

ELECTRICAL ENGINEERING MAJOR REQUIREMENTS 2017-2018

Electrical & Computer Engineering Student Affairs Office / ece.ucsd.edu / Jacobs Hall 2701, 2702

COMMUNICATION SYSTEMS

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 102, 107, 109
Depth: ECE 153, 154A-B-C, 158A
Technical Electives: four upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

COMPUTER SYSTEM DESIGN

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 102, 103, 109
Depth: CSE 141, ECE 165 and two of ECE 111, 158A or CSE 143
Technical Electives: five upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111 (if not selected as a Depth course), 190, or 191

ELECTRONIC CIRCUITS & SYSTEMS

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 102, 103, 107, 109
Depth: ECE 164, 165, 166
Technical Electives: five upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

ELECTRONIC DEVICES & MATERIALS

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 102, 103, 107, 109
Depth: ECE 135A-B, 136L, 183
Technical Electives: four upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

MACHINE LEARNING & CONTROLS

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 107, 109
Depth: ECE 171A, 174, 175A and one of ECE 171B, 172A, or 175B
Technical Electives: six upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

PHOTONICS

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 103, 107, 109
Depth: ECE 181, 182, 183 and either ECE 184 or 185
Technical Electives: five upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

SIGNAL & IMAGE PROCESSING

Lower Division [72 units]

MATH 18, 20A-B-C-D-E
PHYS 2A-B-C-D
CHEM 6A
ECE 5, 15, 25, 30, 35, 45, 65

Upper Division [68 units]

Breadth: ECE 100, 101, 107, 109
Depth: ECE 153, 161A-B-C
Technical Electives: six upper division engineering, math, or physics courses
Professional Electives: two upper division courses
Design: one of ECE 111, 190, or 191

COMMUNICATIONS SYSTEMS DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15 ECE 25 ECE 35	ECE 15 or ECE 5 ECE 45 MATH 20E	ECE 30 ECE 65 PHYS 2D
Year 2	ECE 100 ECE 101 Tech. Elective 1	ECE 102 ECE 109 Tech. Elective 2	ECE 107 ECE 153 Prof. Elective 1
Year 3	ECE 154A ECE 158A Prof. Elective 2	ECE 154B Tech. Elective 3 Tech. Elective 4	ECE 154C Design

PLEASE NOTE:

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- Go to <http://www.ece.ucsd.edu/undergraduate/ee-ep-electives> for a list of acceptable electives.
- ALL courses used to satisfy major requirements must be taken for a **letter grade and passed with a C- or better.**
- This plan assumes that students have completed equivalent lower division MATH, PHYS and CHEM courses at the community college that are required for the major.
- For personalized course plans, please set up an appointment with an advisor.

MAJOR REQUIREMENTS

Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 18 Linear Algebra |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20D Differential Equations |
| <input type="checkbox"/> ECE 5 Intro to ECE | <input type="checkbox"/> MATH 20E Vector Calculus |
| <input type="checkbox"/> ECE 15 Engineering Computation | |
| <input type="checkbox"/> ECE 25 Intro to Digital Design | |
| <input type="checkbox"/> ECE 30 Intro to Computer Eng | |
| <input type="checkbox"/> ECE 35 Intro to Analog Design | |
| <input type="checkbox"/> ECE 45 Circuits & Systems | |
| <input type="checkbox"/> ECE 65 Components & Circuits Lab | |

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 107 Electromagnetism
- ECE 109 Eng. Probability & Stats

COMMUNICATIONS SYSTEMS DEPTH

- ECE 153 Probability and Random Processes for Engineers
- ECE 154A Communications Systems I
- ECE 154B Communications Systems II
- ECE 154C Communications Systems III
- ECE 158A Data Networks I

Design Course: ECE 111, 115, 191, or 190

ELECTIVES

4 Technical

- _____
- _____
- _____
- _____

2 Professional

- _____
- _____

COMPUTER SYSTEM DESIGN DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15	ECE 15 or ECE 5	ECE 30
	ECE 25	ECE 45	ECE 65
	ECE 35	MATH 20E	PHYS 2D
Year 2	ECE 100	ECE 102	ECE 165
	ECE 101	ECE 109	Tech. Elective 2
	ECE 103	Tech. Elective 1	Prof. Elective 1
Year 3	ECE 158A*	CSE 141	ECE 111*
	Tech. Elective 3	Tech. Elective 4	Design
	Prof. Elective 2	Tech. Elective 5	

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MAJOR REQUIREMENTS

Lower Division Requirements

- CHEM 6A General Chemistry I
- MATH 20A Calculus I
- MATH 20B Calculus II
- MATH 20C Calculus III
- MATH 20D Differential Equations
- MATH 20E Vector Calculus
- MATH 18 Linear Algebra
- PHYS 2A Mechanics
- PHYS 2B Electricity and Magnetism
- PHYS 2C Flu,Wav,Thrmdyn,Optics
- PHYS 2D Relativity & Quantum
- ECE 5 Intro to ECE
- ECE 15 Engineering Computation
- ECE 25 Intro to Digital Design
- ECE 30 Intro to Computer Eng
- ECE 35 Intro to Analog Design
- ECE 45 Circuits & Systems
- ECE 65 Components & Circuits Lab

