ELECTRICAL ENGINEERING (BS)

Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/) section of this catalog, including:

- 40 units of upper-division courses
- 2.0 GPA
- Graduation Writing Requirement (GWR)
- U.S. Cultural Pluralism (USCP)

Note: No Major or Support courses may be selected as credit/no credit. In addition, no more than 12 units of cooperative or internship courses can count towards your degree requirements.

Code	Title	Units
MAJOR COURSES		
EE 1111 & 1111L	Introduction to Electrical Engineering and Introduction to Electrical Engineering Laboratory	2
EE 2211	Electric Circuit Analysis I	3
EE 2241	Electric Circuit Analysis Laboratory I	1
EE 2212	Electric Circuit Analysis II	3
EE 2328	Signals and Systems	4
EE 3302 & 3302L	Classical Control Systems and Classical Control Systems Laboratory	4
EE 3306 & 3306L	Electronics I and Electronics Laboratory I	4
EE 3308 & 3308L	Electronics II and Electronics Laboratory II	4
EE 3255 & 3255L	Electric Machines and Power Systems and Electric Machines and Power Systems Laboratory	4
EE 3335 & 3335L	Electromagnetic Fields and Transmission and Electromagnetic Fields and Transmission Laboratory	4
EE 3329	Cyber-Physical Systems	4
EE 4314 & 4314L	Communication Systems and Communication Systems Laboratory	4
EE 4461	Senior Project I	1
EE 4462	Senior Project II	1
EE 4463	Senior Project Design Laboratory I	1
or EE 4465	Senior Design: Individual Project I	
EE 4464	Senior Project Design Laboratory II	1
or EE 4466	Senior Design: Individual Project II	
EE 4459	Electrical Engineering Fundamentals of Engineering Exam	1
Concentration or General Curriculum in Electrical Engineering		
(See list of Concentrations and General Curriculum in Electrical Engineering)		15
SUPPORT COURSES		
BIO 2213	Life Science for Engineers (5B) [1]	3
CSC 1001 & 1001L	Fundamentals of Computer Science and Fundamentals of Computer Science Laboratory	4
CPE 2300	Introduction to Computer Systems	3
CPE 2301	Introduction to HDL and Digital Design Laboratory	1
MATH 1261	Calculus I (2) [1]	4
MATH 1262	Calculus II	4
MATH 2263	Calculus III	3
MATH 2341	Linear Analysis	4

PHYS 1141	General Physics I (5A & 5C) [1]	4
PHYS 1143	General Physics II	4
STAT 3310	Probability and Random Processes for Engineers (Upper-Division 2/5) [1]	3
GENERAL EDUCATION (GE)		
(See GE program requirements below)		30
FREE ELECTIVES		
Free Electives		0
Total Units		**128**

[1] Required in Major or Support; also satisfies General Education (GE) requirement.

Concentrations

General Curriculum in Electrical Engineering

Code	Title	Units
REQUIRED COURSES		
Approved Electrical Engineering Electives		
Select from the following:		15
EE Technical Electives [1]		
EE 4406	Power System Analysis I	
EE 4407	Power System Analysis II	
EE 4410	Fundamentals of Power Electronics	
EE 4412	Advanced Analog and Mixed-Signal Electronics	
EE 4452	Advanced Analog and Mixed-Signal Electronics Laboratory	
EE 4416	Digital Communication Systems	
EE 4456	Modern Communication Systems Laboratory	
EE 4417	Electric Machines	
EE 4418 & 4418L	Photonic Component and System Engineering and Photonic Engineering Laboratory	
EE 4419	Digital Signal Processing	
EE 4420	Sustainable Energy Generation	
EE 4422	Polymer Electronics Laboratory	
EE 4425 & 4425L	Signal Integrity Electronics and Test Automation and Signal Integrity Electronics and Test Automation Laboratory	
EE 4431	Computer-Aided Design of VLSI Devices	
EE 4433	Magnetic Apparatus Design	
EE 4434	Transportation Electrification and Energy Storage Systems	
EE 4435	Industrial Power Control and Automation	
EE 4440 & 4440L	Wireless Communications and Wireless Communications Laboratory	
EE 4450	Solar Photovoltaic System Engineering I	
EE 4470	Special Advanced Topics	
EE 4471	Special Advanced Laboratory	
EE 4528	Digital Image Processing	
EE 5344	Phased Array Antennas	
EE 5424	Principles of Remote Sensing and Radar	
EE 5428	Computer Vision	
EE 5500	Individual Study	
EE 5502	Microwave and Millimeter Wave Device and System Electronics	
EE 5504	Software Defined Radio	
EE 5509	Computational Intelligence	
EE 5510	Advanced Power Electronics	
EE 5511	Advanced Electric Machines and Design	

