ELECTRICAL ENGINEERING COMPUTER DIGITAL 4+1 GRADUATE 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	Success Seminar	1-2
or YSU 1500S	Youngstown State University 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
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
General Education Elective (9 s.h. select 2 courses)		6
CMST 1545	Communication Foundations	3
Major Requirements		
ECEN 1521 & 1521L	Digital Circuits and Digital Circuits Laboratory Lecture is 3 sh lab is 1 sh	4
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 & 4803L	Linear Control Systems and Linear Control Systems Laboratory	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
Dual Credit Requirements		
Select 9 s.h. of 5800 or 6900 level or higher CSCI/ECEN electives below		9
ECEN 5800	Special Topics	
ECEN 5808	Advanced Signals and Systems	
ECEN 5830	Digital Signal Processing	
ECEN 5835	Computer Architecture with VHDL	
ECEN 5840	Electric Power Systems	
ECEN 5860	Fundamental of Antenna Design and Application	
ECEN 5890	Power Electronics	
ECEN 6900	Seminar	
ECEN 6901	Control Systems 1	
ECEN 6902	Control Systems 2	
ECEN 6933	Digital Systems: VHDL Design	
ECEN 6934	Digital Systems: Computer Arithmetic	
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		**130-132**

Dual Credit Requirements

Accelerated 4+1 Program

Undergraduate Electrical Engineering students can apply for admission into the accelerated 4+1 MSE in Electrical Engineering graduate program after completing 78 undergraduate semester hours with a GPA of 3.3 or higher. After

being admitted to the accelerated 4+1 MSE program, students will be allowed a maximum of nine semester hours of graduate coursework, specified as 5000 level or higher, to be double counted toward both a bachelor's and master's degrees. The courses chosen to count for both undergraduate and graduate coursework must be approved by the Graduate Program Director. An additional three hours of graduate coursework can be completed as an undergraduate and used exclusively for graduate credit. This allows the student to graduate with a master's degree with one year of additional full-time study beyond the bachelor's degree, as the total hours counted towards the Master's degree is greater than or equal to 30 hours.

Courses Counting Towards Requirements

Select 3 of these courses, as only 3 can be double counted. Can select a 4th that would only count for the Master's degree.

Year 1

Fall

		S.H.
YSU 1500 or YSU 1500S or HONR 1500	Success Seminar or Youngstown State University 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
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
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 & 4803L	Linear Control Systems and Linear Control Systems Laboratory	4
ECEN 4811	Senior Laboratory	1
CSCI/ECEN Elective		6
PHYS 3705	Thermodynamics and Classical Statistical Dynamics	3
ECON 2610	Principles 1: Microeconomics	3
	Semester Hours	**17**

Spring

ECEN 4899	Senior Design Project	3
ECEN 4899L	Senior Design Project Lab	1
PHIL 2626	Engineering Ethics	3
CSCI/ECEN Elective		3
General Education Requirement		3
General Education Requirement		3
	Semester Hours	**16**
	Total Semester Hours	**130-132**

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.