Communications Systems Depth

<table>
<thead>
<tr>
<th>FALL QUARTER</th>
<th>WINTER QUARTER</th>
<th>SPRING QUARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 18</td>
<td>MATH 20A</td>
<td>MATH 20B</td>
</tr>
<tr>
<td>ECE 5 or CHEM 6A</td>
<td>CHEM 6A or ECE 5</td>
<td></td>
</tr>
<tr>
<td>ECE 15</td>
<td>ECE 25</td>
<td>ECE 30</td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 20C</td>
<td>MATH 20D</td>
<td>MATH 20E</td>
</tr>
<tr>
<td>PHYS 2B</td>
<td>PHYS 2C</td>
<td>PHYS 2D</td>
</tr>
<tr>
<td>ECE 35</td>
<td>ECE 45</td>
<td>ECE 65</td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 100</td>
<td>ECE 102</td>
<td>ECE 107</td>
</tr>
<tr>
<td>ECE 101</td>
<td>ECE 109</td>
<td>ECE 153</td>
</tr>
<tr>
<td>Tech. Elective 1</td>
<td>Tech. Elective 2</td>
<td>Prof. Elective 1</td>
</tr>
<tr>
<td><strong>Year 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 154A</td>
<td>ECE 154B</td>
<td>ECE 154C</td>
</tr>
<tr>
<td>ECE 158A</td>
<td>Tech. Elective 3</td>
<td>Design</td>
</tr>
<tr>
<td>Prof. Elective 2</td>
<td>Tech. Elective 4</td>
<td></td>
</tr>
</tbody>
</table>

PLEASE NOTE:
- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to:
  - http://www.ece.ucsd.edu/undergraduate/ee-ep-electives
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.

MAJOR REQUIREMENTS

**Lower Division Requirements**
- CHEM 6A General Chemistry I
- MATH 18 Linear Algebra
- PHYS 2A Mechanics
- PHYS 2B Electricity and Magnetism
- PHYS 2C Flu, Wav, Thmodyn, Optics
- PHYS 2D Relativity & Quantum
- MATH 20A Calculus I
- MATH 20B Calculus II
- MATH 20C Calculus III
- MATH 20D Differential Equations
- MATH 20E Vector Calculus

**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
- ______________ 
- ______________
- ______________ 
- ______________
- ______________ 
- ______________

Questions? Go to vac.ucsd.edu
### MAJOR REQUIREMENTS

#### Lower Division Requirements

- **CHEM 6A** General Chemistry I
- **MATH 20A** Calculus I
- **PHYS 2A** Mechanics
- **PHYS 2B** Electricity and Magnetism
- **PHYS 2C** Flu, Wav, Thrmdyn, Optics
- **PHYS 2D** Relativity & Quantum
- **MATH 20B** Calculus II
- **MATH 20C** Calculus III
- **MATH 20D** Differential Equations
- **MATH 20E** Vector Calculus
- **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

- **ECE 100** Linear Electronic Systems
- **ECE 101** Linear Systems Fundamentals
- **ECE 102** Intro Active Circuit Design
- **ECE 103** Fundamentals/Devicis & Matrls
- **ECE 109** Eng. Probability & Stats
- **ECE 111** Advanced Digital Design Project
- **ECE 158A** Data Networks I
- **CSE 141** Intro to Computer Architecture
- **CSE 143** Microelectronic System Design
- **CSE 144** Digital Integrated Circuit Design

#### BREADTH

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

#### COMPUTER SYSTEM DESIGN DEPTH

- **ECE 158A** Data Networks I
- **CSE 143** Microelectronic System Design

#### Design Course: ECE 191 or 190

#### ELECTIVES

- **5 Technical**
- **2 Professional**

---

**PLEASE NOTE:**

- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to:
  - http://www.ece.ucsd.edu/undergraduate/ee-ep-electives
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.
## MAJOR REQUIREMENTS

### Lower Division Requirements

- CHEM 6A General Chemistry I
- MATH 20A Calculus I
- PHY 2A Mechanics
- MATH 20B Calculus II
- PHY 2B Electricity and Magnetism
- MATH 20C Calculus III
- PHY 2C Flu,Wav,Thrmdyn,Optics
- MATH 20D Differential Equations
- PHY 2D Relativity & Quantum
- MATH 18 Vector Calculus

