

# APPLIED ENGINEERING - B.S.

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

## Examples of Possible Careers\*

### Architectural and engineering managers

- 2.6% slower than the average
- 198,100 number of jobs
- \$149,530 potential earnings

### Foundry mold and coremakers

- -5.8% decline
- 17,600 number of jobs
- \$37,140 potential earnings

### Industrial engineering technologists and technicians

- 1.5% slower than the average
- 68,500 number of jobs
- \$57,320 potential earnings

### Industrial production managers

- 0.9% little or no change
- 190,100 number of jobs
- \$108,790 potential earnings

## Contact Information

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

## Fully Offered

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

### \*Note

Source of occupation titles and labor data is 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.

## Description

The Bachelor of Science degree in Applied Engineering provides students instruction in basic math and science, engineering principles, processes, project management and personnel management. Students learn in the classroom, as well as through hands-on experiments and real-world internships.

The degree program can also function as a completer degree for students with an associate degree in engineering technology.

The Applied Engineering major comprises the following concentrations:

- The **Applied Engineering and Technology Management** concentration provides a focus on the application of management, design and technical skills for system integration; the execution of new product designs; the improvement of manufacturing processes and the management; and direction of physical and/or technical functions of an organization. Students also understand materials, facility design, quality and safety.
- The **Foundry Technology** concentration prepares students for employment in the metal casting industry. Students complete coursework in materials and processes, cast metals, metallurgy and material science, solid modeling and solidification. In addition, students apply their knowledge and skills in the capstone course on foundry tooling and pattern making. They also will gain experience with programmable logic controllers, hydraulics, pneumatics and computer-aided manufacturing.

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

Students may apply early to the Master of Engineering Technology degree (Quality Systems and Engineering Management Technology concentration) 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.

## Accreditation

The B.S. degree in Applied Engineering - Applied Engineering and Technology Management concentration - is accredited by the Association of Technology, Management and Applied Engineering (ATMAE). The College of Aeronautics and Engineering is accredited as a "Certified School" by the Foundry Educational Foundation (fefinc.org).

## 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.

**First-Year Students on the Kent Campus:** First-year admission policy on the Kent Campus is selective. Admission decisions are based upon cumulative grade point average, strength of high school college preparatory curriculum and grade trends. Students not admissible to the Kent Campus may be administratively referred to one of the seven regional campus to begin their college coursework. For more information, visit the admissions website for first-year students.

**First-Year Students on the Regional Campuses:** First-year admission to Kent State's campuses at Ashtabula, East Liverpool, Geauga, Salem, Stark, Trumbull and Tuscarawas, as well as the Twinsburg Academic Center, is open to anyone with a high school diploma or its equivalent. Check with a regional campus admissions office to determine application requirements, as they may differ among campuses.

**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, minimum 48 PTE score or minimum 100 DET score; or by completing the ESL level 112

Intensive Program. For more information, visit the admissions website for international students.

**Transfer Students:** For more information, visit the admissions website for transfer students.

**Former Students:** Former Kent State students or graduates who have not attended another college or university since Kent State may complete the reenrollment or reinstatement form on the University Registrar's website.

## 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.

## 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
Students must successfully complete 39 upper-division (numbered 30000 to 49999) credit hours to graduate.	
Total Credit Hour Requirement	120

