

# Course road map for electrical engineering majors

## First-year courses

### Autumn semester

<b>Required core courses</b> .....	<b>Credits</b>
Fundamentals of Engineering I ( <b>ENGR 1181</b> ).....	2
Calculus I ( <b>MATH 1151</b> ).....	5
General Chemistry for Engineers ( <b>CHEM 1250</b> ).....	4
Engineering Survey ( <b>ENGR 1100</b> ) .....	1
<b>General education courses</b> .....	<b>Credits</b>
One elective from general education.....	3
<b>Total credit hours</b> .....	<b>15</b>

### Spring semester

<b>Required core courses</b> .....	<b>Credits</b>
Fundamentals of Engineering II ( <b>ENGR 1182</b> ).....	2
Engineering Mathematics ( <b>MATH 1172</b> ) .....	5
Mechanics, Thermal Physics, Waves ( <b>PHYS 1250</b> ) ...	5
Intro to Computer Programming C++ ( <b>ENGR 1222</b> )...3	
<b>General education courses</b> .....	<b>Credits</b>
One elective from general education.....	3
<b>Total credit hours</b> .....	<b>18</b>

## Second-year courses

### Autumn semester

<b>Required core courses</b> .....	<b>Credits</b>
E&M, Optics, Modern Physics ( <b>PHYS 1251</b> ).....	5
Linear Algebra ( <b>MATH 2568</b> ).....	3
Introduction to ECE ( <b>ECE 2000</b> ) .....	4
<b>General education courses</b> .....	<b>Credits</b>
One elective from general education.....	3
<b>Total credit hours</b> .....	<b>15</b>

### Spring semester

<b>Required core courses</b> .....	<b>Credits</b>
Diff. Equations & Complex Math ( <b>MATH 2415</b> ).....	3
Introduction to ECE II ( <b>ECE 2100</b> ) .....	4
Intro. to Microcontroller-Based Systems ( <b>ECE 2560</b> ) ...	2
Semiconductor Electronic Devices ( <b>ECE 3030</b> ) .....	3
<b>General education courses</b> .....	<b>Credits</b>
Two electives from general education.....	6
<b>Total credit hours</b> .....	<b>18</b>

## Third-year courses

### Autumn semester

<b>Required core courses</b> .....	<b>Credits</b>
Intro to Probability and Statistics ( <b>STAT 3470</b> ).....	3
Intro to Radio Freq. and Optical Eng. ( <b>ECE 3010</b> ).....	3
Intro to Electronics ( <b>ECE 3020</b> ) .....	3
Signals and Systems ( <b>ECE 3050</b> ) .....	3
<b>General education courses</b> .....	<b>Credits</b>
One elective from general education.....	3
<b>Total credit hours</b> .....	<b>15</b>

### Spring semester

<b>Required core courses</b> .....	<b>Credits</b>
Sustainable Energy & Power Systems I ( <b>ECE 3040</b> ).....	3
<b>ECE elective courses</b> .....	<b>Credits</b>
Technical or directed electives ( <b>view</b> ) .....	7
<b>General education courses</b> .....	<b>Credits</b>
Two electives from general education.....	6
<b>Total credit hours</b> .....	<b>16</b>

## Fourth-year courses

### Autumn semester

<b>Required core courses</b> .....	<b>Credits</b>
Engineering Economics ( <b>ISE 2040</b> ) .....	2
Ethics and Professionalism ( <b>ECE 3080</b> ).....	1
Technical Writing and Presentations ( <b>ECE 3090</b> ).....	1
<b>ECE elective courses</b> .....	<b>Credits</b>
Technical or directed electives ( <b>view</b> ) .....	12
<b>Total credit hours</b> .....	<b>16</b>

### Spring semester

<b>Required core courses</b> .....	<b>Credits</b>
Capstone Design ( <b>ECE 4900</b> ).....	3
<b>ECE elective courses</b> .....	<b>Credits</b>
Technical or directed electives ( <b>view</b> ) .....	12
<b>Total credit hours</b> .....	<b>15</b>

# Technical/Directed Electives by Area of Focus

Students are required to take 31 elective hours, including 16 hours from focused ECE domains. Of those 16 elective hours, six hours must be from one of the following domains and at least three hours must come from each of two other domains. At least one of these electives must be a 5000-level course and at least two electives must be labs.

