APPLIED ENGINEERING - B.S.

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

About This Program
The Bachelor of Science in Applied Engineering program 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'll 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

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

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

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.

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.

Admission policies for undergraduate students may be found in the University Catalog.

Program Requirements

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 20002</td>
<td>INTRODUCTION TO TECHNICAL WRITING</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 11000</td>
<td>INTRODUCTION TO ENGINEERING</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 13585</td>
<td>COMPUTER AIDED ENGINEERING GRAPHICS</td>
<td>3</td>
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<tr>
<td>ENGR 20000</td>
<td>PROFESSIONAL DEVELOPMENT IN ENGINEERING</td>
<td>1</td>
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<tr>
<td>ENGR 20002</td>
<td>MATERIALS AND PROCESSES</td>
<td>3</td>
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<td>ENGR 23585</td>
<td>ADVANCED COMPUTER AIDED DESIGN</td>
<td>3</td>
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<tr>
<td>ENGR 30001</td>
<td>APPLIED THERMODYNAMICS</td>
<td>3</td>
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<tr>
<td>ENGR 31000</td>
<td>CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC)</td>
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</tr>
<tr>
<td>ENGR 31016</td>
<td>MANUFACTURING TECHNOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 31065</td>
<td>CAST METALS</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 33031</td>
<td>PROGRAMMABLE LOGIC CONTROLLERS</td>
<td>3</td>
</tr>
</tbody>
</table>

* 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.
ENGR 33033  HYDRAULICS/PNEUMATICS  3
ENGR 33111  STATICS AND STRENGTH OF MATERIALS  3-6
   or MERT 22005  STATICS
   & MERT 22007  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 36620  PROJECT MANAGEMENT IN ENGINEERING  3
ENGR 43080  INDUSTRIAL AND ENVIRONMENTAL SAFETY  3
ENGR 43550  COMPUTER-AIDED MANUFACTURING  3

Electricity and Electronics Electives, choose from the following:  4-7
   EERT 12000  ELECTRIC CIRCUITS I & EERT 12001  and ELECTRIC CIRCUITS II
   & ENGR 21020  SURVEY OF ELECTRICITY AND ELECTRONICS
                  and SURVEY OF ELECTRICITY AND ELECTRONICS LABORATORY

Additional Requirements (courses do not count in major GPA)
   MATH 11010  ALGEBRA FOR CALCULUS (KMCR)  2  3
   MATH 11022  TRIGONOMETRY (KMCR)  2  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

Concentrations
Choose from the following:  23-24
   Applied Engineering and Technology Management
   Foundry Technology

Minimum Total Credit Hours:  120

1 A minimum C grade must be earned to fulfill the writing-intensive requirement.
2 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tr>
<td></td>
<td>Concentration Requirements (courses count in major GPA)</td>
<td>Credit Hours</td>
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<tr>
<td>BA 24056</td>
<td>BUSINESS ANALYTICS I</td>
<td>3</td>
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<tr>
<td>ENGR 27210</td>
<td>INTRODUCTION TO SUSTAINABILITY</td>
<td>3</td>
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<tr>
<td>ENGR 43899</td>
<td>APPLIED ENGINEERING CAPSTONE (ELR)</td>
<td>3</td>
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<tr>
<td>ENGR 47200</td>
<td>SYSTEMS ENGINEERING</td>
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<td>Additional Requirements (courses do not count in major GPA)</td>
<td>Credit Hours</td>
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<tr>
<td>ECON 22060</td>
<td>PRINCIPLES OF MICROECONOMICS (KSS)</td>
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</table>

General Electives (total credit hours depends on earning 120 credits hour, including 39 upper-division credit hours)  8

Minimum Total Credit Hours:  23

1 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.

Foundry Technology Concentration Requirements

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

Minimum Total Credit Hours:  24

Graduation Requirements

Minimum Major GPA  2.250
Minimum Overall GPA  2.000

Roadmaps

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.

