BS IN ELECTRICAL AND ELECTRONIC ENGINEERING

Units required for Major: 92
Total units required for BS: 122

Program Description

The field of Electrical and Electronic Engineering continues to expand in scope, driven by advances in technology and new challenges faced by society. To prepare our graduates for careers in this demanding field, we equip them with a strong background in the fundamental principles of the discipline, and subsequent advanced courses in specific areas. Our curriculum provides practical, hands-on experience through laboratory courses.

The Electrical and Electronic Engineering program provides breadth (core courses), depth (elective sequence), and a culminating design project to apply the knowledge gained through the curriculum. The curriculum allows flexibility by offering a number of elective courses providing our graduates with depth in their respective areas of interest. The electives offered provide depth in one or more of the following areas: Analog/ Digital Electronics, Control Systems, Communication Engineering, and Power Engineering. Students select a senior project either in power engineering or in the general area of electronics. Each of these options includes a sequence of two courses for the completion of the project, and has its own pre-requisite requirements.

Note: Students graduating with a BS in Electrical and Electronic Engineering will not be subject to the University's Foreign Language Graduation Requirement. Students who change major may be subject to the University's Foreign Language Graduation Requirement.

Minimum Grade Requirement

A grade of "C-" or better is required in all courses applied to an Electrical and Electronic Engineering major.

Program Requirements

Code	Title	Units
REQUIRED LOWER DIVISION COURSES (38 Units)		
First Semester Freshman Year		
CHEM 1E	General Chemistry for Engineering [1]	4
ENGR 1	Introduction to Engineering [1]	1
MATH 30	Calculus I [1]	4
Second Semester Freshman Year		
ENGR 50	Computational Methods and Applications	3
MATH 31	Calculus II [1]	4
PHYS 11A	General Physics: Mechanics [1]	4
First Semester Sophomore Year		
EEE/CPE 64	Introduction to Logic Design [1,2]	4
MATH 32	Calculus III	4
PHYS 11C	General Physics: Electricity and Magnetism [1]	4
Second Semester Sophomore Year		
ENGR 17	Introductory Circuit Analysis [2]	3
MATH 45	Differential Equations for Science and Engineering	3
REQUIRED UPPER DIVISION COURSES (33 Units) [3]		
First Semester Junior Year		
EEE 117 & 117L	Network Analysis Networks Analysis Laboratory	4
EEE 161	Applied Electromagnetics	4
EEE 180	Signals & Systems	3
ENGR 140	Engineering Economics [1]	2
Second Semester Junior Year		
EEE 108 & 108L	Electronics I Electronics I Laboratory	4
EEE 141	Power System Analysis I	3
EEE 174	Introduction to Microprocessors	4
EEE 184	Introduction to Feedback Systems	3
ENGR 120	Probability and Random Signals	3
First semester senior year		
EEE 185	Modern Communication Systems	3
REQUIRED DESIGN PROJECT SERIES		
Select one of the following two series:		
POWER DESIGN PROJECT SERIES (8 Units)		
EEE 142 & EEE 143	Power System Analysis II Power System Laboratory	4
EEE 192A	Electrical Power Design Project I [1]	2
EEE 192B	Electrical Power Design Project II [1]	2
OR		
PRODUCT DESIGN PROJECT SERIES (8 Units)		
EEE 109	Electronics II	4
EEE 193A	Product Design Project I [1]	2
EEE 193B	Product Design Project II [1]	2
ADDITIONAL ELECTIVE REQUIREMENTS FOR BOTH POWER/ PRODUCT DESIGN PROJECT SERIES		
Select 6 units of lecture and 1 unit of laboratory from one of the four areas listed below.		
Select 6 additional units from any of the four areas listed below.		
TOTAL UNITS		**92**

1. Course also satisfies General Education (GE)/Graduation Requirement. The designation "General Education course" denotes a course which meets GE requirements other than those which also serve as prerequisites to courses in the major. Students are expected to satisfy the University's GE requirements. Consult the Department Chair for specific GE requirements. Students should take ENGL 5 as early as possible since it is required for admission to the upper division.
2. CPE 64W, EEE 64W or ENGR 17W may be available to augment understanding of material; however, these courses cannot be used to satisfy graduation requirements.
3. It is imperative that students take the University's Writing Placement for Juniors (WPJ) during the first semester of the junior year, as it is a prerequisite to some laboratory courses after EEE 117L.

Depth Requirement Areas and List of Electives

Depth Area Requirement for both Power Design and Product Design Series:

- Select 6 units of lecture and 1 unit of laboratory from one of the four areas below.
- Select 6 additional units from any of the four areas listed below.

Code	Title	Units
Analog/Digital Electronics (34 Units)		
CPE/CSC 138	Computer Networking Fundamentals	3
CPE 151	CMOS and Digital VLSI Design	3
CPE 153	Vlsi Design	3
CPE 166	Advanced Logic Design	4
CPE 186	Computer Hardware System Design	3
CPE 187	Embedded Systems Design	3
EEE 109	Electronics II [1]	4
EEE 110	Advanced Analog Integrated Circuits	3
EEE 111	Advanced Analog Integrated Circuits Laboratory	1
EEE 120	Electronic Instrumentation	4
EEE 166	Physical Electronics	3
Control Systems (11 Units)		
EEE 178	Introduction to Machine Vision	3
EEE 187	Robotics	4
EEE 188	Digital Control System	3
EEE 189	Controls Laboratory	1
Communication Engineering (19 Units)		
EEE 122	Applied Digital Signal Processing	3
EEE 162	Applied Wave Propagation	3
EEE 163	Traveling Waves Laboratory	1
EEE 165	Introduction To Optical Engineering	3
EEE 167	Electro-Optical Engineering Lab	1
EEE 181	Introduction to Digital Signal Processing	3
EEE 182	Digital Signal Processing Lab	1
EEE 183	Digital and Wireless Communication System Design	3
EEE 186	Communication Systems Laboratory	1
Power Engineering (29 Units)		
EEE 130	Electromechanical Conversion	3
EEE 131	Electromechanics Laboratory	1
EEE 135	Renewable Electrical Energy Sources and Grid Integration	3
EEE 136	Smart Electric Power Grid	3
EEE 137	Applications of Power Electronics in Power Systems	3
EEE 142	Power System Analysis II [1]	3
EEE 143	Power System Laboratory [1]	1
EEE 144	Electric Power Distribution	3
EEE 145	Power System Relay Protection and Laboratory	4
EEE 146	Power Electronics	3
EEE 147	Power System Operation and Control Laboratory	1
EEE 148	Power Electronics Laboratory	1

[1] You may not use a course to count for both a required course and an elective course.

Note:

- Other upper division courses in Engineering and Computer Science may be selected as elective lectures with **prior** approval of the student's advisor.
- Other upper division and graduate courses in Engineering and Computer Science may be selected as elective lectures with **prior** approval of the student's advisor. Graduate courses counted towards a BS degree may **not** be used for a MS degree.

General Education Requirements [1]

Code	Title	Units
Area A: Basic Subjects (6 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking (Exempt)		0
Area B: Physical Universe and Its Life Forms (3 Units)		
B1 - Physical Science - Met by major courses.		0
B2 - Life Forms		3
B3 - Lab - Met by major courses.		0
B4 - Math Concepts - Met by major courses.		0
B5 - Additional Course - Met by upper-division major courses.		0
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 Area C Course		3
C1/C2 - Any Upper-Division Area C Course - Take upper-division course to complete Area & upper-division requirements.		3
Area D: The Individual and Society (6 Units)		
Area D Course		3
Area D Course		3
Area D Course - Met by upper-division major courses.		0
Area E: Understanding Personal Development		
Area E Course - Met by major courses.		0
Area F: Ethnic Studies (3 units) (3 Units)		
Area F Course		3
Total Units		**30**

[1] To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (https://catalog.csus.edu/colleges/academic-affairs/general-education/).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

Graduation Requirements [1]

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (6 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement (Exempt)		0

[1] To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (https://catalog.csus.edu/colleges/academic-affairs/general-education/).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

The following roadmaps are sample planning resources. Please consult your academic advisor and Academic Catalog for graduation requirements as you develop your individualized academic plan.