## 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
<b>Total Credit Hours:</b>	<b>36-37</b>

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements (courses count in major GPA)</b>		
ENG 20002	INTRODUCTION TO TECHNICAL WRITING	3
ENGR 11000	INTRODUCTION TO ENGINEERING	3
ENGR 13585	COMPUTER AIDED ENGINEERING GRAPHICS	3
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 20002	MATERIALS AND PROCESSES	3
ENGR 21020	SURVEY OF ELECTRICITY AND ELECTRONICS	3
ENGR 21022	SURVEY OF ELECTRICITY AND ELECTRONICS LABORATORY	1
ENGR 23585	ADVANCED COMPUTER AIDED DESIGN	3
ENGR 31000	CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC) <sup>1</sup>	3
ENGR 31016	MANUFACTURING TECHNOLOGY	3
ENGR 31020	AUTOMATED MANUFACTURING	3
ENGR 31065	CAST METALS	3
ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33033	HYDRAULICS/PNEUMATICS	3
ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3
ENGR 33700	QUALITY TECHNIQUES	3
ENGR 33870	FACILITY DESIGN AND MATERIAL HANDLING	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
ENGR 36620	PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY	3
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 43550	COMPUTER-AIDED MANUFACTURING	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
MATH 11010	ALGEBRA FOR CALCULUS (KMCR) <sup>2</sup>	3
MATH 11022	TRIGONOMETRY (KMCR) <sup>2</sup>	3
PHY 13001	GENERAL COLLEGE PHYSICS I (KBS)	4
PHY 13002	GENERAL COLLEGE PHYSICS II (KBS)	4
PHY 13021	GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB)	1
PHY 13022	GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB)	1
PSYC 11762	GENERAL PSYCHOLOGY (DIVD) (KSS)	3
PSYC 31773	INDUSTRIAL PSYCHOLOGY	3
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
<b>Concentrations</b>		
Choose one of the following:		23-24
Applied Engineering and Technology Management		
Foundry Technology		
<b>Minimum Total Credit Hours:</b>		<b>120-121</b>

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

<sup>2</sup> Applicants to this program 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 fail to obtain the minimum score required to place into the required math courses are at risk of delaying graduation.

## Applied Engineering and Technology Management Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
ENGR 27210	INTRODUCTION TO SUSTAINABILITY	3
ENGR 30001	APPLIED THERMODYNAMICS	3
ENGR 43899	APPLIED ENGINEERING TECHNOLOGY SEMINAR (ELR)	3
MGMT 24056	BUSINESS ANALYTICS I	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		8
<b>Minimum Total Credit Hours:</b>		<b>23</b>

## Foundry Technology Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
ENGR 33364	METALLURGY AND MATERIALS SCIENCE	3
ENGR 41065	SOLID MODELING AND SOLIDIFICATION SIMULATION	3
ENGR 45099	CAPSTONE: FOUNDRY TOOLING AND PATTERN MAKING (ELR)	3
<b>Additional Requirements (courses do not count in major GPA)</b>		
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
HRM 34180	HUMAN RESOURCE MANAGEMENT	3
MGMT 24163	PRINCIPLES OF MANAGEMENT	3
Kent Core Social Sciences (must be from two disciplines)		3
<b>Minimum Total Credit Hours:</b>		<b>24</b>

## Graduation Requirements

Minimum Major GPA	Minimum Overall GPA
2.250	2.000

## Roadmaps

- Applied Engineering and Technology Management Concentration
- Foundry Technology Concentration

**Note:** Students wishing to complete internships and/or cooperative education opportunities are encouraged to do so over the summer.

Those wishing to take off a semester for a co-op will likely delay graduation by a year.

## Applied Engineering and Technology Management Concentration

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.

Semester One		Credits
ENGR 13585	COMPUTER AIDED ENGINEERING GRAPHICS	3
ENGR 20002	MATERIALS AND PROCESSES	3
! MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Two		Credits
ENGR 11000	INTRODUCTION TO ENGINEERING	3
ENGR 23585	ADVANCED COMPUTER AIDED DESIGN	3
! MATH 11022	TRIGONOMETRY (KMCR)	3
PSYC 11762	GENERAL PSYCHOLOGY (DIVD) (KSS)	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
Semester Three		Credits
! ENG 20002	INTRODUCTION TO TECHNICAL WRITING	3
ENGR 31016	MANUFACTURING TECHNOLOGY	3
MGMT 24056	BUSINESS ANALYTICS I	3
! PHY 13001	GENERAL COLLEGE PHYSICS I (KBS)	4
! PHY 13021	GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB)	1
<b>Credit Hours</b>		<b>14</b>
Semester Four		Credits
! ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
! ENGR 31065	CAST METALS	3
ENGR 33033	HYDRAULICS/PNEUMATICS	3
! PHY 13002	GENERAL COLLEGE PHYSICS II (KBS)	4
! PHY 13022	GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB)	1
<b>Credit Hours</b>		<b>15</b>
Semester Five		Credits
ENGR 21020	SURVEY OF ELECTRICITY AND ELECTRONICS	3
ENGR 21022	SURVEY OF ELECTRICITY AND ELECTRONICS LABORATORY	1
ENGR 31020	AUTOMATED MANUFACTURING	3
ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3
ENGR 33700	QUALITY TECHNIQUES	3
! PSYC 31773	INDUSTRIAL PSYCHOLOGY	3
<b>Credit Hours</b>		<b>16</b>
Semester Six		Credits
! ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33870	FACILITY DESIGN AND MATERIAL HANDLING	3