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 103 Fundamentals/Devices & Matrls
- ECE 109 Eng. Probability & Stats

COMPUTER SYSTEM DESIGN DEPTH

- CSE 141 Intro to Computer Architecture
- ECE 165 Digital Integrated Circuit Design and two of
 - ECE 111 Advanced Digital Design Project
 - ECE 158A Data Networks I
 - CSE 143 Microelectronic System Design

- Design Course: ECE 191 or 190

ELECTIVES

5 Technical

- _____
- _____
- _____

2 Professional

- _____
- _____

ELECTRONIC CIRCUITS & SYSTEMS DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15	ECE 15 or ECE 5	ECE 30
	ECE 25	ECE 45	ECE 65
	ECE 35	MATH 20E	PHYS 2D
Year 2	ECE 100	ECE 102	ECE 107
	ECE 101	ECE 109	ECE 165
	ECE 103	Tech. Elective 1	Prof. Elective 1
Year 3	ECE 164	Tech. Elective 2	Tech. Elective 5
	ECE 166	Tech. Elective 3	Design
	Prof. Elective 2	Tech. Elective 4	

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MAJOR REQUIREMENTS

Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20D Differential Equations |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20E Vector Calculus |
| | <input type="checkbox"/> MATH 18 Linear Algebra |

- ECE 5 Intro to ECE
- ECE 15 Engineering Computation
- ECE 25 Intro to Digital Design
- ECE 30 Intro to Computer Eng
- ECE 35 Intro to Analog Design
- ECE 45 Circuits & Systems
- ECE 65 Components & Circuits Lab

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 103 Fundamentals/Devis & Matrils
- ECE 107 Electromagnetism
- ECE 109 Eng. Probability & Stats

ELECTRONIC CIRCUITS & SYSTEMS DEPTH

- ECE 164 Analog Integrated Circuit Design
- ECE 165 Digital Integrated Circuit Design
- ECE 166 Microwave Systems and Circuits

- Design Course: ECE 111, 191, or 190

ELECTIVES

5 Technical

- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | |

2 Professional

- | |
|--------------------------------|
| <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ |

ELECTRONIC DEVICES & MATERIALS DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15	ECE 15 or ECE 5	ECE 30
	ECE 25	ECE 45	ECE 65
	ECE 35	MATH 20E	PHYS 2D
Year 2	ECE 100	ECE 102	ECE 107
	ECE 101	ECE 109	Tech. Elective 2
	ECE 103	Tech. Elective 1	Prof. Elective 1
Year 3	ECE 135A	ECE 135B	ECE 136L
	Tech. Elective 3	ECE 183	Design
	Prof. Elective 2	Tech. Elective 4	

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MAJOR REQUIREMENTS

Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20D Differential Equations |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20E Vector Calculus |
| | <input type="checkbox"/> MATH 18 Linear Algebra |
-
- ECE 5 Intro to ECE
 - ECE 15 Engineering Computation
 - ECE 25 Intro to Digital Design
 - ECE 30 Intro to Computer Eng
 - ECE 35 Intro to Analog Design
 - ECE 45 Circuits & Systems
 - ECE 65 Components & Circuits Lab

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 103 Fundamentals/Devs & MatrIs
- ECE 107 Electromagnetism
- ECE 109 Eng. Probability & Stats

ELECTRONIC DEVICES & MATERIALS DEPTH

- ECE 135A Semiconductor Physics
 - ECE 135B (Electronic Devices)
 - ECE 136L Microelectronics Laboratory
 - ECE 183 Optical Electronics
- Design Course: ECE 111, 191, or 190

ELECTIVES

- | | |
|--------------------------------|--------------------------------|
| 4 Technical | 2 Professional |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | |
| <input type="checkbox"/> _____ | |

MACHINE LEARNING & CONTROLS DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15 ECE 25 ECE 35	ECE 15 or ECE 5 ECE 45 MATH 20E	ECE 30 ECE 65 PHYS 2D
Year 2	ECE 100 ECE 101 Tech. Elective 1	ECE 107 ECE 109 Tech. Elective 2	ECE 171A Prof. Elective 1 Tech. Elective 3
Year 3	ECE 171B* ECE 174 Prof. Elective 2	ECE 172A* ECE 175A Tech. Elective 4 Tech. Elective 5	ECE 175B* Tech. Elective 6 Design

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MAJOR REQUIREMENTS

Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 18 Linear Algebra |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20D Differential Equations |
| <input type="checkbox"/> ECE 5 Intro to ECE | <input type="checkbox"/> MATH 20E Vector Calculus |
| <input type="checkbox"/> ECE 15 Engineering Computation | |
| <input type="checkbox"/> ECE 25 Intro to Digital Design | |
| <input type="checkbox"/> ECE 30 Intro to Computer Eng | |
| <input type="checkbox"/> ECE 35 Intro to Analog Design | |
| <input type="checkbox"/> ECE 45 Circuits & Systems | |
| <input type="checkbox"/> ECE 65 Components & Circuits Lab | |