Electrical and Electronic Engineering, BS: 4-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
CHEM 1E	General Chemistry for Engineering	4
ENGR 1	Introduction to Engineering	1
MATH 30	Calculus I	4
GE Area 1C - Oral Communication [2]		3
GE Area 6 - Ethnic Studies [2]		3
	Units	**15**
Second Semester		
ENGR 50	Computational Methods and Applications	3
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics	4
GE Area 1A - English Composition [2]		3
GR American Institutions (US History) [2]		3
	Units	**17**
Year 2		
First Semester		
EEE 64	Introduction to Logic Design	4
MATH 32	Calculus III	4
PHYS 11C	General Physics: Electricity and Magnetism	4
GR American Institutions (GOVT) [2]		3
	Units	**15**
Second Semester		
ENGL 20	College Composition II	3
ENGR 17	Introductory Circuit Analysis	3
MATH 45	Differential Equations for Science and Engineering	3
GE Area 3A - Arts [2]		3
GE Area 5B - Biological Science [2]		3
	Units	**15**
Year 3		
First Semester		
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
EEE 161	Applied Electromagnetics	4
EEE 180	Signals & Systems	3
ENGR 140	Engineering Economics	2
GE Area 3B - Humanities [2]		3
	Units	**16**
Second Semester		
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 141	Power System Analysis I	3
EEE 174	Introduction to Microprocessors	4
EEE 184	Introduction to Feedback Systems	3
ENGR 120	Probability and Random Signals	3
	Units	**17**
Year 4		
First Semester		
EEE 185	Modern Communication Systems	3
EEE 109	Electronics II	4
EEE 193A	Product Design Project I	2
EEE 142	Power System Analysis II	3
EEE 143	Power System Laboratory	1
EEE 192A	Electrical Power Design Project I	2
EEE Depth Elective Lecture and Lab [3]		4
	Units	**19**
Second Semester		
EEE 192B	Electrical Power Design Project II	2
EEE 193B	Product Design Project II	2
EEE Depth Elective Lecture [3]		3
EEE Broad Depth Elective Lecture [3]		3
EEE Broad Depth Elective Lecture [3]		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
GE Area 4 - Social & Behavioral Sciences [2]		3
	Units	**19**
	Total Units	**133**

Electrical and Electronic Engineering, BS: 2-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
EEE 161	Applied Electromagnetics	4
EEE 180	Signals & Systems	3
ENGR 140	Engineering Economics	2
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive [2]		3
	Units	**16**
Second Semester		
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 141	Power System Analysis I	3
EEE 174	Introduction to Microprocessors	4
EEE 184	Introduction to Feedback Systems	3
ENGR 120	Probability and Random Signals	3
	Units	**17**
Year 2		
First Semester		
EEE 185	Modern Communication Systems	3

EEE 192A	Electrical Power Design Project I	2
EEE 193A	Product Design Project I	2
EEE Depth Elective Lecture and Lab [3]		4
EEE Depth Elective Lecture [3]		3
	Units	**14**
Second Semester		
EEE 192B	Electrical Power Design Project II	2
EEE 193B	Product Design Project II	2
EEE Broad Depth Elective Lecture [3]		3
EEE Broad Depth Elective Lecture [3]		3
GR American Institutions (US History) [2]		3
GR American Institutions (GOVT) [2]		3
	Units	**16**
	Total Units	**63**

1. Any course not completed in the first semester should be taken in the second or a later semester.
2. Please see General Education/Graduation Requirement **course options (https://catalog.csus.edu/colleges/engineering-computer-science/engineering-civil/bs-in-civil-engineering/colleges/academic-affairs/general-education/)**.
3. Please see an academic advisor for elective options.