## Communication & Digital Signal Processing

- ECE elective courses..... Credits**
- Intro to Analog and Digital Comm (ECE 5000).....3
  - Intro to Wireless Networking (ECE 5101).....3
  - Intro to Digital Signal Processing (ECE 5200).....3
  - Medical Imaging and Processing (ECE 5206).....3
  - Instrumentation, Signals, Controls  
in Transportation Applications (ECE 5400).....3
- Laboratories ..... Credits**
- Communication Lab (ECE 4007).....0.5
  - Real-time Digital Signal Processing Lab (ECE 4207)....0.5

## Electronics

- ECE elective courses..... Credits**
- Mixed Signal VLSI (ECE 5020).....3
  - Analog Integrated Circuits (ECE 5021).....3
  - Radio Frequency Integrated Circuits (ECE 5022).....3
  - Intro to Integrated Circuits Test  
& Measurement (ECE 5120).....3
- Laboratories ..... Credits**
- Electronics Lab (ECE 3027).....0.5
  - Microwave Electronics (ECE 5027).....4

## Solid State Electronics & Photonics

- ECE elective courses..... Credits**
- Semiconductor Process Technology (ECE 5031).....3
  - Surfaces & Interfaces in Electronic Mats. (ECE 5033).....3
  - Lasers (ECE 5131).....3
  - Photonics (ECE 5132).....3
  - Fund. of Semiconductors for Microelectronics  
and Photonics (ECE 5530).....3
  - Fund. of Semiconductor Devices (ECE 5531).....3
  - Nanofabrication & Nanoscale Devices (ECE 5532)....3
- Laboratories ..... Credits**
- Solid State Microelectronics Lab (ECE 5037).....4
  - Photonics Lab (ECE 5137).....0.5
  - Photovoltaics Lab (ECE 5237).....3

## Computers

- ECE elective courses..... Credits**
- Advanced Digital Design (ECE 3561).....3
  - Computer Architecture & Design (ECE 5362).....3
  - Image Processing (ECE 5460).....3
  - HDL Design & Verification (ECE 5462).....3
  - Intro to Real-Time Robotic Systems (ECE 5463).....3
  - Advanced Microcomputers (ECE 5465).....3
- Laboratories ..... Credits**
- Microcomputer Lab (ECE 3567).....1
  - Firmware Dev. for Imbedded Systems (ECE 5467).....3

## Electromagnetics

- ECE elective courses..... Credits**
- Wireless Propagation & Remote Sensing (ECE 5010)....3
  - Antennas (ECE 5011).....3
  - Integrated Optics (ECE 5012).....3
  - Intro to Radar Systems (ECE 5013).....3
  - Intro to Computational Electromagnetics (ECE 5510)....3
  - Nonlinear Optics (ECE 5511).....3
- Laboratories ..... Credits**
- Microwave Engineering (ECE 5017).....4

## Sustainable Energy & Power Systems

- ECE elective courses..... Credits**
- Power Electronics: Devices, Ciccuits  
& Applications (ECE 5025).....3
  - Electric Machines (ECE 5041).....3
  - Power Systems (ECE 5042).....3
  - Sustainable Energy & Power Systems II (ECE 5541).....3
- Laboratories ..... Credits**
- Sustainable Energy & Energy Conversion  
Lab (ECE 3047).....1
  - High Voltage Engineering & Lab (ECE 5047).....3
  - Power Electronics Lab (ECE 5127).....1

## Control

- ECE elective courses..... Credits**
- Intro to Feedback Control Systems (ECE 3551).....3
  - State-Space Control Systems (ECE 5551).....3
  - Autonomy in Vehicles (ECE 5553).....3
  - Powertrain Control Systems (ECE 5554).....3
  - Linear Systems Theory (ECE 5750).....3
  - Nonlinear Systems Theory (ECE 5754).....3
  - Optimization for Static & Dynamic Syst. (ECE 5759).....3
- Laboratories ..... Credits**
- Control Systems Lab (ECE 3557).....1
  - Control System Implementation Lab (ECE 5557).....1