

BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING, TRADITIONAL 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 simulations, 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 or SS 1500 or HONR 1500 | Success Seminar Strong Start Success Seminar Intro to Honors | 1-2 |
| General Education Requirements | | |
| ENGL 1550 or ENGL 1549 | Writing 1 Writing 1 with Support | 3-4 |
| ENGL 1551 | Writing 2 | 3 |
| CMST 1545 | Communication Foundations | 3 |
| Gen Ed Math met in major | | |
| Natural Science (7 s.h.) | | |
| CHEM 1515 | General Chemistry 1 | 3 |
| CHEM 1515L | General Chemistry 1 Laboratory | 1 |
| PHYS 2610 | General Physics 1 | 4 |
| PHYS 2610L | General Physics Laboratory 1 | 1 |
| Arts and Humanities (6 s.h. select one course) | | |
| PHIL 2626 | Engineering Ethics | 3 |
| Social Science (6 s.h. select one course) | | |
| ECON 2610 | Principles 1: Microeconomics | 3 |
| Social and Personal Awareness (6 s.h. select 2 courses) | | |
| Major Requirements | | |
| ECEN 1521 | Digital Circuits | 3 |
| ECEN 1521L | Digital Circuits Laboratory | 1 |
| ECEN 2611 | Instrumentation and Computation Lab 1 | 1 |
| ECEN 2612 | Instrumentation and Computation Lab 2 | 1 |
| ECEN 2632 | Basic Circuit Theory 1 | 3 |

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|------------|---|---|
| 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 3772 | Digital and Analog Circuits 2 | 3 |
| ECEN 4803 | Linear Control Systems | 3 |
| ECEN 4803L | Linear Control Systems Laboratory | 1 |
| ECEN 4811 | Senior Laboratory | 1 |
| ECEN 4844 | Electromagnetic Energy Conversion | 3 |
| ENGR 1500 | Engineering Orientation | 1 |
| ECEN 4899 | Senior Design Project | 3 |
| ECEN 4899L | Senior Design Project Lab | 1 |
| ENGR 1550 | Engineering Concepts | 2 |
| ENGR 1560 | Engineering Computing | 2 |
| MECH 2620 | Statics and Dynamics | 3 |
| ISEN 2610 | Engineering Statistics | 3 |
| PHYS 3705 | Thermodynamics and Classical Statistical Dynamics | 3 |
| CSIS 2610 | Programming and Problem-Solving | 3 |
| CSIS 2610L | Programming and Problem-Solving Lab | 1 |

ECEN Electives/Internship -Students have the option of one of the following:

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|--|---|
| 9 s.h. of ECEN Electives or (6) ECEN elective hours + (3) STEM internship credits or (3) ECEN elective hours + (6) STEM internship credits | 9 |
|--|---|

Mathematics Minor -one course counts toward Gen Ed

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|-----------|---|---|
| MATH 1571 | Calculus 1 | 4 |
| MATH 1572 | Calculus 2 | 4 |
| MATH 2673 | Calculus 3 | 4 |
| MATH 3705 | Differential Equations | 3 |
| MATH 3718 | Linear Algebra and Discrete Mathematics for Engineers | 3 |

Total Semester Hours 126-128

Course List

Year 1

| Fall | S.H. | |
|--|--|-----|
| YSU 1500 or SS 1500 or HONR 1500 | Success Seminar or Strong Start Success Seminar or Intro to Honors | 1-2 |
| MATH 1571 | Calculus 1 | 4 |
| ENGR 1500 | Engineering Orientation | 1 |
| ENGR 1550 | Engineering Concepts | 2 |
| CHEM 1515 & 1515L | General Chemistry 1 and General Chemistry 1 Laboratory | 4 |
| ENGL 1550 or ENGL 1549 | Writing 1 or Writing 1 with Support | 3-4 |

Semester Hours 15-17

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 |

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|-----------------------|---------------------------|-----------|
| CMST 1545 | Communication Foundations | 3 |
| Semester Hours | | 16 |

Year 2**Fall**

| | | |
|-------------------------------|--|-----------|
| 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 |
| MATH 3718 | Linear Algebra and Discrete Mathematics for Engineers | 3 |
| ECEN 2633 | Basic Circuit Theory 2 | 3 |
| ECEN 2612 | Instrumentation and Computation Lab 2 | 1 |
| MECH 2620 | Statics and Dynamics | 3 |
| CSIS 2610 | Programming and Problem-Solving | 3 |
| CSIS 2610L | Programming and Problem-Solving Lab | 1 |
| Semester Hours | | 17 |

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 |
| PHIL 2626 | Engineering Ethics | 3 |
| ISEN 2610 | Engineering Statistics | 3 |
| Semester Hours | | 16 |

Spring

| | | |
|-----------------------|-----------------------------------|-----------|
| ECEN 3712 | Intermediate Laboratory 2 | 1 |
| ECEN 3710 | Signals and Systems | 3 |
| ECEN 3742 | Electromagnetic Fields 2 | 3 |
| ECEN 3772 | Digital and Analog Circuits 2 | 3 |
| ECEN 4844 | Electromagnetic Energy Conversion | 3 |
| ECON 2610 | Principles 1: Microeconomics | 3 |
| Semester Hours | | 16 |

Year 4**Fall**

| | | |
|-------------------------------|--|-----------|
| ECEN 4803 & 4803L | Linear Control Systems and Linear Control Systems Laboratory | 4 |
| ECEN 4811 | Senior Laboratory | 1 |
| ECEN elective | | 3 |
| ECEN elective | | 3 |
| PHYS 3705 | Thermodynamics and Classical Statistical Dynamics | 3 |
| General Education Requirement | | 3 |
| Semester Hours | | 17 |

Spring

| | | |
|-------------------------------|---------------------------|---|
| ECEN Elective | | 3 |
| ECEN 4899 | Senior Design Project | 3 |
| ECEN 4899L | Senior Design Project Lab | 1 |
| General Education Requirement | | 3 |

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|-------------------------------|----------------|
| General Education Requirement | 3 |
| Semester Hours | 13 |
| Total Semester Hours | 126-128 |

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.