ENGR 36620	PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY	3
Kent Core Requirement		3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
Semester Seven		Credits
ENGR 27210	INTRODUCTION TO SUSTAINABILITY	3
ENGR 30001	APPLIED THERMODYNAMICS	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
ENGR 43550	COMPUTER-AIDED MANUFACTURING	3
General Elective		3
<b>Credit Hours</b>		<b>15</b>
Semester Eight		Credits
ENGR 31000	CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC)	3
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 43899	APPLIED ENGINEERING TECHNOLOGY SEMINAR (ELR)	3
General Electives		5
<b>Credit Hours</b>		<b>14</b>
<b>Minimum Total Credit Hours:</b>		<b>120</b>

## Foundry Technology Concentration

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.

Semester One		Credits
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	3
ENGR 13585	COMPUTER AIDED ENGINEERING GRAPHICS	3
ENGR 20002	MATERIALS AND PROCESSES	3
! MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Two		
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
ENGR 11000	INTRODUCTION TO ENGINEERING	3
ENGR 23585	ADVANCED COMPUTER AIDED DESIGN	3
! MATH 11022	TRIGONOMETRY (KMCR)	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
Semester Three		
! ENG 20002	INTRODUCTION TO TECHNICAL WRITING	3
ENGR 31016	MANUFACTURING TECHNOLOGY	3
! PHY 13001	GENERAL COLLEGE PHYSICS I (KBS)	4
! PHY 13021	GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB)	1
PSYC 11762	GENERAL PSYCHOLOGY (DIVD) (KSS)	3
<b>Credit Hours</b>		<b>14</b>
Semester Four		
ENGR 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 33033	HYDRAULICS/PNEUMATICS	3
MGMT 24163	PRINCIPLES OF MANAGEMENT	3
! PHY 13002	GENERAL COLLEGE PHYSICS II (KBS)	4
! PHY 13022	GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB)	1
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
Semester Five		
ENGR 21020	SURVEY OF ELECTRICITY AND ELECTRONICS	3
ENGR 21022	SURVEY OF ELECTRICITY AND ELECTRONICS LABORATORY	1
ENGR 31000	CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC)	3
ENGR 31020	AUTOMATED MANUFACTURING	3
! PSYC 31773	INDUSTRIAL PSYCHOLOGY	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Six		
ENGR 31065	CAST METALS	3
! ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33364	METALLURGY AND MATERIALS SCIENCE	3
ENGR 36620	PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>

Semester Seven		
ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3
ENGR 33700	QUALITY TECHNIQUES	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
ENGR 41065	SOLID MODELING AND SOLIDIFICATION SIMULATION	3
ENGR 43550	COMPUTER-AIDED MANUFACTURING	3
<b>Credit Hours</b>		<b>15</b>
Semester Eight		
ENGR 33870	FACILITY DESIGN AND MATERIAL HANDLING	3
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 45099	CAPSTONE: FOUNDRY TOOLING AND PATTERN MAKING (ELR)	3
HRM 34180	HUMAN RESOURCE MANAGEMENT	3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>15</b>
<b>Minimum Total Credit Hours:</b>		<b>121</b>