MECHATRONICS ENGINEERING TECHNOLOGY - B.S.

College of Aeronautics and Engineering
www.kent.edu/cae

About This Program

Ready to design, build and optimize the smart systems driving the future of automation and robotics? The Mechatronics Engineering Technology program focuses on the applied integration of mechanical, electrical and computer systems to develop intelligent technologies for advanced manufacturing, autonomous systems and smart infrastructure. Read more...

Contact Information

- cae@kent.edu | 330-672-2892
- Speak with an Advisor
- Chat with an Admissions Counselor

Program Delivery

- **Delivery:**
  - In person
- **Location:**
  - Kent Campus

Examples of Possible Careers and Salaries*

Electrical and electronic engineering technologists and technicians

- 1.5% slower than the average
- 125,800 number of jobs
- $67,550 potential earnings

Electrical engineers

- 4.6% about as fast as the average
- 193,100 number of jobs
- $100,830 potential earnings

Electronics engineers, except computer

- 1.4% slower than the average
- 134,900 number of jobs
- $107,540 potential earnings

Electro-mechanical and mechatronics technologists and technicians

- 3.0% about as fast as the average
- 14,600 number of jobs
- $59,800 potential earnings

Industrial engineers

- 10.1% much faster than the average
- 295,800 number of jobs
- $88,950 potential earnings

Mechanical engineers

- 3.9% about as fast as the average
- 316,300 number of jobs
- $90,160 potential earnings

Additional Careers

- Application engineer (automation products)
- Controls engineer
- Field service engineer (automation or robotics)
- Industrial maintenance engineer
- Instrumentation and controls engineer
- Manufacturing systems engineer
- Product development engineer
- Programmable logic controller (PLC) programmer
- Quality control inspector
- Systems integration engineer
- Tooling engineer

Accreditation

The Bachelor of Science degree in Mechatronics Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET, www.abet.org, under the General Criteria and the Program Criteria for Mechatronics Engineering Technology and Similarly Named Programs.

* Source of occupation titles and labor data comes from the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

Admission Requirements

The university affirmatively strives to provide educational opportunities and access to students with varied backgrounds, those with special talents and adult students who graduated from high school three or more years ago.

Admission to the Mechatronics Engineering Technology major is selective.

New Students: Admission into this major requires a minimum 2.700 unweighted high school GPA. Students who do not meet this requirement will be admitted to the Industrial Engineering Technology major. Students may change their major to Mechatronics Engineering Technology after satisfying the below requirements for current students.

Note: Applicants should understand that this is a math-intensive program. Students admitted to the program are expected to demonstrate prerequisite knowledge on a math placement exam (the ALEKS exam) prior to starting their first semester. Students who do not obtain the minimum score required to place into MATH 11022 or MATH 12011 are at risk of delaying graduation.

Current Students: Students may change their major to Mechatronics Engineering Technology if they meet the following criteria:

- Minimum 2.500 overall Kent State GPA
- Minimum C grade in both ENGR 11001 and ENGR 11002
- Minimum C grade in either MATH 11022 or MATH 12011

Transfer Students: Transfer students must have completed minimum 12 credit hours of college-level coursework with a minimum 2.500 overall GPA for admission to the Mechatronics Engineering Technology major. Students with less than 12 credit hours completed will be evaluated based on their high school transcript using the criteria in the above "new student" section.

International Students: All international students must provide proof of proficiency of the English language (unless they meet specific exceptions) through the submission of an English language proficiency test score or by completing English language classes at Kent State's English as a Second Language Center before entering their program. For more information, visit the admissions website for international students.

Program Requirements
Major Requirements

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
ENGR 11001	INTRODUCTION TO ENGINEERING	2
ENGR 11002	INTRODUCTION TO ENGINEERING LABORATORY	1
ENGR 13586 & ENGR 13587	COMPUTER AIDED DESIGN I and COMPUTER AIDED DESIGN I LABORATORY	3
or MERT 12001	COMPUTER-AIDED DESIGN	
ENGR 15302	MATLAB SKILLS FOR ENGINEERS	1
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 20002	MATERIALS AND PROCESSES	3
or MERT 12004	MANUFACTURING PROCESSES	
ENGR 23585	COMPUTER AIDED DESIGN II	3
ENGR 27210	INTRODUCTION TO SUSTAINABILITY	3
ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33032	PROGRAMMABLE LOGIC CONTROLLERS II	3
ENGR 33033	HYDRAULICS/PNEUMATICS	3
ENGR 33041	CONTROL SYSTEMS	3
ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3-6
or MERT 22005 & MERT 22007	STATICS and STRENGTH OF MATERIALS	
ENGR 33222	DIGITAL DESIGN FOR COMPUTER ENGINEERING	3
ENGR 33334	INDUSTRIAL ROBOTICS	1
ENGR 33335	INDUSTRIAL ROBOTICS LABORATORY	1
ENGR 33700	QUALITY TECHNIQUES	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	2
ENGR 43030	MECHATRONICS	3
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 43099	MECHATRONICS CAPSTONE (ELR) (WIC) [1,2]	3-6
or ENGR 48099 & ENGR 48199	ENGINEERING CAPSTONE I (ELR) and ENGINEERING CAPSTONE II (ELR) (WIC)	
ENGR 43580	COMPUTER-AIDED MACHINE DESIGN	3
ENGR 47200	SYSTEMS ENGINEERING	3

