AEROSPACE ENGINEERING - B.S.

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

Examples of Possible Careers*

Aerospace engineers
- 2.8% slower than the average
- 66,400 number of jobs
- $118,610 potential earnings

Architectural and engineering managers
- 2.6% slower than the average
- 198,100 number of jobs
- $149,530 potential earnings

Avionics technicians
- 4.4% about as fast as the average
- 22,800 number of jobs
- $67,840 potential earnings

Engineering teachers, postsecondary
- 8.6% much faster than the average
- 44,600 number of jobs
- $103,600 potential earnings

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

Fully Offered
- 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 Aerospace Engineering focuses on the application of engineering principles to the design, manufacturing, and functionality of aerospace vehicles such as aircraft, missiles and spacecraft, to include autonomous and semi-autonomous unmanned aerial systems. Students gain an in-depth knowledge of aerodynamics, engineering materials and processes, structures, propulsion, flight mechanics, and control, while being exposed to orbital mechanics, space structures, and rocket propulsion.

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 Aerospace Engineering major is selective.

Freshmen Students: Admission into the Aerospace Engineering major requires:
- A minimum 3.0 high school GPA;
- A minimum 24 ACT composite score (minimum 24 ACT sub-scores in both English and math) or a minimum 1160 SAT score (minimum 580 sub-scores in both mathematics and evidence-based reading and writing);
- Clear demonstration of an ability to be placed directly into MATH 12002 (or its equivalent); this will occur if the student is already taking (or has taken) a Calculus or Pre-Calculus course, with a minimum grade of B.

Students who do not meet these requirements will be admitted to the Aeronautical Systems Engineering Technology major, provided that they meet those major requirements. Students accepted into the Aeronautical Systems Engineering Technology major may request a change in major to Aerospace Engineering as soon as placement into MATH 12002 has been demonstrated (prior to the beginning their freshman year). Otherwise, students may request to change their major to the Aerospace Engineering after their freshman year if they meet the following criteria:
- Minimum 3.200 overall Kent State GPA
- 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 Aerospace Engineering major requires 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 fewer 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. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. communicate effectively with a range of audiences
4. recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. Acquire and apply new knowledge as needed, using appropriate learning strategies

**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**
  - 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 (KCMP)**
  - 6

- **Kent Core Mathematics and Critical Reasoning (KMCR)**
  - 3

- **Kent Core Humanities and Fine Arts (KHFIA) (minimum one course each)**
  - 9

- **Kent Core Social Sciences (KSS) (must be from two disciplines)**
  - 6

- **Kent Core Basic Sciences (KB/KBLL) (must include one laboratory)**
  - 6-7

- **Kent Core Additional (KADL)**
  - 6

Total Credit Hours: 36-37

**Program Requirements**

**Major Requirements**

**Code** | **Title** | **Credit Hours**
---|---|---
AERN 30000 | Professional Development in Aeronautics | 1
ENGR 13585 | Computer Aided Engineering Graphics | 3
ENGR 15300 | Introduction to Engineering Analysis Using MATLAB® | 2

**Graduation Requirements**

**Minimum Major GPA** | **Minimum Overall GPA**
---|---
2.750 | 2.500
## 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.

### Semester One

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 15300</td>
<td>INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB®</td>
<td>2</td>
</tr>
<tr>
<td>! ENGR 15301</td>
<td>INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB® LAB</td>
<td>1</td>
</tr>
<tr>
<td>! CHEM 10060</td>
<td>GENERAL CHEMISTRY I (KBS)</td>
<td>4</td>
</tr>
<tr>
<td>! MATH 12002</td>
<td>ANALYTIC GEOMETRY AND CALCULUS I (KMCR)</td>
<td>5</td>
</tr>
<tr>
<td>UC 10097</td>
<td>DESTINATION KENT STATE: FIRST YEAR EXPERIENCE</td>
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**Kent Core Requirement**: 3

