laptop required

EECE 237 Embedded Systems Development   **3 Units**
Prerequisite: CSCI 111.
Typically Offered: Fall and spring
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. (021437)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Lower Division

EECE 237X Embedded Systems Development Problem Solving   **1 Unit**
Corequisites: EECE 237.
Typically Offered: Fall and spring
Supplemental applications and explanations intended to facilitate student understanding of content from EECE 237. 2 hours activity. (021640)
Grade Basis: Credit/No Credit
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Lower Division

EECE 311 Linear Circuits II   **4 Units**
Prerequisite: EECE 211 with a grade C- or higher; MATH 260 (may be taken concurrently).
Typically Offered: Fall and spring
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. (002527)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

EECE 314 Bioinstrumentation   **3 Units**
Prerequisite: EECE 211 and EECE 211L, or EECE 215, or PHYS 327; PHYS 204A.
Typically Offered: Fall only
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. (022130)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 3 units
Course Attributes: Upper Division; Laptop required

EECE 314L Bioinstrumentation Activity   **1 Unit**
Prerequisite: CSCI 111 or MECH 208; EECE 314 (may be taken concurrently).
Typically Offered: Fall only
Experiments to reinforce the principles taught in EECE 314. 2 hours activity. (022131)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 1 unit
Course Attributes: Upper Division; Laptop required

EECE 315 Electronics I   **4 Units**
Prerequisite: EECE 211, EECE 211L; EECE 311 and MATH 260 (may be taken concurrently).
Typically Offered: Fall and spring
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. (002530)
Grade Basis: Graded
Repeatability: You may take this course for a maximum of 4 units
Course Attributes: Upper Division

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 theorey 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   3 Units
Prerequisite: MATH 260, PHYS 204B.
Typically Offered: Inquire at department
Transmission lines. Frequency-domain techniques. Fields and field operators. Electrostatic fields and capacitance. Magneto-static fields and inductance. Time-varying fields and Maxwell equations. Skin effect. Plane electromagnetic waves. Reflection and refraction. Waveguides and optical fibers. Radiation and antennas. 3 hours lecture. (002529)
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

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. 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
Properties of continuous and discrete signals. Z-transform and Fast-
Fourier Transform. Digital filtering techniques. Finite word length effects
on digital signal processing elements. 4 hours discussion. (002580)
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 490AW 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 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 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; Laptop required

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 sytems 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

  Doctor of Philosophy University of Windsor (Windsor, Ontario--Canada)

Larry L Wear   1972
  Emeritus
  Doctor of Philosophy Santa Clara Univ