# Curriculum for B.S. Degree in Electrical Engineering (122 units)

**CALIFORNIA STATE UNIVERSITY, LOS ANGELES**

**(Effective Fall 2024) revised 07/01/2024**

## General Education (21 units)

**Lower Division General Education Requirements (21 units)**

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| | Oral Communication (3) |
| | Written Communication (3) |
| | United States History (3) * |
| | United States Constitution and State/Local Government (3) |
| BLOCK C – Humanities | Select 1 course in C1 (3) * |
| BLOCK E – Life Long Learning | First-time freshmen need to take ENGR 1500 Introduction to Engineering and Technology (3); Transfer students without equivalent credit need to select 1 course (3) in Block E |
| BLOCK F – Ethnic Studies | Select 1 course (3) * |

### Upper Division General Education Requirements (0 units)

*Students need to select the ***US History, C1, and F*** courses to fulfill the requirement of one race/ethnicity (***re***) and one diversity (***d***) course, or two ***re*** courses.

## Lower Division Major Requirements (40 units)

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| CHEM 1040 | **General Chemistry for Engineers (4)** *Prerequisites*: Completion of GE Math (B4) or GE Math supported instruction is not required (Math Placement Category I or II). Must be an engineering major. |
| EE 2040 | **Circuit Analysis I (3)** *Co-requisite*: MATH 2120, PHYS 2200 |
| EE 2049 | **Electrical Measurements and Circuits Laboratory (1)** *Prerequisites*: EE 2040 |
| EE 2440 | **Digital Engineering (3)** *Prerequisites*: None |
| EE 2449 | **Digital Logic Laboratory (1)** *Co-requisites*: EE 2440 |
| EE 2450 | **Embedded System Programming I (3)** *Prerequisites or Co-requisites*: ENGR 1500 |
| MATH 2110 | **Calculus I (4)** *Prerequisites*: MATH 1040 with a minimum C grade, or MATH 1081 and MATH 1083 both with a minimum C grade, or MATH 1082 and MATH 1083 both with a minimum C grade, or ESM 1082 and MATH 1083 both with a minimum C grade, or satisfactory score on placement examination; students with a grade of less than B- in either MATH 1040, or in one of MATH 1081 or MATH 1083, or in one of MATH 1082 or MATH 1083, or in one of ESM 1082 or MATH 1083 must enroll concurrently in MATH 2111. |
| MATH 2120 | **Calculus II (4)** *Prerequisites*: MATH 2110 with a minimum C grade; students with a grade of less than B- in MATH 2110 must enroll concurrently in MATH 2121. |
| MATH 2130 | **Calculus III (3)** *Prerequisites*: MATH 2120 with a minimum C grade; students with a grade of less than B- in MATH 2120 must enroll concurrently in MATH 2131 |
| MATH 2150 | **Differential Equations (3)** *Prerequisites*: MATH 2130 |
| PHYS 2100 | **General Physics I, Mechanics (4)** *Prerequisites*: MATH 2110 with a minimum C grade |
| PHYS 2200 | **General Physics II, Electromagnetism and Circuits (4)** *Prerequisites*: PHYS 2100 with a minimum C grade |
| ENGL 2030 | **Introduction to Technical Writing (3)** *Prerequisites*: ENGL 1010 |

## Upper Division Major Requirements (45 units)

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| EE/ME/CE 3000 | **Economics for Engineers (3)** *Prerequisites*: Junior or Senior Standing |
| ENGR 3010 | **Ethics and Professionalism in Engineering (3)** *Prerequisites*: Junior or Senior Standing |
| EE 3003 | **Linear Algebra and Numerical Analysis in Electrical and Computer Engineering (3)** *Prerequisites*: EE 2450, *Co-req*: EE 2040 |
| EE 3020 | **Signals and Systems (3)** *Prerequisites*: EE 2040, *Co-req*: MATH 2150 |
| EE 3030 | **Circuit Analysis II (3)** *Prerequisites*: EE 3020 |
| EE 3040 | **Probability, Random Variable, and Random Processes (3)** *Co-requisites*: MATH 2130 |
| EE 3050 | **Electric and Magnetic Fields (3)** *Prerequisites*: EE 2040 |
| EE 3200 | **Analog Communication Systems (3)** *Prerequisites*: EE 3020 |
| EE 3300 | **Electric Machines (3)** *Prerequisites*: EE 2040 |
| EE 3450 | **Embedded Systems Programming II (3)** *Prerequisites*: EE 2450 |

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| EE 3600 | **Control Systems I (3)** *Prerequisites*: EE 3020 |
| EE 3700 | **Electronics I (3)** *Prerequisites*: EE 2040 |
| EE 3810 | **Sensors, Data Acquisition, & Instrumentation w/ App. in Biomedical Engr. (3)** *Prerequisites*: EE 2049 |
| EE 4961 | **Senior Design I (3)** *Prerequisites*: Completion of Blocks A1 and A2, ENGR 3010, EE/ME/CE 3000, EE 3020, EE 3450, and EE3810 |
| EE 4962 | **Senior Design II (3)** *Prerequisites*: EE 4961 with grade of C or higher |

