

# INDUSTRIAL ENGINEERING TECHNOLOGY - B.S.

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

**Program revisions are pending approval from the Ohio Department of Higher Education. After final approval, the program revisions will display.**

## About This Program

The Bachelor of Science degree in Industrial Engineering Technology teaches practical problem-solving skills and requires hands-on experience to prepare you for a fulfilling career in engineering. With access to state-of-the-art facilities, experienced faculty and real-world challenges, you will gain the skills needed to solve complex engineering problems and make an impact in industry. 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\*

### Architectural and engineering managers

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

### Materials engineers

- 1.5% slower than the average
- 27,500 number of jobs
- \$95,640 potential earnings

## 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).

\* 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.

**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 campuses 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. For more information on admissions, contact the Regional Campuses admissions offices.

**International Students:** All international students must provide proof of English language proficiency (unless they meet specific exceptions to waive) by earning a minimum 71 TOEFL iBT score, minimum 6.0 IELTS score, minimum 47 PTE score or minimum 100 DET score, or by completing the ELS level 112 Intensive English Program. For more information, visit the admissions website for international 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.

**Transfer Students:** Students who have attended any other educational institution after graduating from high school must apply as undergraduate transfer students. For more information, visit the admissions website for transfer students.

Admission policies for undergraduate students may be found in the University Catalog's Academic Policies.

Students may be required to meet certain criteria to progress in their program. Any progression requirements will be listed on the program's Coursework tab

**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 fail to obtain the

minimum score required to place into the required math courses are at risk of delaying graduation.

## Program Requirements

### Major Requirements

Code	Title	Credit Hours
<b>Major Requirements (courses count in major GPA)</b>		
BA 44152	PROJECT MANAGEMENT <sup>1,2</sup>	3
or EMAT 41510	PROJECT MANAGEMENT AND TEAM DYNAMICS (WIC)	
or ENGR 36620	PROJECT MANAGEMENT IN ENGINEERING	
ENGR 20002	INTRODUCTION TO TECHNICAL WRITING	3
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 20000	PROFESSIONAL DEVELOPMENT IN ENGINEERING	1
ENGR 20002	MATERIALS AND PROCESSES	3
ENGR 23585	COMPUTER AIDED DESIGN II	3
ENGR 30001	APPLIED THERMODYNAMICS	3
ENGR 31000	CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC) <sup>2</sup>	3
ENGR 31016	MANUFACTURING TECHNOLOGY	3
ENGR 31065	CAST METALS	3
ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33033	HYDRAULICS/PNEUMATICS	3
ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3-6
or MERT 22005 & MERT 22007	STATICS and STRENGTH OF MATERIALS	
ENGR 33700	QUALITY TECHNIQUES	3
ENGR 33870	FACILITY DESIGN AND MATERIAL HANDLING	3
ENGR 35550	LAW AND ETHICS FOR ENGINEERS	3
ENGR 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
ENGR 43550	COMPUTER-AIDED MANUFACTURING	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	
<b>Additional Requirements (courses do not count in major GPA)</b>		
MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
MATH 11022	TRIGONOMETRY (KMCR)	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 10001	FLASHES 101	1
Kent Core Composition		6
Kent Core Humanities and Fine Arts (minimum one course from each)		9
<b>Concentrations</b>		

Choose from the following:	23-24
applied engineering and technology management/ foundry technology/	

**Minimum Total Credit Hours:** 120

<sup>1</sup> Some course options may require coursework outside of this program.

<sup>2</sup> A minimum C grade must be earned to fulfill the writing-intensive requirement.

### Applied Engineering and Technology Management Concentration Requirements

Code	Title	Credit Hours
<b>Concentration Requirements (courses count in major GPA)</b>		
BA 24056	BUSINESS ANALYTICS I	3
ENGR 27210	INTRODUCTION TO SUSTAINABILITY	3
ENGR 43899	ENGINEERING TECHNOLOGY CAPSTONE (ELR) (WIC)	3
ENGR 47200	SYSTEMS ENGINEERING	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) <sup>1</sup>		8
<b>Minimum Total Credit Hours:</b>		<b>23</b>

<sup>1</sup> Students wishing to complete internships and/or cooperative education opportunities are encouraged to do so during the summer. Those wishing to take off a semester for a co-op will likely delay graduation by a year.