Upper Division Requirements

- BREADTH**
- ECE 100 Linear Electronic Systems
 - ECE 101 Linear Systems Fundamentals
 - ECE 107 Electromagnetism
 - ECE 109 Eng. Probability & Stats

MACHINE LEARNING & CONTROLS DEPTH

- ECE 171A Linear Control System Theory)
- ECE 174 Intro to Linear and Nonlinear Optimization with Applications
- ECE 175A Elements of MI: Pattern Recognition & Machine Learning
- *One of: ECE 171B Linear Control System Theory, OR
ECE 172A Intro to Intelligent Sys: Robotics & Machine Intelligence, OR
ECE 175B Elements of MI: Probabilistic Reasoning & Graphical Models

- Design Course: ECE 111, 191, or 190

ELECTIVES

- | | |
|--------------------------------|--------------------------------|
| 6 Technical | 2 Professional |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | |

PHOTONICS DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15	ECE 15 or ECE 5	ECE 30
	ECE 25	ECE 45	ECE 65
	ECE 35	MATH 20E	PHYS 2D
Year 2	ECE 100	ECE 107	ECE 181
	ECE 101	ECE 109	Tech. Elective 2
	ECE 103	Tech. Elective 1	Prof. Elective 1
Year 3	ECE 182	ECE 183	ECE 185*
	Tech. Elective 3	ECE 184*	Tech. Elective 5
	Prof. Elective 2	Tech. Elective 4	Design

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MAJOR REQUIREMENTS

Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 18 Linear Algebra |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20D Differential Equations |
| | <input type="checkbox"/> MATH 20E Vector Calculus |

- ECE 5 Intro to ECE
- ECE 15 Engineering Computation
- ECE 25 Intro to Digital Design
- ECE 30 Intro to Computer Eng
- ECE 35 Intro to Analog Design
- ECE 45 Circuits & Systems
- ECE 65 Components & Circuits Lab

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 103 Fundamentals/Devs & Matrls
- ECE 107 Electromagnetism
- ECE 109 Eng. Probability & Stats

PHOTONICS DEPTH

- ECE 181 Physical Optics and Fourier Optics
- ECE 182 Electromagnetic Optics, Guided-Wave, and Fiber Optics
- ECE 183 Optical Electronics
- One of: ECE 184 Optical Information Processing and Holography, OR ECE 185 Lasers and Modulators

- Design Course: ECE 111, 191, or 190

ELECTIVES

5 Technical

- _____
- _____
- _____

2 Professional

- _____
- _____

SIGNAL & IMAGE PROCESSING DEPTH			
	FALL QUARTER	WINTER QUARTER	SPRING QUARTER
Year 1	ECE 5 or ECE 15	ECE 15 or ECE 5	ECE 30
	ECE 25	ECE 45	ECE 65
	ECE 35	MATH 20E	PHYS 2D
Year 2	ECE 100	ECE 107	Prof. Elective 1
	ECE 101	ECE 109	Tech. Elective 3
	Tech. Elective 1	Tech. Elective 2	Tech. Elective 4
Year 3	ECE 153	ECE 161B	ECE 161C
	ECE 161A	Tech. Elective 5	Design
	Prof. Elective 2	Tech. Elective 6	

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Lower Division Requirements

- | | |
|--|--|
| <input type="checkbox"/> CHEM 6A General Chemistry I | <input type="checkbox"/> MATH 18 Linear Algebra |
| <input type="checkbox"/> PHYS 2A Mechanics | <input type="checkbox"/> MATH 20A Calculus I |
| <input type="checkbox"/> PHYS 2B Electricity and Magnetism | <input type="checkbox"/> MATH 20B Calculus II |
| <input type="checkbox"/> PHYS 2C Flu,Wav,Thrmdyn,Optics | <input type="checkbox"/> MATH 20C Calculus III |
| <input type="checkbox"/> PHYS 2D Relativity & Quantum | <input type="checkbox"/> MATH 20D Differential Equations |
| <input type="checkbox"/> ECE 5 Intro to ECE | <input type="checkbox"/> MATH 20E Vector Calculus |
| <input type="checkbox"/> ECE 15 Engineering Computation | |
| <input type="checkbox"/> ECE 25 Intro to Digital Design | |
| <input type="checkbox"/> ECE 30 Intro to Computer Eng | |
| <input type="checkbox"/> ECE 35 Intro to Analog Design | |
| <input type="checkbox"/> ECE 45 Circuits & Systems | |
| <input type="checkbox"/> ECE 65 Components & Circuits Lab | |

Upper Division Requirements

BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 107 Electromagnetism
- ECE 109 Eng. Probability & Stats

SIGNAL & IMAGE PROCESSING DEPTH

- ECE 153 Probability and Random Processes for Engineers
- ECE 161A Intro to Digital Signal Processing
- ECE 161B Digital Signal Processing I
- ECE 161C Applications of Digital Signal Processing
- Design Course: ECE 111, 191, or 190

ELECTIVES

6 Technical

- | | |
|--------------------------------|--------------------------------|
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |

2 Professional

- | |
|--------------------------------|
| <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ |