

ENGINEERING

Program Director:

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Program Overview

The Bachelor of Science in Engineering program prepares students for careers in multidisciplinary engineering. The program includes a core set of engineering courses, which provides students with a foundation in Computer, Electrical, Industrial, and Mechanical Engineering principles. Students will then select one of the following application areas:

- Engineering Management
- Manufacturing Systems
- Mechatronics Systems
- Robotic Systems

The Bachelor of Science in Engineering program is new and not currently accredited by the Engineering Accreditation Commission of ABET. The program becomes eligible for ABET accreditation when the first students graduate from the program.

Program Educational Objectives

With their Kettering education as a foundation, within a few years of graduation, graduates will attain:

- A reputation for working effectively and ethically in diverse professional environments.
- Leadership in their profession while actively pursuing lifelong learning and contributing to progress within their field.
- The ability to practice responsible decision making and apply best practices to their professional endeavors.

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.

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		
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-258	Probability and Statistics	4
CHEM-135 or CHEM-137	Principles of Chemistry General Chemistry I	3
CHEM-136	Principles of Chemistry Lab	1
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
Math/Science Elective		4
		<i>Credit Hours Subtotal:</i>
		32
Engineering Fundamentals Core		
IME-100	Interdisciplinary Design and Manufacturing	4
ECE-100	Principles of Electrical and Computer Engineering	4
IME-200	Introduction to Industrial Engineering	4
IME-351	Engineering Economics	4
ECE-101 or CS-101	MATLAB and C Programming Computing & Algorithms I	4
EE-210	Circuits I	3
EE-211	Circuits I Lab	1
MECH-210	Statics	4
MECH-310	Dynamics	4
		<i>Credit Hours Subtotal:</i>
		32
Concentration - See Below		52
		<i>Credit Hours Subtotal:</i>
		52
Free Electives		8
		<i>Credit Hours Subtotal:</i>
		8
Culminating Undergraduate Experience		
CILE-400	Culminating Undergraduate Experience: Thesis ¹	4
		<i>Credit Hours Subtotal:</i>
		4
Total Credit Hours		128

(Minimum) Total Credits Required for Program: 161

¹ Students are automatically registered for CILE-400 in a co-op term when they reach Junior II status.

Manufacturing Systems Concentration

Code	Title	Credit Hours
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
MECH-100	Engineering Graphical Communication	4
MECH-212	Mechanics of Materials	4
MECH-300	Computer Aided Engineering	4
MECH-307	Materials Engineering	4
MECH-311	Introduction to Mechanical System Design	4
IME-300	Manufacturing Processes	4
Select Two of the Following:		8
IME-403	Computer Numerical Control Machining	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
Select Two of the Following:		8
CE-472	VR Systems: Modeling & Control	
CE-484	Internet of Things (IoT)	
CS-355	Introduction to Cybersecurity	
IME-361	Lean Work Design	
IME-422	Simulation	
IME-465	Human-Computer Interaction and Interface Design	
IME-471	Quality Control	
IME-473	Design of Experiments	
IME-476	Lean Six Sigma	
MECH-312	Mechanical Component Design I	
MECH-482	Mechanics and Design Simulation of Fiber-Reinforced Composite Materials	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		52

Mechatronic Systems Concentration

Code	Title	Credit Hours
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
EE-320 & EE-321	Electronics I and Electronics I Laboratory	4
EE-338	Discrete-Time Signals and Systems	4
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
CE-426	Real-Time Embedded Systems	4
MECH-311	Introduction to Mechanical System Design	4
MECH-330 & MECH-331	Dynamic Systems with Vibrations and Dynamic Sys w Vibrations Lab	4
MECH-430 & MECH-431	Dynamic Systems with Controls and Dynamic Systems with Controls Lab	4

Select Two of the Following:		8
CE-442	Mobile Robotics	
CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
CE-472	VR Systems: Modeling & Control	
EE-421	Energy Storage Sys w/ EV App	
EE-434	Digital Signal Processing	
EE-336	Continuous-Time Signals and Systems	
IME-408	Industrial Robotics	
IME-412	Applied Control Systems Design	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		52