**Credit Hours**: 16

### Semester Two

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>ENGR 13585</td>
<td>COMPUTER AIDED ENGINEERING GRAPHICS</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 15500</td>
<td>INTRODUCTION TO AEROSPACE ENGINEERING</td>
<td>3</td>
</tr>
<tr>
<td>! MATH 12003</td>
<td>ANALYTIC GEOMETRY AND CALCULUS II</td>
<td>5</td>
</tr>
<tr>
<td>! PHY 23101</td>
<td>GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)</td>
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**Credit Hours**: 16

### Semester Three

<table>
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<tr>
<td>ENGR 25200</td>
<td>STATICS</td>
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<tr>
<td>! MATH 32051</td>
<td>MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I</td>
<td>4</td>
</tr>
<tr>
<td>! PHY 23102</td>
<td>GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)</td>
<td>5</td>
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<tr>
<td>Kent Core Requirement</td>
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**Credit Hours**: 15

### Semester Four

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<tbody>
<tr>
<td>ECON 22060</td>
<td>PRINCIPLES OF MICROECONOMICS (KSS)</td>
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<tr>
<td>ENGR 20002</td>
<td>MATERIALS AND PROCESSES</td>
<td>3</td>
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<tr>
<td>ENGR 25400</td>
<td>DYNAMICS</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 25500</td>
<td>AERODYNAMICS FOR ENGINEERS I</td>
<td>3</td>
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<tr>
<td>! MATH 32052</td>
<td>MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II</td>
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**Credit Hours**: 16

### Semester Five

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<tr>
<td>ENGR 35200</td>
<td>THERMAL FLUID ENGINEERING</td>
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<td>ENGR 35201</td>
<td>THERMAL FLUID ENGINEERING LABORATORY</td>
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<tr>
<td>ENGR 35500</td>
<td>SIGNALS AND CIRCUITS</td>
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<tr>
<td>ENGR 35501</td>
<td>SIGNALS AND CIRCUITS LABORATORY</td>
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<tr>
<td>ENGR 35600</td>
<td>AERODYNAMICS FOR ENGINEERS II</td>
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<td>ENGR 42111</td>
<td>STRENGTH OF MATERIALS FOR ENGINEERS</td>
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**Credit Hours**: 14

### Semester Six

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<tbody>
<tr>
<td>! AERN 30000</td>
<td>PROFESSIONAL DEVELOPMENT IN AERONAUTICS</td>
<td>1</td>
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<tr>
<td>ENGR 35300</td>
<td>AEROSPACE VEHICLE PERFORMANCE I</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 35400</td>
<td>SYSTEM DYNAMICS AND CONTROL</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 45121</td>
<td>AEROSPACE PROPULSION FOR ENGINEERING AND ENGINEERING TECHNOLOGY</td>
<td>3</td>
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<td>Kent Core Requirement</td>
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**Credit Hours**: 13

### Semester Seven

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<th>Credits</th>
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<tbody>
<tr>
<td>ENGR 45600</td>
<td>AEROSPACE VEHICLE PERFORMANCE II</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 45799</td>
<td>AIRCRAFT DESIGN I (ELR)</td>
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**Credit Hours**: 15

### Semester Eight

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<tr>
<td>ENGR 45899</td>
<td>AIRCRAFT DESIGN II (ELR) (WIC)</td>
<td>3</td>
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<tr>
<td>! ENGR 45901</td>
<td>INTRODUCTION TO FINITE ELEMENT METHOD AND APPLICATIONS</td>
<td>3</td>
</tr>
<tr>
<td>! ENGR 48001</td>
<td>ORBITAL MECHANICS</td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Kent Core Requirement</td>
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</tbody>
</table>

**Credit Hours**: 15

**Minimum Total Credit Hours**: 120

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**College of Aeronautics and Engineering Electives**: 3

**Kent Core Requirement**: 3

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**Aerospace Engineering - B.S.**