

ELECTRICAL ENGINEERING

Home Department: Electrical and Computer Engineering

Department Head:

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Program Overview

Electrical Engineering is a broad engineering discipline that integrates mathematical and scientific principles of electricity and magnetism to analyze electrical phenomena and to design electrical systems. The Electrical Engineering program prepares students for a wide range of careers involving design and implementation of electrical systems.

The Electrical Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET.

Program Educational Objectives

The Electrical Engineering Program is designed to provide its graduates a solid educational foundation on which they can build successful and sustainable careers in electrical engineering or a related field. In particular, graduates of the Electrical Engineering Program will:

- Be employed or pursuing an advanced degree in the field of electrical engineering or other related disciplines.
- Be productive members of interdisciplinary teams.
- Assume leadership positions in their industry, their continuing education, or in their communities, as their careers develop.
- Continue their professional development and engage in the life-long learning necessary for a sustainable career.

The Electrical Engineering program is designed to meet its objectives through its curriculum, experiential learning including cooperative education, and co-curricular activities sponsored by the department and the university.

The curriculum includes a strong sequence of mathematics and basic science courses that provides the solid foundation in these areas that is common to all engineering programs at Kettering University. Engineering design and basic engineering concepts from a variety of disciplines are introduced in the freshman year in IME-100. Basic and practical computer programming and problem solving is introduced, also in the freshman year, in ECE-101.

The “core” curriculum includes fundamental courses in electrical circuits, electronics, electrical signals and systems, electromagnetic fields and waves, digital systems, and embedded computer systems. Fully half of the courses in the core curriculum include a strong laboratory experience, which both enhances students’ learning and hones their abilities to apply technology effectively in the workplace. A flexible selection of electives allow students to deepen their knowledge in specific areas or applications of electrical engineering, or to broaden their background through dual majors or minors, or simply well chosen combinations of courses that meet their individual educational goals.

The culminating experience in the curriculum takes place in EE-490, which gives students experience working in a team environment to complete a large engineering project that builds on the knowledge and skills they have gained in their coursework.

The curriculum is supported by modern lab facilities for analog and digital circuits and electronics, electrical machines, power electronics, control systems, high-voltage studies, virtual reality systems, and embedded computer systems.

BS/MASTERS PATHWAY

Undergraduate students also have an opportunity to get their bachelor's and master's degrees in five years with the BS/MASTERS Pathway.

Electrical Engineering Program Curriculum Requirements

Code	Title	Credit Hours
First Year Experience		
CILE-101	First Year Foundations	1
General Education		
COMM-101	Rhetoric & Writing	4
ECON-201	Economic Principles	4
LA-201	Sophomore Seminar: Exploring the Human Condition	4
LA-489	Sr. Seminar: Leadership, Ethics	4
Advanced Humanities Electives ¹		8
Advanced Social Science Electives ¹		8
Total Credit Hours		33

¹ Humanities and Social Science advanced electives must be selected from approved 300 and 400 level courses.

Code	Title	Credit Hours
Mathematics and Basic Science		
CHEM-135 & CHEM-136	Principles of Chemistry and Principles of Chemistry Lab	4
MATH-101 or MATH-101X	Calculus I	4
MATH-102 or MATH-102X	Calculus II	4
MATH-203 or MATH-203X	Multivariate Calculus	4
MATH-204	Differential Equations & Laplace Transforms	4
MATH-258	Probability and Statistics	4
MATH-307	Matrix Algebra	4
PHYS-114 & PHYS-115	Newtonian Mechanics and Newtonian Mechanics Laboratory	4
PHYS-224 & PHYS-225	Electricity and Magnetism and Electricity and Magnetism Laboratory	4
Math/Science Elective		4
<i>Credit Hours Subtotal:</i>		40