<table>
<thead>
<tr>
<th>Semester One</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ENGR 11000</td>
<td>INTRODUCTION TO ENGINEERING</td>
</tr>
<tr>
<td>ENGR 23585</td>
<td>ADVANCED COMPUTER AIDED DESIGN</td>
</tr>
<tr>
<td>! MATH 11010</td>
<td>ALGEBRA FOR CALCULUS (KMCR)</td>
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<tr>
<td>UC 10001</td>
<td>FLASHES 101</td>
</tr>
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<td>Kent Core Requirement</td>
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<tr>
<td>Kent Core Requirement</td>
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Credit Hours  16

<table>
<thead>
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<th>Semester Two</th>
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<tbody>
<tr>
<td>ENGR 13585</td>
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<td>ENGR 20002</td>
<td>MATERIALS AND PROCESSES</td>
</tr>
<tr>
<td>! MATH 11022</td>
<td>TRIGONOMETRY (KMCR)</td>
</tr>
<tr>
<td>PSYC 11762</td>
<td>GENERAL PSYCHOLOGY (DIVD) (KSS)</td>
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<td>Kent Core Requirement</td>
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Credit Hours  15

<table>
<thead>
<tr>
<th>Semester Three</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BA 24056</td>
<td>BUSINESS ANALYTICS I</td>
</tr>
<tr>
<td>! ENGR 20002</td>
<td>INTRODUCTION TO TECHNICAL WRITING</td>
</tr>
<tr>
<td>ENGR 31016</td>
<td>MANUFACTURING TECHNOLOGY</td>
</tr>
</tbody>
</table>

Credit Hours  15
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**
- COMM 15000 INTRODUCTION TO HUMAN COMMUNICATION (KADL) 3
- ENGR 13585 COMPUTER AIDED ENGINEERING GRAPHICS 3
- ENGR 20002 MATERIALS AND PROCESSES 3

**Semester Two**
- MATH 11010 ALGEBRA FOR CALCULUS (KMCR) 3
- UC 10001 FLASHES 101 1
- Kent Core Requirement 3

**Semester Three**
- ENGR 20000 PROFESSIONAL DEVELOPMENT IN ENGINEERING 1
- ENGR 33033 HYDRAULICS/PNEUMATICS 3
- ! ENGR 13002 GENERAL COLLEGE PHYSICS II (KBS) 4
- ! ENGR 13022 GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB) 1

**Semester Four**
- ENGR 31065 CAST METALS 3
- ! ENGR 33031 PROGRAMMABLE LOGIC CONTROLLERS 3
- ! ENGR 33364 METALLURGY AND MATERIALS SCIENCE 3
- ! ENGR 41065 SOLID MODELING AND SOLIDIFICATION SIMULATION 3
- ENGR 43550 COMPUTER-AIDED MANUFACTURING 3

**Semester Five**
- ENGR 30001 APPLIED THERMODYNAMICS 3
- ENGR 31000 CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC) 3
- ! PSYC 31773 INDUSTRIAL PSYCHOLOGY 3
- Electricity and Electronics Electives 4-7
- Kent Core Requirement 3

**Semester Six**
- ENGR 31065 CAST METALS 3
- ! ENGR 33364 METALLURGY AND MATERIALS SCIENCE 3
- ENGR 36620 PROJECT MANAGEMENT IN ENGINEERING 3
- ! ENGR 33870 FACILITY DESIGN AND MATERIAL HANDLING 3
- Kent Core Requirement 3

**Semester Seven**
- ENGR 31000 CULTURAL DYNAMICS TECHNOLOGY (DIVD) (WIC) 3
- ! PSYC 31773 INDUSTRIAL PSYCHOLOGY 3
- Electricity and Electronics Electives 4-7
- Kent Core Requirement 3

**Semester Eight**
- ENGR 33111 STATICS AND STRENGTH OF MATERIALS 3-6
- ! MATH 11022 TRIGONOMETRY (KMCR) 3
- Kent Core Requirement 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

Credit Hours  15

Minimum Total Credit Hours:  121

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.

Full 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 complete 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 (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.