Electrical Circuits Electives, choose from the following:		4-7
EERT 12000 & EERT 12001	ELECTRIC CIRCUITS I and ELECTRIC CIRCUITS II	
ENGR 21020 & ENGR 21022	SURVEY OF ELECTRICITY AND ELECTRONICS and SURVEY OF ELECTRICITY AND ELECTRONICS LABORATORY	
Programming Elective, choose from the following:		3-4
CS 13001	COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	
CS 13011 & CS 13012	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING	
ENGR 26220 & ENGR 26222	PROGRAMMING FOR ENGINEERS and PROGRAMMING FOR ENGINEERS LABORATORY	
Technical Elective, choose from the following:		6
Any Aeronautics (AERN) course		
Any College of Aeronautics and Engineering (CAE) course		
Any Design Innovation (DI) course		
Any Engineering (ENGR) course		
Additional Requirements (courses do not count in major GPA)		
CAE 12260	SOLVING PROBLEMS IN AERONAUTICS AND ENGINEERING [3]	1-3
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
PHY 13001 & PHY 13021	GENERAL COLLEGE PHYSICS I (KBS) and GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB) [4]	5
or PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	
PHY 13002 & PHY 13022	GENERAL COLLEGE PHYSICS II (KBS) and GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB) [4]	5
or PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	
UC 10001	FLASHES 101	1
Mathematics Electives, choose from the following: [5]		6-8
MATH 11022 & MATH 12002	TRIGONOMETRY (KMCR) and ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	
MATH 12011 & MATH 12012	CALCULUS WITH PRECALCULUS I (KMCR) and CALCULUS WITH PRECALCULUS II (KMCR)	
Kent Core Composition		6
Kent Core Humanities and Fine Arts (minimum one course from each)		9
Kent Core Social Sciences (must be from two disciplines) (cannot be ECON course)		3
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		8
Minimum Total Credit Hours:		**120**

[1] A minimum C grade must be earned to fulfill the writing-intensive requirement.

[2] Students wishing to take the full-year capstone option (ENGR 48099 and ENGR 48199) must take the sequence during consecutive semesters. ENGR 48099 is only offered during the fall semester and ENGR 48199 is only offered during the spring semester.

[3] Students scoring 34 or below on the ALEKS math assessment are required to enroll in CAE 12260 until they successfully complete MATH 00022.

[4] Students wishing to change their major to Mechatronics Engineering **must** take PHY 23101 and PHY 23102. Failing to do so will result in additional coursework.

[5] MATH 12011 and MATH 12012 are the preferred math electives for this program. However, students wishing to change their major to Mechatronics Engineering are encouraged to take MATH 11022 and MATH 12002.

Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.250	2.000

Roadmap

This roadmap is a recommended semester-by-semester plan of study for this program. Students will work with their advisor to develop a sequence based on their academic goals and history. Courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

	Semester One		Credits
	CAE 12260	SOLVING PROBLEMS IN AERONAUTICS AND ENGINEERING	1
	COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
	ENGR 20002 or MERT 12004	MATERIALS AND PROCESSES or MANUFACTURING PROCESSES	3
	ENGR 27210	INTRODUCTION TO SUSTAINABILITY	3
	UC 10001	FLASHES 101	1
	Mathematics Elective		3
	Kent Core Requirement		3
	Credit Hours		**17**
	Semester Two		
	ENGR 11001	INTRODUCTION TO ENGINEERING	2
	ENGR 11002	INTRODUCTION TO ENGINEERING LABORATORY	1
!	PHY 13001 & PHY 13021 or PHY 23101	GENERAL COLLEGE PHYSICS I (KBS) and GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB) or GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
	Mathematics Elective		3-5
	Programming Elective		3-4
	Credit Hours		**14**
	Semester Three		
	ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
	ENGR 13586 & ENGR 13587 or MERT 12001	COMPUTER AIDED DESIGN I and COMPUTER AIDED DESIGN I LABORATORY or COMPUTER-AIDED DESIGN	3
	ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
!	PHY 13002 & PHY 13022 or PHY 23102	GENERAL COLLEGE PHYSICS II (KBS) and GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB) or GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
	Kent Core Requirement		3
	Credit Hours		**15**