### Upper Division Requirements

#### BREADTH

- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 103 Fundamentals/Devics & Matrls
- 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
- 2 Professional

---

### PLEASE NOTE:

- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C− or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to: [http://www.ece.ucsd.edu/undergraduate/ee-electives](http://www.ece.ucsd.edu/undergraduate/ee-electives)
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.
### MAJOR REQUIREMENTS

#### Lower Division Requirements

<table>
<thead>
<tr>
<th>FALL QUARTER</th>
<th>WINTER QUARTER</th>
<th>SPRING QUARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 18</td>
<td>MATH 20A</td>
<td>MATH 20B</td>
</tr>
<tr>
<td>ECE 5 or CHEM 6A</td>
<td>CHEM 6A or ECE 5</td>
<td>PHYS 2A</td>
</tr>
<tr>
<td>ECE 15</td>
<td>ECE 25</td>
<td>ECE 30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 20C</td>
<td>MATH 20D</td>
<td>MATH 20E</td>
</tr>
<tr>
<td>PHYS 2B</td>
<td>PHYS 2C</td>
<td>PHYS 2D</td>
</tr>
<tr>
<td>ECE 35</td>
<td>ECE 45</td>
<td>ECE 65</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 100</td>
<td>ECE 102</td>
<td>ECE 107</td>
</tr>
<tr>
<td>ECE 101</td>
<td>ECE 109</td>
<td>Tech. Elective 2</td>
</tr>
<tr>
<td>ECE 103</td>
<td>Tech. Elective 1</td>
<td>Prof. Elective 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 135A</td>
<td>ECE 135B</td>
<td>ECE 136L</td>
</tr>
<tr>
<td>Tech. Elective 3</td>
<td>ECE 183</td>
<td>Design</td>
</tr>
<tr>
<td>Prof. Elective 2</td>
<td>Tech. Elective 4</td>
<td></td>
</tr>
</tbody>
</table>

#### Upper Division Requirements

**BREADTH**
- ECE 100 Linear Electronic Systems
- ECE 101 Linear Systems Fundamentals
- ECE 102 Intro Active Circuit Design
- ECE 103 Fundamentals/Devices & Matrils
- 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

**ELECTIVES**
- 4 Technical
- 2 Professional

**PLEASE NOTE:**
- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to:
  - http://www.ece.ucsd.edu/undergraduate/ee-ep-electives
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.
# ELECTRICAL ENGINEERING MAJOR
## Machine Learning & Controls Depth Suggested Freshman Plan
### 2017-2018

### Machine Learning & Controls Depth

<table>
<thead>
<tr>
<th>FALL QUARTER</th>
<th>WINTER QUARTER</th>
<th>SPRING QUARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 18</td>
<td>MATH 20A</td>
<td>MATH 20B</td>
</tr>
<tr>
<td>ECE 5 or CHEM 6A</td>
<td>CHEM 6A or ECE 5</td>
<td>PHYS 2A</td>
</tr>
<tr>
<td>ECE 15</td>
<td>ECE 25</td>
<td>ECE 30</td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 20C</td>
<td>MATH 20D</td>
<td>MATH 20E</td>
</tr>
<tr>
<td>PHYS 2B</td>
<td>PHYS 2C</td>
<td>PHYS 2D</td>
</tr>
<tr>
<td>ECE 35</td>
<td>ECE 45</td>
<td>ECE 65</td>
</tr>
<tr>
<td><strong>Year 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 100</td>
<td>ECE 107</td>
<td>ECE 171A</td>
</tr>
<tr>
<td>ECE 101</td>
<td>ECE 109</td>
<td>Prof. Elective 1</td>
</tr>
<tr>
<td>Tech. Elective 1</td>
<td>Tech. Elective 2</td>
<td>Tech. Elective 3</td>
</tr>
<tr>
<td><strong>Year 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 171B*</td>
<td>ECE 172A*</td>
<td>ECE 175B*</td>
</tr>
<tr>
<td>ECE 174</td>
<td>ECE 175A</td>
<td>Tech. Elective 6</td>
</tr>
<tr>
<td>Prof. Elective 2</td>
<td>Tech. Elective 4</td>
<td>Design</td>
</tr>
<tr>
<td>Tech. Elective 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MAJOR REQUIREMENTS

