ELECTRICAL ENGINEERING

Home Department: Electrical and Computer Engineering

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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 the 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 lifelong 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
200-level Liberal Arts Electives		8
LA-489	Sr. Seminar:Leadership, Ethics	4
Advanced Humanities Electives [1]		4
Advanced Social Science Electives [1]		4
Advanced Humanities or Social Science Elective [1]		4
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	Calculus I	4
or MATH-101X	Calculus I	
MATH-102	Calculus II	4
or MATH-102X	Calculus II	
MATH-203	Multivariate Calculus	4
or MATH-203X	Multivariate Calculus	
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
	Credit Hours Subtotal:	*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	Engineering Circuit Analysis 1	4
EE-240	Electromagnetic Fields and Applications	4
EE-310	Engineering Circuit Analysis II	4
EE-320	Introduction to Microelectronic Devices and Circuits	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
	Credit Hours Subtotal:	*64*
Electives		
Free Electives		8
Technical Electives		12
	Credit Hours Subtotal:	*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. 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, or PHYS prefix, *except* MATH-100 and EP-235.

Technical Electives

A technical elective may be any course numbered 200-level and above with a BIOL, CE, CHEM, CHME, CS, EE, IME, MATH, MECH, or PHYS prefix that is not used to complete core degree requirements. Additionally, CS-101, CS-102, BUSN-303, BUSN-304, and MGMT-419 also qualify as technical electives.

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
200-level Liberal Arts Elective		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	Engineering Circuit Analysis 1	4
EE-240	Electromagnetic Fields and Applications	4
200-level Liberal Arts Elective		4
MATH-204	Differential Equations & Laplace Transforms	4
	Credit Hours	**16**
Junior I		
EE-310	Engineering Circuit Analysis II	4
EE-320	Introduction to Microelectronic Devices and Circuits	4
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 & CILE-401	Undergraduate Thesis Initiation and Undergraduate Thesis Completion	4
	Credit Hours	**4**
	Total Credit Hours	**161**

(Minimum) Total Credits Required for Program: 161