EE 5512	Advanced Control Techniques in Modern Power Systems
EE 5513	Modern Control Systems
EE 5514	Advanced Modern Control Systems
EE 5515	Advanced Digital Signal Processing
EE 5517	Data Analytics for Cyber-Physical Systems
EE 5518	Power System Protection
EE 5519	Electric Power Distribution and Microgrids
EE 5520	Advanced Solar-Photovoltaic Systems Design
EE 5524	Solid State Electronics
EE 5525	Stochastic Processes
EE 5526	Advanced Digital Communications
EE 5530	Advanced Photonic Systems
EE 5531	Advanced VLSI Design and Validation
EE 5532	VLSI Test Laboratory
EE 5533	Antennas
EE 5535	Utility Applications of Power Electronics and Power Quality
EE 5541	Advanced Microwave and Millimeter-Wave Laboratory
EE 5544	Solid-state Electronics Laboratory
EE 5563	Graduate Seminar
EE 5570	Special Advanced Topics
EE 5571	Special Advanced Laboratory
EE 5594	Professional Engineer Examination
Non-EE Electives [2]	
BMED 4434	Micro/Nano Fabrication
BMED 4435	Micro/Nano Fabrication Laboratory
CPE 3300	Computer Architecture
CPE 4180	Advanced Microcontrollers and Embedded Applications
CPE 4300	Advanced Computer Architecture
CPE 4390	Introduction to Real-Time Operating Systems
CPE 4420	High-Performance Embedded Systems
CPE 4455	Design of Fault-Tolerant Systems
CPE 5350	Digital Systems Design
ME 4305	Mechatronics II
Lower-Division Electives [2]	
CHEM 1120	Fundamentals of Chemical Structure and Properties
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory
EE 2261	Introduction to C Programming with a Hardware Emphasis
EE 2262	Object-Oriented Programming with a Hardware Emphasis
IME 1140	Technical Graphics Communication for Design and Manufacturing
IME 1143	Introduction to Design and Manufacturing
ME 2210	Engineering Statics
PHYS 2211	General Physics III: Modern Physics
Total Units	**15**

1 A minimum of 8 units from the EE Technical Electives list is required.

2 A maximum of 4 units may come from either the Non-EE Technical Electives or the Lower-Division Electives list, with a combined maximum of 7 units allowed across both lists.

Electronics, Controls, and Communications

Code	Title	Units
REQUIRED COURSES		
Approved Electrical Engineering Electives		

Select from the following: [1]		15
EE Technical Electives [1]		
BMED 4434	Micro/Nano Fabrication	
BMED 4435	Micro/Nano Fabrication Laboratory	
EE 4410	Fundamentals of Power Electronics	
EE 4412	Advanced Analog and Mixed-Signal Electronics	
EE 4452	Advanced Analog and Mixed-Signal Electronics Laboratory	
EE 4416	Digital Communication Systems	
EE 4456	Modern Communication Systems Laboratory	
EE 4418 & 4418L	Photonic Component and System Engineering and Photonic Engineering Laboratory	
EE 4419	Digital Signal Processing	
EE 4425 & 4425L	Signal Integrity Electronics and Test Automation and Signal Integrity Electronics and Test Automation Laboratory	
EE 4431	Computer-Aided Design of VLSI Devices	
EE 4440 & 4440L	Wireless Communications and Wireless Communications Laboratory	
EE 4470	Special Advanced Topics	
EE 4471	Special Advanced Laboratory	
EE 5344	Phased Array Antennas	
EE 5424	Principles of Remote Sensing and Radar	
EE 5502	Microwave and Millimeter Wave Device and System Electronics	
EE 5504	Software Defined Radio	
EE 5509	Computational Intelligence	
EE 5513	Modern Control Systems	
EE 5514	Advanced Modern Control Systems	
EE 5515	Advanced Digital Signal Processing	
EE 5524	Solid State Electronics	
EE 5525	Stochastic Processes	
EE 5526	Advanced Digital Communications	
EE 5530	Advanced Photonic Systems	
EE 5531	Advanced VLSI Design and Validation	
EE 5532	VLSI Test Laboratory	
EE 5533	Antennas	
EE 5544	Solid-state Electronics Laboratory	
Lower-Division Electives [2]		
CHEM 1120	Fundamentals of Chemical Structure and Properties	
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	
EE 2261	Introduction to C Programming with a Hardware Emphasis	
EE 2262	Object-Oriented Programming with a Hardware Emphasis	
IME 1140	Technical Graphics Communication for Design and Manufacturing	
IME 1143	Introduction to Design and Manufacturing	
ME 2210	Engineering Statics	
PHYS 2211	General Physics III: Modern Physics	
Total Units		**15**

