BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING, COMPUTER/DIGITAL TRACK

Through the Electrical Engineering program at Youngstown State University, you'll develop competency in all aspects of electrical engineering and its related fields. You'll take coursework anchored in engineering, math and physics that will allow you to solve complex problems and design intricate systems. Along the way, you'll also refine your communication skills and learn how to ethically and responsibly deploy your engineering skills.

Electrical engineers have homes in a large assortment of industries, from power generation and automotive manufacturing to biomedical development and consumer product design. You may even find yourself using your engineering expertise to serve your country in the military.

With your bachelor’s degree in hand, you'll be the person advancing the products and systems that advance society.

MAJOR

Design projects, computer simulation and hands-on laboratory sessions are the pillars of the Electrical Engineering major at YSU. Students enrolled in the program may choose from three options that prepare graduates for a large variety of professional positions or advanced studies:

- Traditional Option (https://ysu.edu/academics/science-technology-engineering-mathematics/electrical-engineering-major/#panel0)
- Computer/Digital Option (https://ysu.edu/academics/science-technology-engineering-mathematics/electrical-engineering-major/#panel1)
- Biomedical Option (https://ysu.edu/academics/science-technology-engineering-mathematics/electrical-engineering-major/#panel2)

COURSE | TITLE | S.H.
--- | --- | ---
FIRST YEAR REQUIREMENT - STUDENT SUCCESS
YSU 1500 | Success Seminar | 1-2
or SS 1500 | Strong Start Success Seminar | 1
or HONR 1500 | Intro to Honors | 1

General Education Requirements

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|ENGL 1550 | Writing 1 | 3-4
|ENGL 1549 | Writing 1 with Support | 3
|ENGR 1551 | Writing 2 | 3
|CMST 1545 | Communication Foundations | 3
|CHEM 1515 | General Chemistry 1 Laboratory | 4
|CHEM 1515L | General Chemistry 1 Laboratory | 4

|PHYS 2610 | General Physics 1 | 5
|PHYS 2610L | General Physics Laboratory 1 Lecture is 4 s.h lab is 1 s.h | 5
|PHIL 2626 | Engineering Ethics | 3
|Arts and Humanities (1 course) | | 3
|Social Science (1 course) | | 3
|ECON 2610 | Principles I: Microeconomics | 3
|Social and Personal Awareness (2 courses) | | 6

Major Requirements

|ECEN 1521 | Digital Circuits & 1521L | 4
|ECEN 2611 | Instrumentation and Computation Lab 1 | 1
|ECEN 2612 | Instrumentation and Computation Lab 2 | 1
|ECEN 2631 | Basic Circuit Theory 1 | 3
|ECEN 2633 | Basic Circuit Theory 2 | 3

ECEN 3710 | Signals and Systems | 3
ECEN 3711 | Intermediate Laboratory 1 | 1
ECEN 3712 | Intermediate Laboratory 2 | 1
ECEN 3733 | Digital Circuit Design | 3
ECEN 3741 | Electromagnetic Fields 1 | 3
ECEN 3742 | Electromagnetic Fields 2 | 3
ECEN 3771 | Digital and Analog Circuits 1 | 3
ECEN 4803 | Linear Control Systems | 4
ECEN 4811 | Senior Laboratory | 1
ECEN 4844 | Electromagnetic Energy Conversion | 3
ECEN 4899 | Senior Design Project | 4

Computer Engineering/Science

|CSIS 2610 | Programming and Problem-Solving | 4
|CSIS 3700 | Data Structures and Objects | 4
|ECEN 3734 | Computer Design | 3
|ENGR 1500 | Engineering Orientation | 1
|ENGR 1550 | Engineering Concepts | 2
|ENGR 1560 | Engineering Computing | 2
MECH 2620 | Statics and Dynamics | 3
isen 3710 | Engineering Statistics | 3

CSCI/ECEN Electives

Select 8 s.h. of approved CSCI/ECEN electives.