Engineering Topics

CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
ECE-101	MATLAB and C Programming	4
EE-210 & EE-211	Circuits I and Circuits I Lab	4
EE-240	Electromagnetic Fields and Applications	4
EE-310	Circuits II	4
EE-320 & EE-321	Electronics I and Electronics I Laboratory	4
EE-336	Continuous-Time Signals and Systems	4
EE-338	Discrete-Time Signals and Systems	4
EE-432	Feedback Control Systems	4
EE-490	Senior Electrical Engineering Design Project	4
IME-100	Interdisciplinary Design and Manufacturing	4
Electrical Engineering Electives		8
Upper Level Electrical Engineering Elective (400 level)		4
Electrical or Computer Engineering Elective		4
<i>Credit Hours Subtotal:</i>		64
Electives		
Free Electives		8
Technical Electives		12
<i>Credit Hours Subtotal:</i>		20
Culminating Undergraduate Experience		
CILE-400 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion ²	4
Total Credit Hours		128

(Minimum) Total Credits Required for Program: 161

² Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Electives

Electrical Engineering Electives

An electrical engineering elective may be any course with an EE prefix, *except* EE-212. At least 4 credits of electrical engineering electives must be at the 400 level.

Electrical or Computer Engineering Electives

The electrical or computer engineering elective may be an electrical engineering elective or any course with a CE prefix.

Free Elective

COMM-435 and MATH-100 are NOT accepted for free elective credit.

Math/Science Elective

The math/science elective may be CS-211, or any course with a BIOL, CHEM, EP, MATH, PHYS prefix, *except* MATH-100 and EP-235.

Technical Electives

A technical elective may be any course with an BIOL, CE, CHEM, CHME, CS, EE, EP, IME, MATH, MECH or PHYS prefix, BUSN-303, BUSN-304, and MGMT-419, *except* EE-212, EP-235, and MATH-100,

Representative Program

Course	Title	Credit Hours
Freshman I		
CILE-101	First Year Foundations	1
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
COMM-101	Rhetoric & Writing	4
ECE-101	MATLAB and C Programming	4
MATH-101	Calculus I	4
Credit Hours		17
Freshman II		
ECON-201	Economic Principles	4
IME-100	Interdisciplinary Design and Manufacturing	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
Credit Hours		16
Sophomore I		
CE-210	Intro to Digital Systems Design	4
LA-201	Sophomore Seminar: Exploring the Human Condition	4
MATH-203	Multivariate Calculus	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
Credit Hours		16
Sophomore II		
EE-210	Circuits I	3
EE-211	Circuits I Lab	1
EE-240	Electromagnetic Fields and Applications	4
MATH-204	Differential Equations & Laplace Transforms	4
Advanced Humanities or Social Science Elective		4
Credit Hours		16
Junior I		
EE-310	Circuits II	4
EE-320	Electronics I	3
EE-321	Electronics I Laboratory	1
EE-336	Continuous-Time Signals and Systems	4
MATH-307	Matrix Algebra	4
Advanced Humanities or Social Science Elective		4
Credit Hours		20
Junior II		
CE-320	Intro to Microcomputers	4
EE-338	Discrete-Time Signals and Systems	4
MATH-258	Probability and Statistics	4

Advanced Humanities or Social Science Elective	4
Electrical Engineering Elective	4
Credit Hours	20
Senior I	
EE-432 Feedback Control Systems	4
Advanced Humanities or Social Science Elective	4
Electrical or Computer Engineering Elective	4
Math/Science Elective	4
Technical Elective	4
Credit Hours	20
Senior II	
LA-489 Sr. Seminar:Leadership, Ethics	4
Electrical Engineering Elective	4
Free Elective	4
Technical Elective	4
Credit Hours	16
Senior III	
EE-490 Senior Electrical Engineering Design Project	4
Free Elective	4
Upper Level Electrical Engineering Elective	4
Technical Elective	4
Credit Hours	16
Any Term	
CILE-400 Undergraduate Thesis Initiation & CILE-401 and Undergraduate Thesis Completion	4
Credit Hours	4
Total Credit Hours	161

(Minimum) Total Credits Required for Program: 161