#### Lower Division Requirements
- CHEM 6A General Chemistry I
- PHYS 2A Mechanics
- PHYS 2B Electricity and Magnetism
- PHYS 2C Flu.,Wav.,Thrm.dyn.,Optics
- PHYS 2D Relativity & Quantum
- MATH 18 Linear Algebra
- MATH 20A Calculus I
- MATH 20B Calculus II
- MATH 20C Calculus III
- MATH 20D Differential Equations
- MATH 20E Vector Calculus

#### 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

### PLEASE NOTE:
- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to: http://www.ece.ucsd.edu/undergraduate/ee-ep-electives
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.
Photonics Depth

FALL QUARTER | WINTER QUARTER | SPRING QUARTER
--- | --- | ---
Year 1 | MATH 18 | MATH 20A | MATH 20B
| ECE 5 or CHEM 6A | CHEM 6A or ECE 5 | PHYS 2A
| ECE 15 | ECE 25 | ECE 30

Year 2 | MATH 20C | MATH 20D | MATH 20E
| PHYS 2B | PHYS 2C | PHYS 2D
| ECE 35 | ECE 45 | ECE 65

Year 3 | ECE 100 | ECE 107 | ECE 181
| ECE 101 | ECE 109 | Tech. Elective 2
| ECE 103 | Tech. Elective 1 | Prof. Elective 1

Year 4 | ECE 182 | ECE 183 | ECE 185*
| Tech. Elective 3 | ECE 184* | Tech. Elective 5
| Prof. Elective 2 | Tech. Elective 4 | Design

PLEASE NOTE:
- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to: [http://www.ece.ucsd.edu/undergraduate/ee-ep-electives](http://www.ece.ucsd.edu/undergraduate/ee-ep-electives)
- For personalized course plans, please set up an appointment with an advisor.
- Due to six different college requirements, only major requirements are listed.
### MAJOR REQUIREMENTS

#### Lower Division Requirements

- CHEM 6A General Chemistry I
- PHYS 2A Mechanics
- PHYS 2B Electricity and Magnetism
- PHYS 2C Flu, Wav, Thmdyn, Optics
- MATH 18 Linear Algebra
- MATH 20A Calculus I
- MATH 20B Calculus II
- MATH 20C Calculus III
- MATH 20D Differential Equations
- MATH 20E Vector Calculus

#### Upper Division Requirements

- 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

### Signal & Image Processing Depth

<table>
<thead>
<tr>
<th>FALL QUARTER</th>
<th>WINTER QUARTER</th>
<th>SPRING QUARTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 18</td>
<td>MATH 20A</td>
<td>MATH 20B</td>
</tr>
<tr>
<td>ECE 5 or CHEM 6A</td>
<td>CHEM 6A or ECE 5</td>
<td>PHYS 2A</td>
</tr>
<tr>
<td>ECE 15</td>
<td>ECE 25</td>
<td>ECE 30</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 20C</td>
<td>MATH 20D</td>
<td>MATH 20E</td>
</tr>
<tr>
<td>PHYS 2B</td>
<td>PHYS 2C</td>
<td>PHYS 2D</td>
</tr>
<tr>
<td>ECE 35</td>
<td>ECE 45</td>
<td>ECE 65</td>
</tr>
<tr>
<td>Year 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 100</td>
<td>ECE 107</td>
<td>Prof. Elective 1</td>
</tr>
<tr>
<td>ECE 101</td>
<td>ECE 109</td>
<td>Tech. Elective 3</td>
</tr>
<tr>
<td>Tech. Elective 1</td>
<td>Tech. Elective 2</td>
<td>Tech. Elective 4</td>
</tr>
<tr>
<td>Year 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECE 153</td>
<td>ECE 161B</td>
<td>ECE 161C</td>
</tr>
<tr>
<td>ECE 161A</td>
<td>Tech. Elective 5</td>
<td>Design</td>
</tr>
<tr>
<td>Prof. Elective 2</td>
<td>Tech. Elective 6</td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE NOTE:**
- All courses used to satisfy major requirements must be taken for a LETTER GRADE and completed with a C– or better.
- Depth courses are offered only once a year. Course offerings are subject to change.
- For a list of acceptable electives, go to: [http://www.ece.ucsd.edu/undergraduate/ee-ep-electives](http://www.ece.ucsd.edu/undergraduate/ee-ep-electives)
- For personalized course plans, please set up an appointment with an advisor.
- **Due to six different college requirements, only major requirements are listed.**