

AEROSPACE 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 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, aerospace materials, structures, propulsion, flight mechanics and stability and control while being briefly exposed to orbital mechanics, control, space structures and rocket propulsion.

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 Aerospace Engineering major is selective.

Freshmen Students: Admission into the Aerospace 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 math) or a minimum 1160 SAT score (minimum 580 sub-scores in both mathematics and evidence-based reading and writing); and placement directly into MATH 12002 (or its equivalent).

Students who do not meet these requirements may apply for admission to the Aeronautical Systems Engineering Technology concentration within the Aeronautics major and request to change their program to the Aerospace 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 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 the program will be able to:

1. Apply knowledge of mathematics, science and engineering.
2. Design and conduct experiments, and analyze and interpret data.
3. Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4. Function on multidisciplinary teams.
5. Identify, formulate and solve engineering problems.
6. Understand professional and ethical responsibility.
7. Communicate effectively, via both written and verbal means.
8. Understand the impact of engineering solutions in a global, economic, environmental and societal context.
9. Recognize the need for, and able to engage in life-long learning.
10. Be aware of contemporary issues in the aerospace industry.
11. 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 (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

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 Studies (cannot be from ECON)		3
Kent Core Additional		3
Minimum Total Credit Hours:		122

Program Requirements

Major Requirements

Code	Title	Credit Hours
Major Requirements (courses count in major GPA)		
AERN 15300	INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB®	3
AERN 15500	INTRODUCTION TO AEROSPACE ENGINEERING (min C grade)	3
AERN 20000	PROFESSIONAL DEVELOPMENT IN AERONAUTICS I	1
AERN 25200	STATICS	3
AERN 25400	DYNAMICS	3
AERN 25500	AERODYNAMICS FOR ENGINEERS (min C grade)	3
AERN 30000	PROFESSIONAL DEVELOPMENT IN AERONAUTICS II	1
AERN 35200	THERMAL FLUID ENGINEERING	3
AERN 35201	THERMAL-FLUID ENGINEERING LABORATORY	1
AERN 35300	AEROSPACE VEHICLE PERFORMANCE	3
AERN 35400	SYSTEM DYNAMICS AND CONTROL	3
AERN 35500	SIGNALS AND CIRCUITS	3
AERN 35501	SIGNALS AND CIRCUITS LABORATORY	1
AERN 35600	HIGH-SPEED AERODYNAMICS	3
AERN 45121	AEROSPACE PROPULSION FOR ENGINEERING AND ENGINEERING TECHNOLOGY	3
AERN 45360	PROFESSIONAL DEVELOPMENT IN AERONAUTICS III	1
AERN 45600	AIRCRAFT STABILITY AND CONTROL	3
AERN 45601	AIRCRAFT STABILITY AND CONTROL LABORATORY	1
AERN 45700	AIRCRAFT DESIGN (ELR)	3
AERN 45850	AIRCRAFT DESIGN II (WIC)	3
AERN 45900	AEROELASTICITY	3
TECH 13580	ENGINEERING GRAPHICS I	3
TECH 20002	MATERIALS AND PROCESSES	3
TECH 33111	STATICS AND STRENGTH OF MATERIALS	3
Aeronautics (AERN) Electives		6
Additional Requirements (courses do not count in major GPA)		
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	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

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			Credits
!	AERN 15300	INTRODUCTION TO ENGINEERING ANALYSIS USING MATLAB®	3
!	CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
!	MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
	UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement			3
Credit Hours			15
Semester Two			
!	AERN 15500	INTRODUCTION TO AEROSPACE ENGINEERING	3
!	MATH 12003	ANALYTIC GEOMETRY AND CALCULUS II	5
!	PHY 23101	GENERAL UNIVERSITY PHYSICS I (KBS) (KLAB)	5
!	TECH 13580	ENGINEERING GRAPHICS I	3
Credit Hours			16
Semester Three			
!	AERN 20000	PROFESSIONAL DEVELOPMENT IN AERONAUTICS I	1
!	AERN 25200	STATICS	3
!	MATH 32051	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES I	4
!	PHY 23102	GENERAL UNIVERSITY PHYSICS II (KBS) (KLAB)	5
Kent Core Requirement			3
Credit Hours			16
Semester Four			
!	AERN 25400	DYNAMICS	3
!	AERN 25500	AERODYNAMICS FOR ENGINEERS	3
	ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
!	MATH 32052	MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES II	4
!	TECH 20002	MATERIALS AND PROCESSES	3
Credit Hours			16
Semester Five			
!	AERN 35200	THERMAL FLUID ENGINEERING	3
!	AERN 35201	THERMAL-FLUID ENGINEERING LABORATORY	1
!	AERN 35300	AEROSPACE VEHICLE PERFORMANCE	3
!	AERN 35400	SYSTEM DYNAMICS AND CONTROL	3
!	TECH 33111	STATICS AND STRENGTH OF MATERIALS	3
Kent Core Requirement			3
Credit Hours			16
Semester Six			
!	AERN 30000	PROFESSIONAL DEVELOPMENT IN AERONAUTICS II	1
!	AERN 35500	SIGNALS AND CIRCUITS	3
!	AERN 35501	SIGNALS AND CIRCUITS LABORATORY	1
!	AERN 35600	HIGH-SPEED AERODYNAMICS	3
!	AERN 45121	AEROSPACE PROPULSION FOR ENGINEERING AND ENGINEERING TECHNOLOGY	3
Kent Core Requirement			3
Credit Hours			14
Semester Seven			
!	AERN 45600	AIRCRAFT STABILITY AND CONTROL	3

!	AERN 45601	AIRCRAFT STABILITY AND CONTROL LABORATORY	1
!	AERN 45700	AIRCRAFT DESIGN (ELR)	3
Aeronautics (AERN) Electives			3
Kent Core Requirement			3
Credit Hours			13
Semester Eight			
	AERN 45360	PROFESSIONAL DEVELOPMENT IN AERONAUTICS III	1
!	AERN 45850	AIRCRAFT DESIGN II (WIC)	3
!	AERN 45900	AEROELASTICITY	3
Aeronautics (AERN) Electives			3
Kent Core Requirement			3
Kent Core Requirement			3
Credit Hours			16
Minimum Total Credit Hours:			122