

MECHATRONICS ENGINEERING - B.S.

College of Aeronautics and Engineering
 Aeronautics and Technology Building
 Kent Campus
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Description

The Bachelor of Science degree in Mechatronics Engineering integrates mechanical, electrical, computer and controls engineering to understand automated machinery, specifically, how to design it and how to make it work. Mechatronics engineering 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 or machinery on manufacturing lines, boilers and aircraft to reduce labor costs, increase precision and accuracy and provide quality and safety for workers. Mechatronic devices can be found in agriculture, hospitals, buildings, homes, automobiles, manufacturing plants, the toy and entertainment industry and in aids for the elderly and disabled.

Fully Offered At:

- Kent Campus

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 major is selective.

Freshman Students: Admission into the Mechatronics Engineering major requires a minimum 3.0 high school GPA and a minimum 24 ACT composite score (minimum 24 ACT sub-scores in both English and mathematics) or a minimum 1160 SAT composite score (mathematics, critical reasoning and writing); and placement directly into MATH 12002 (or its equivalent).

Students who do not meet these requirements may apply for admission to the Mechatronics Engineering Technology major and request to change their program to the Mechatronics Engineering major after their freshman year if they meet the following criteria: minimum 3.200 overall Kent State GPA and minimum B grade in both MATH 12002 and PHY 23101.

English Language Proficiency Requirements for International Students:

All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 75 MELAB score, minimum 6.0 IELTS score or minimum 48 PTE Academic score, or by completing the ELS level 112 Intensive Program. For more information on international admission, visit the Office of Global Education's admission website.

Transfer Students: Admission into the Mechatronics Engineering major requires a minimum 12 credit hours in college-level coursework with a minimum 3.200 overall GPA and a minimum B grade in both MATH 12002 and PHY 23101 (or their equivalents). Transfer students who have completed less than 12 credit hours of college-level coursework will be evaluated on both collegiate and high school records and must submit a final high school transcript and an ACT or SAT score.

Program Learning Outcomes

Graduates of this program will be able to:

1. Apply knowledge of mathematics, science and engineering
2. Design a system, component or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturing and sustainability
3. Use the techniques, skills and modern engineering tools necessary for engineering practice.

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.

Destination Kent State: First Year Experience	1
Course is not required for students with 25 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
Writing-Intensive Course (WIC)	1 course
Students must earn a minimum C grade in the course.	
Upper-Division Requirement	39 (or 42)
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate. Students in a B.A. and/or B.S. degree in the College of Arts and Sciences must complete 42 upper-division credit hours.	
Total Credit Hour Requirement	120
Some bachelor's degrees require students to complete more than 120 credit hours.	

Kent Core Requirements

Kent Core Composition (KCOMP)	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 Requirements

Major Requirements

[BS-MENG]

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
AERN 15300	INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB®	3
TECH 13580	ENGINEERING GRAPHICS I	3
TECH 20002	MATERIALS AND PROCESSES	3
TECH 20004	FUNDAMENTALS OF CIRCUIT ANALYSIS	3
TECH 23581	COMPUTER-AIDED ENGINEERING GRAPHICS	3
TECH 26010	INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY	3
TECH 26200	PROGRAMMING FOR ENGINEERS I	3
TECH 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
TECH 33033	HYDRAULICS/PNEUMATICS	3
TECH 33040	CONTROL SYSTEMS	3
TECH 33092	COOPERATIVE EDUCATION - PROFESSIONAL DEVELOPMENT (ELR) (WIC) ¹	1-3
TECH 33111	STATICS AND STRENGTH OF MATERIALS	3
TECH 33220	ELECTRONIC DEVICES	4
TECH 33222	DIGITAL DESIGN FOR COMPUTER ENGINEERING	3
TECH 33363	MATERIALS SCIENCE AND TECHNOLOGY	3
TECH 36200	PROGRAMMING FOR ENGINEERS II	3
TECH 37666	KINEMATICS AND DYNAMICS OF MACHINERY	3
TECH 43030	MECHATRONICS	3
TECH 43031	MECHATRONICS II	3
TECH 43220	ELECTRICAL MACHINERY	3
TECH 43580	COMPUTER-AIDED MACHINE DESIGN	3
TECH 47200	SYSTEMS ENGINEERING	3
Additional Requirements (courses do not count in major GPA)		
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
MATH 32052	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II	4
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
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)		6
Kent Core Additional		3
Minimum Total Credit Hours:		121

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

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 major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Course	Title	Credits
Semester One		
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
TECH 13580	ENGINEERING GRAPHICS I	3
TECH 20002	MATERIALS AND PROCESSES	3
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
	Credit Hours	15
Semester Two		
MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
TECH 26010	INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY	3
Kent Core Requirement		3
	Credit Hours	16
Semester Three		
AERN 15300	INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB®	3
MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
TECH 33111	STATICS AND STRENGTH OF MATERIALS	3
	Credit Hours	15
Semester Four		
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
MATH 32052	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II	4
TECH 20004	FUNDAMENTALS OF CIRCUIT ANALYSIS	3
TECH 37666	KINEMATICS AND DYNAMICS OF MACHINERY	3
Kent Core Requirement		3
	Credit Hours	16
Semester Five		
TECH 23581	COMPUTER-AIDED ENGINEERING GRAPHICS	3
TECH 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
TECH 33033	HYDRAULICS/PNEUMATICS	3
TECH 33220	ELECTRONIC DEVICES	4
Kent Core Requirement		3
	Credit Hours	16
Semester Six		
TECH 26200	PROGRAMMING FOR ENGINEERS I	3
TECH 33040	CONTROL SYSTEMS	3
TECH 33363	MATERIALS SCIENCE AND TECHNOLOGY	3
TECH 43580	COMPUTER-AIDED MACHINE DESIGN	3
Kent Core Requirement		3
	Credit Hours	15

Semester Seven

TECH 33222	DIGITAL DESIGN FOR COMPUTER ENGINEERING	3
TECH 36200	PROGRAMMING FOR ENGINEERS II	3
TECH 43030	MECHATRONICS	3
TECH 47200	SYSTEMS ENGINEERING	3
Kent Core Requirement		3
Credit Hours		15

Semester Eight

TECH 33092	COOPERATIVE EDUCATION - PROFESSIONAL DEVELOPMENT (ELR) (WIC)	1-3
TECH 43031	MECHATRONICS II	3
TECH 43220	ELECTRICAL MACHINERY	3
Kent Core Requirement		3
Kent Core Requirement		3
Credit Hours		13
Minimum Total Credit Hours:		121