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

General Education Requirements
ENGL 1550 | Writing 1 | 3-4
or ENGL 1549 | Writing 1 with Support | 
ENGL 1551 | Writing 2 | 3
CMST 1545 | Communication Foundations | 3

Gen Ed Math met through major
Natural Science Gen Ed (9 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.)
Arts and Humanities (select 1 course) | 3
PHIL 2626 | Engineering Ethics | 3
Social Science (6 s.h.)
Social Science (select 1 course) | 3
ECON 2610 | Principles 1: Microeconomics | 3
Social and Personal Awareness (6 s.h.) | 6

Major Requirements
ECEN 1521 | Digital Circuits | 4
& 1521L | Digital Circuits Laboratory Lecture is 3 sh lab is 1 sh
ECEN 2611 | Instrumentation and Computation Lab 1 | 1
ECEN 2612 | Instrumentation and Computation Lab 2 | 1
ECEN 2632 | 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 & 4803L | 4
ECEN 4811 | Senior Laboratory | 1
ECEN 4844 | Electromagnetic Energy Conversion | 3
ECEN 4899 | Senior Design Project | 3
ECEN 4899L | Senior Design Project Lab | 1

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

CSCI/ECEN Electives
Select 8 s.h. of 3700 level or higher CSCI/ECEN electives. | 8

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 3718 | Linear Algebra and Discrete Mathematics for Engineers | 3

Total Semester Hours | 129-131

Year 1

**Fall** | **S.H.**
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YSU 1500 | Success Seminar | 1-2
or SS 1500 | Strong Start Success Seminar | 
or HONR 1500 | Intro to Honors | 
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 | Writing 1 | 3-4
or ENGL 1549 | Writing 1 with Support | 

Semester Hours | 15-17

Spring

MATH 1572 | Calculus 2 | 4
ENGR 1560 | Engineering Computing | 2
ECEN 1521 | Digital Circuits | 4
& 1521L | Digital Circuits Laboratory | 
ENGL 1551  Writing 2  3
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  General Physics 1
& 2610L  General Physics Laboratory 1  5
General Education Requirement  3

Semester Hours  17

Spring
MATH 3705  Differential Equations  3
ECEN 2633  Basic Circuit Theory 2  3
MATH 3718  Linear Algebra and Discrete Mathematics for Engineers  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  3
CSIS 2610L  Programming and Problem-Solving Lab  1
ISEN 2610  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  3
CSIS 3700L  Data Structures and Objects Lab  1

Semester Hours  17

Year 4
Fall
ECEN 4803  Linear Control Systems
& 4803L  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  3
ECEN 4899L  Senior Design Project Lab  1
PHIL 2626  Engineering Ethics  3
CSCI/ECEN Elective  4
General Education Requirement  3

General Education Requirement  3

Semester Hours  17

Total Semester Hours  129-131

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.