## Upper Division Technical Electives (16 units)

*Select 5 lecture courses and 1 lab from the following. (3 lecture and 1 lab courses in one specialty with advisor's approval.)*

### Lecture Electives (15 units):

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| EE/ME/CS 3420 | **Introduction to Autonomous Robotic Systems (3)** *Prerequisites:* EE 2450 |
| EE 3710 | **Electronics II (3)** *Prerequisites*: EE 3700 |
| EE 3720 | **Digital Electronics (3)** *Prerequisites*: EE 2440, EE 3700 |
| EE 4130 | **Systems Engineering (3)** *Prerequisites*: EE 3600 |
| EE 4200 | **Digital Communication Systems (3)** *Prerequisites*: EE 3200, EE 3040 |
| EE 4210 | **Coding for Communications (3)** *Prerequisites*: EE 3200 |
| EE 4220 | **Digital Signal Processing (3)** *Prerequisites*: EE 3200 |
| EE 4230 | **Antennas (3)** *Co-requisites*: EE 3050 |
| EE 4240 | **Fiber Optics (3)** *Prerequisites*: EE 3200 |
| EE 4250 | **Digital Image Processing (3)** *Prerequisites*: EE 3200 |
| EE 4300 | **Introduction to Power Systems Engineering (3)** *Prerequisites*: EE 3300 |
| EE 4310 | **Power Systems Analysis (3)** *Prerequisites*: EE 4300 |
| EE 4320 | **Electric Power Distribution (3)** *Co-requisites*: EE 4300 |
| EE 4330 | **Power Electronics (3)** *Prerequisites*: EE 3700 |
| EE 4340 | **Electromagnetic Energy Conversion (3)** *Prerequisites*: EE 3300 |
| EE 4400 | **Data Communications and Networking (3)** *Prerequisites*: EE 3200 |
| EE 4420 | **Multimedia Networking (3)** *Prerequisites*: EE 4400, Knowledge of MATLAB |
| EE 4440 | **Computer Organization (3)** *Prerequisites*: EE 3450 |
| EE 4450 | **Embedded Architectures (3)** *Prerequisites*: EE 3450 |
| EE 4480 | **Advanced Digital Design (3)** *Prerequisites or Co-requisites*: EE 4440 |
| EE 4600 | **Applied Control System Design and Simulation (3)** *Prerequisites*: EE 3600 |
| EE 4610 | **Digital Control Systems (3)** *Prerequisites*: EE 3600 |
| EE 4620 | **Modern Control Systems (3)** *Prerequisites*: EE 3020 |
| EE 4630 | **Machine Learning Principles and Applications (3)** *Prerequisites*: EE 3020, EE 3040 |
| EE 4710 | **Analog Integrated Circuits (3)** *Prerequisites*: EE 3700 |
| EE 4720 | **CMOS VLSI Design (3)** *Prerequisites*: EE 3720 |
| EE 4730 | **Optoelectronics (3)** *Prerequisites*: EE 3700 |
| EE 4810 | **Biomedical Devices (3)** *Prerequisites*: EE 2040 |
| EE 4820 | **Biomedical Signal Processing (3)** *Prerequisites*: EE 3020 |

### Laboratory Electives (1 unit):

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| EE 3209 | **Communications Laboratory (1)** *Prerequisites*: EE 3200 |
| EE 3309 | **Electromagnetic Energy Conversion Laboratory (1)** *Prerequisites*: EE 3300, EE 2049 |
| EE 3709 | **Electronics Laboratory (1)** *Co-requisites*: EE 3710 |
| EE 4229 | **Digital Signal Processing Laboratory (1)** *Prerequisites*: EE 3020, *Co-req*: EE 4220 |
| EE 4459 | **Systems Design Tools and Implementation Laboratory (1)** *Prerequisite*: EE 2450 |
| EE 4689 | **Control Systems Laboratory (1)** *Co-requisites*: EE 3600 |

### Additional Courses That May Count Towards Major with Department Approval:

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| EE 2801 | **Intro to Biomed Engineering (3)** *Prerequisites:* None |
| EE 3540 | **Special Topics in Electrical Engineering (1-3)** *Prerequisites*: Department Permission |
| EE 4009 | **Professional Engineering Practice (1)** *Prerequisites*: Department Permission under the conditions: acceptance by the corresponding worksite; junior, senior, or graduate standing; min 2.5 GPA for undergraduates and 3.0 for graduates. |
| EE 4540 | **Special Topics in Electrical Engineering (1-3)** *Prerequisites*: Senior standing or graduate standing in EE, enrollment subject to approval of instructor in charge. Permission needed by the EE Department. |
| EE 4990 | **Undergraduate Directed Study (1–3)** *Prerequisites*: Department Permission |