### 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>		
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
COMM 15000	INTRODUCTION TO HUMAN COMMUNICATION (KADL)	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

# Roadmap

## 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 13586 & ENGR 13587 or MERT 12001	COMPUTER AIDED DESIGN I and COMPUTER AIDED DESIGN I LABORATORY or COMPUTER-AIDED DESIGN	3
ENGR 20002	MATERIALS AND PROCESSES	3
! MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
UC 10001	FLASHES 101	1
Kent Core Requirement		3
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Two		Credits
ENGR 11001	INTRODUCTION TO ENGINEERING	2
ENGR 11002	INTRODUCTION TO ENGINEERING LABORATORY	1
ENGR 23585	COMPUTER AIDED DESIGN II	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
BA 24056	BUSINESS ANALYTICS I	3
! 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
<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 33111 or MERT 22005 and MERT 22007	STATICS AND STRENGTH OF MATERIALS or STATICS <i>and</i> STRENGTH OF MATERIALS	3-6
ENGR 33700	QUALITY TECHNIQUES	3
! PSYC 31773	INDUSTRIAL PSYCHOLOGY	3
Electrical Circuits Electives		4-7
General Elective		3
<b>Credit Hours</b>		<b>16</b>

Semester Six		Credits
BA 44152 or EMAT 41510 or ENGR 36620	PROJECT MANAGEMENT or PROJECT MANAGEMENT AND TEAM DYNAMICS (WIC) or PROJECT MANAGEMENT IN ENGINEERING	3
! ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
ENGR 33870	FACILITY DESIGN AND MATERIAL HANDLING	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
ENGR 47200	SYSTEMS ENGINEERING	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	ENGINEERING TECHNOLOGY CAPSTONE (ELR) (WIC)	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 13586 & ENGR 13587 or MERT 12001	COMPUTER AIDED DESIGN I and COMPUTER AIDED DESIGN I LABORATORY or COMPUTER-AIDED DESIGN	3
ENGR 20002	MATERIALS AND PROCESSES	3
! MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
UC 10001	FLASHES 101	1
Kent Core Requirement		3
<b>Credit Hours</b>		<b>16</b>
Semester Two		Credits
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
ENGR 11001	INTRODUCTION TO ENGINEERING	2
ENGR 11002	INTRODUCTION TO ENGINEERING LABORATORY	1
ENGR 23585	COMPUTER AIDED DESIGN II	3
! MATH 11022	TRIGONOMETRY (KMCR)	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
! 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>
<b>Semester Four</b>			
	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>
<b>Semester Five</b>			
	ENGR 30001	APPLIED THERMODYNAMICS	3
	ENGR 31000	CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC)	3
!	PSYC 31773	INDUSTRIAL PSYCHOLOGY	3
Electrical Circuits Electives			4-7
Kent Core Requirement			3
<b>Credit Hours</b>			<b>16</b>
<b>Semester Six</b>			
	BA 44152	PROJECT MANAGEMENT	3
	or	or PROJECT MANAGEMENT AND TEAM DYNAMICS (WIC)	
	EMAT 41510	or PROJECT MANAGEMENT IN ENGINEERING	
	or	ENGR 36620	
	ENGR 31065	CAST METALS	3
!	ENGR 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
	ENGR 33364	METALLURGY AND MATERIALS SCIENCE	3
Kent Core Requirement			3
<b>Credit Hours</b>			<b>15</b>
<b>Semester Seven</b>			
	ENGR 33111	STATICS AND STRENGTH OF MATERIALS	3-6
	or	or STATICS <i>and</i> STRENGTH OF MATERIALS	
	MERT 22005		
	<i>and</i>		
	MERT 22007		
	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>
<b>Semester Eight</b>			
	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>

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

## 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 manufacturing, quality, engineering management, foundry operations or related fields in a 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 Applied Engineering successfully prepares graduates to apply basic engineering principles, engineering skills and management practices using a systems approach to provide leadership and solve applied technical problems that provide solutions addressing societal needs and challenges. The program 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.

Applicants to this program should understand that this is a math-intensive program. 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 gain experience with programmable logic controllers, hydraulics, pneumatics and computer-aided manufacturing.

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.