Science

|PHYS 3705 | Thermodynamics and Classical Statistical Dynamics | 3
Math Minor - one course counts toward Gen Ed

|MATH 1571 | Calculus 1 | 4
|MATH 1572 | Calculus 2 | 4
|MATH 2673 | Calculus 3 | 4
|MATH 3705 | Differential Equations | 3
|MATH 3715 | Discrete Mathematics | 3

Total Semester Hours 129-131

Year 1

<table>
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<th>Semester Hours</th>
<th>15-16</th>
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<td>Fall</td>
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|YSU 1500 | Success Seminar | 1
|MATH 1571 | Calculus 1 | 4
|ENGR 1500 | Engineering Orientation | 1
|ENGR 1550 | Engineering Concepts | 2
|CHEM 1515 & 1515L | General Chemistry 1 Laboratory | 4
|ENGR 1550 | Writing 1 | 3-4
|or ENGL 1549 | Writing 1 with Support | 3

Spring

|MATH 1572 | Calculus 2 | 4
|ENGR 1560 | Engineering Computing | 2
|ECEN 1521 & 1521L | Digital Circuits and Digital Circuits Laboratory | 4
|ENGL 1551 | Writing 2 | 3
|CMST 1545 | Communication Foundations | 3

Year 2

<table>
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<th>Semester Hours</th>
<th>16</th>
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|MATH 2673 | Calculus 3 | 4
|ECEN 2632 | Basic Circuit Theory 1 | 3
|ECEN 2611 | Instrumentation and Computation Lab 1 | 1
PHYS 2610 & 2610L  
General Physics 1 and General Physics Laboratory 1  
5  
General Education Requirement  
3  
Semester Hours  
16  
Spring  
MATH 3705  
Differential Equations  
3  
ECEN 2633  
Basic Circuit Theory 2  
3  
MATH 3715  
Discrete Mathematics  
3  
ECEN 2612  
Instrumentation and Computation Lab 2  
1  
MECH 2620  
Statics and Dynamics  
3  
General Education Requirement  
3  
Semester Hours  
16  
Year 3  
Fall  
ECEN 3711  
Intermediate Laboratory 1  
1  
ECEN 3733  
Digital Circuit Design  
3  
ECEN 3741  
Electromagnetic Fields 1  
3  
ECEN 3771  
Digital and Analog Circuits 1  
3  
CSIS 2610  
Programming and Problem-Solving  
4  
ISEN 3710  
Engineering Statistics  
3  
Semester Hours  
17  
Spring  
ECEN 3712  
Intermediate Laboratory 2  
1  
ECEN 3710  
Signals and Systems  
3  
ECEN 3734  
Computer Design  
3  
ECEN 3742  
Electromagnetic Fields 2  
3  
ECEN 4844  
Electromagnetic Energy Conversion  
3  
CSIS 3700  
Data Structures and Objects  
4  
Semester Hours  
17  
Year 4  
Fall  
ECEN 4803 & 4803L  
Linear Control Systems and Linear Control Systems Laboratory  
4  
ECEN 4811  
Senior Laboratory  
1  
CSCI/ECEN Elective  
4  
PHYS 3705  
Thermodynamics and Classical Statistical Dynamics  
3  
ECON 2610  
Principles 1: Microeconomics  
3  
Semester Hours  
15  
Spring  
ECEN 4899  
Senior Design Project  
4  
PHIL 2626  
Engineering Ethics  
3  
CSCI/ECEN Elective  
4  
General Education Requirement  
3  
General Education Requirement  
3  
Semester Hours  
17  
Total Semester Hours  
129-130  

**Student Outcomes**

The following (1 through 7) Student Outcomes support the program educational objectives. Attainment of these outcomes by students by the time of their graduation prepares graduating students to enter the professional practice of engineering.

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3. An ability to communicate effectively with a range of audiences.

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.