1 A minimum of 11 units from the EE Technical Electives list is required.
2 A maximum of 4 units may come from the Lower-Division Electives list.

Power

Code	Title	Units
REQUIRED COURSES		
EE 4406	Power System Analysis I	3
or EE 4410	Fundamentals of Power Electronics	
Approved Electrical Engineering Electives		
Select from the following:		12
EE Technical Electives [1]		
EE 4406	Power System Analysis I	
EE 4407	Power System Analysis II	
EE 4410	Fundamentals of Power Electronics	
EE 4417	Electric Machines	
EE 4420	Sustainable Energy Generation	
EE 4433	Magnetic Apparatus Design	
EE 4434	Transportation Electrification and Energy Storage Systems	
EE 4435	Industrial Power Control and Automation	
EE 4450	Solar Photovoltaic System Engineering I	
EE 4470	Special Advanced Topics	
EE 4471	Special Advanced Laboratory	
EE 5510	Advanced Power Electronics	
EE 5511	Advanced Electric Machines and Design	
EE 5512	Advanced Control Techniques in Modern Power Systems	
EE 5517	Data Analytics for Cyber-Physical Systems	
EE 5518	Power System Protection	
EE 5519	Electric Power Distribution and Microgrids	
EE 5520	Advanced Solar-Photovoltaic Systems Design	
EE 5535	Utility Applications of Power Electronics and Power Quality	
Lower-Division Electives [2]		
CHEM 1120	Fundamentals of Chemical Structure and Properties	
CSC 2001 & 2001L	Data Structures and Data Structures Laboratory	
EE 2261	Introduction to C Programming with a Hardware Emphasis	
EE 2262	Object-Oriented Programming with a Hardware Emphasis	
IME 1140	Technical Graphics Communication for Design and Manufacturing	
IME 1143	Introduction to Design and Manufacturing	
ME 2210	Engineering Statics	
Total Units		**15**

1 A minimum of 8 units from the EE Technical Electives list is required.
2 A maximum of 4 units may come from the Lower-Division Electives list.

General Education (GE) Requirements

- 43 units required, 13 of which are specified in Major and/or Support.
- If any of the remaining 30 Units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.
- See the complete GE course listing (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext).
- A grade of C- or better is required in one course in each of the following GE Areas: 1A (English Composition), 1B (Critical Thinking), 1C (Oral Communication), and 2 (Mathematics and Quantitative Reasoning).

Lower-Division General Education

Area 1	English Communication and Critical Thinking	
1A	Written Communication	3

1B	Critical Thinking	3
1C	Oral Communication	3
Area 2	**Mathematics and Quantitative Reasoning**	
2	Mathematics and Quantitative Reasoning (3 units in Support) [1]	0
Area 3	**Arts and Humanities**	
3A	Arts	3
3B	Humanities: Literature, Philosophy, Languages other than English	3
Area 4	**Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)**	
4A	American Institutions (Title 5, Section 40404 Requirement)	3
4B	Social and Behavioral Sciences	3
Area 5	**Physical and Life Sciences**	
5A	Physical Sciences (3 units in Support) [1]	0
5B	Life Sciences (3 units in Support) [1]	0
5C	Laboratory (may be embedded in a 5A or 5B course) (1 units in Support) [1]	0
Area 6	**Ethnic Studies**	
6	Ethnic Studies	3
Upper-Division General Education		
Upper-Division 2/5	Mathematics and Quantitative Reasoning or Physical and Life Sciences (3 units in Support) [1]	0
Upper-Division 3	Arts and Humanities	3
Upper-Division 4	Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)	3
Total Units		**30**

[1] Required in Major or Support; also satisfies General Education (GE) requirement.