Semester Four		
ENGR 15302	MATLAB SKILLS FOR ENGINEERS	1
ENGR 23585	COMPUTER AIDED DESIGN II	3
ENGR 33033	HYDRAULICS/PNEUMATICS	3
Electrical Circuits Electives		4-7
Kent Core Requirement		3
General Elective		3
Credit Hours		**17**
Semester Five		
ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33041	CONTROL SYSTEMS	3
ENGR 33111 or MERT 22005 **and** MERT 22007	STATICS AND STRENGTH OF MATERIALS or STATICS **and** STRENGTH OF MATERIALS	3-6
ENGR 33700	QUALITY TECHNIQUES	3
Kent Core Requirement		3
Credit Hours		**15**
Semester Six		
ENGR 33032	PROGRAMMABLE LOGIC CONTROLLERS II	3
ENGR 33334	INDUSTRIAL ROBOTICS	1
ENGR 33335	INDUSTRIAL ROBOTICS LABORATORY	1
ENGR 47200	SYSTEMS ENGINEERING	3
Technical Elective		3
Kent Core Requirement		3
Credit Hours		**14**
Semester Seven		
ENGR 33222	DIGITAL DESIGN FOR COMPUTER ENGINEERING	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	2
ENGR 43030	MECHATRONICS	3
ENGR 43580	COMPUTER-AIDED MACHINE DESIGN	3
ENGR 48099 or General Elective	ENGINEERING CAPSTONE I (ELR)	3
Credit Hours		**14**
Semester Eight		
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 43099 or ENGR 48199	MECHATRONICS CAPSTONE (ELR) (WIC) or ENGINEERING CAPSTONE II (ELR) (WIC)	3
Technical Elective		3
Kent Core Requirement		3
General Elective		2
Credit Hours		**14**
Minimum Total Credit Hours:		**120**

University Requirements

All students in a bachelor's degree program at Kent State University must complete the following university requirements for graduation.

NOTE: University requirements may be fulfilled in this program by specific course requirements. Please see Program Requirements for details.

Flashes 101 (UC 10001)	1 credit hour
Course is not required for students with 30+ transfer credits (excluding College Credit Plus) or age 21+ at time of admission.	
Diversity Domestic/Global (DIVD/DIVG)	2 courses

Students must successfully complete one domestic and one global course, of which one must be from the Kent Core.	
Experiential Learning Requirement (ELR)	varies
Students must successfully complete one course or approved experience.	
Kent Core (see table below)	36-37 credit hours
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 credit hours
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.	
Total Credit Hour Requirement	120 credit hours

Kent Core Requirements

Kent Core Composition (KCMP)	6
Kent Core Mathematics and Critical Reasoning (KMCR)	3
Kent Core Humanities and Fine Arts (KHUM/KFA) (min one course each)	9
Kent Core Social Sciences (KSS) (must be from two disciplines)	6
Kent Core Basic Sciences (KBS/KLAB) (must include one laboratory)	6-7
Kent Core Additional (KADL)	6
Total Credit Hours:	**36-37**

Program Learning Outcomes

Graduates of this program will be able to:

1. Apply knowledge, techniques, skills and modern tools of mathematics, science, engineering and technology to solve broadly defined engineering problems appropriate to the discipline.
2. Design systems, components or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline.
3. Apply written, oral and graphical communication in broadly defined technical and non-technical environments, and an ability to identify and use appropriate technical literature.
4. Conduct standard tests, measurements and experiments and analyze and interpret the results to improve processes.
5. Function effectively as a member as well as a leader on technical teams.

The educational objectives of the program are the following:

1. Drive positive change in the community by engaging in careers in the areas of mechatronics, automation, systems and other engineering technology fields in a robust manner that promotes excellence and integrity.
2. Practice forward-thinking through continued education by way of professional development, graduate education and other continued self-motivated learning.
3. Successfully navigate the ever-changing trajectory of the world, practicing compassion as you strive to meet your personal and professional goals.

Full Description

The Bachelor of Science degree in Mechatronics Engineering Technology successfully prepares graduates with knowledge across engineering disciplines for professional careers in mechatronics, controls, robotics, automation and related technological fields that provide solutions addressing societal needs and challenges. The program integrates mechanical, electrical, computer and controls. Mechatronics engineering technology revolves around the design, construction and operation of automated systems, robots and intelligent products, which result from the integration of software and hardware.

Using automated systems is becoming more popular for operating equipment/machinery in a host of situations, including on assembly and manufacturing lines, on automobiles and aircraft and in electrical power generations to reduce labor costs, increase precision and accuracy and provide quality and safety for workers.

Graduates from the mechatronics engineering technology program manage and support the design, operation and analysis of mechanical and electrical devices connected with automated systems, robots and computer-integrated manufacturing. They can work in any company that develops, designs or manufactures and markets these devices. Opportunities exist in manufacturing sales as well as research.

Applicants to this program should understand that this is a math-intensive program.

Students may apply early to the Master of Engineering Technology degree and double count 9 credit hours of graduate courses toward both degree programs. See the Combined Bachelor's/Master's Degree Program Policy in the University Catalog for more information.