Robotic Systems Concentration

Code	Title	Credit Hours
MATH-204	Differential Equations & Laplace Transforms	4
MATH-305	Numerical Methods and Matrices	4
EE-320 & EE-321	Electronics I and Electronics I Laboratory	4
EE-338	Discrete-Time Signals and Systems	4
CE-210	Intro to Digital Systems Design	4
CE-320	Intro to Microcomputers	4
CE-426	Real-Time Embedded Systems	4
CE-442	Mobile Robotics	4
IME-408	Industrial Robotics	4
MECH-311	Introduction to Mechanical System Design	4
Select Two of the Following:		8
CE-420	Microcomputer Systems	
CE-452	Artificial Intelligence for Autonomous Driving	
CE-454	Computer Vision for Autonomous Driving	
CE-472	VR Systems: Modeling & Control	
CE-484	Internet of Things (IoT)	
EE-421	Energy Storage Sys w/ EV App	
EE-434	Digital Signal Processing	
EE-336	Continuous-Time Signals and Systems	
IME-412	Applied Control Systems Design	
IME-465	Human-Computer Interaction and Interface Design	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		52

Engineering Management Concentration

Code	Title	Credit Hours
MATH-350	Financial Mathematics	4
IME-321	Operations Research - Deterministic Models	4
IME-332	Engineering Statistics	4
IME-452	Production System Design	4
IME-453	Supply Chain Design	4
IME-564	Ethics and Practice of Engineering	4
Select one of the following		4
IME-471	Quality Control	
IME-476	Lean Six Sigma	
Select Five of the following:		20
BUSN-303	New Venture Creation: Entrepreneurship	
BUSN-304	Innovation Development	
BUSN-331	Financial Management	
BUSN-402	Business Law	
MGMT-205	Organizational Behavior	
MGMT-419	Project Management	
MGMT-424	Data Visualization	
MGMT-465	Strategic Management	
MGMT-479	Leadership	
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Total Credit Hours		52

Course	Title	Credit Hours
Freshman		
Freshman I		
CILE-101	First Year Foundations	1
COMM-101	Rhetoric & Writing	4
CHEM-135	Principles of Chemistry	3
CHEM-136	Principles of Chemistry Lab	1
MATH-101	Calculus I	4
IME-100 or ECE-100	Interdisciplinary Design and Manufacturing or Principles of Electrical and Computer Engineering	4
Credit Hours		17
Freshman II		
LA-201	Sophomore Seminar: Exploring the Human Condition	4
MATH-102	Calculus II	4
PHYS-114	Newtonian Mechanics	3
PHYS-115	Newtonian Mechanics Laboratory	1
IME-100 or ECE-100	Interdisciplinary Design and Manufacturing or Principles of Electrical and Computer Engineering	4
Credit Hours		16

Sophomore

Sophomore I		
ECON-201	Economic Principles	4
MATH-203	Multivariate Calculus	4
PHYS-224	Electricity and Magnetism	3
PHYS-225	Electricity and Magnetism Laboratory	1
MECH-210	Statics	4
Credit Hours		16

Sophomore II		
EE-210	Circuits I	3
EE-211	Circuits I Lab	1
IME-200	Introduction to Industrial Engineering	4
MECH-310	Dynamics	4
CONCENTRATION COURSE ONE		4
Credit Hours		16

Junior		
Junior I		
ECE-101	MATLAB and C Programming	4
MATH-258	Probability and Statistics	4
CONCENTRATION COURSE TWO		4
CONCENTRATION COURSE THREE		4
Advanced Humanities or Social Science Elective		4
Credit Hours		20

Junior II		
IME-351	Engineering Economics	4
CONCENTRATION COURSE FOUR		4
CONCENTRATION COURSE FIVE		4
CONCENTRATION COURSE SIX		4
Advanced Humanities or Social Science Elective		4
Credit Hours		20

Senior		
Senior I		
CONCENTRATION COURSE SEVEN		4
CONCENTRATION COURSE EIGHT		4
CONCENTRATION COURSE NINE		4
Free Elective		4
Advanced Humanities or Social Science Elective		4
Credit Hours		20

Senior II		
CONCENTRATION COURSE TEN		4
CONCENTRATION COURSE ELEVEN		4
Math/Science Elective		4
LA-489	Sr. Seminar: Leadership, Ethics	4
Credit Hours		16

Senior III		
CONCENTRATION COURSE TWELVE		4
Advanced Humanities or Social Science Elective		4
Free Elective		4
ENGR-490	Senior Multidisciplinary Engineering Design Project	4
Credit Hours		16

Any Term

CILE-400	Culminating Undergraduate Experience: Thesis	4
Credit Hours		4
Total Credit Hours		161