

# AEROSPACE ENGINEERING, B.S.

**Begin Campus:** Any Penn State Campus

**End Campus:** University Park

## Degree Requirements

For the Bachelor of Science degree in Aerospace Engineering, a minimum of 131 credits is required:

Requirement	Credits
General Education	45
Requirements for the Major	113-117

27 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

The first two years of study are similar to those in other engineering majors and provide students with a basic education for the engineering profession. Students need to complete EMCH 212, CMPSC 121 or CMPSC 131 or CMPSC 200 or CMPSC 201, MATH 220, MATH 230, and MATH 250 or MATH 251 prior to the start of the junior year in order to meet graduation requirements in the following two years. Six of the nine technical-elective credits taken in the senior year must be aerospace engineering courses.

## Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44>).

Code	Title	Credits
<b>Prescribed Courses</b>		
AERSP 304	Dynamics and Control of Aerospace Systems	3
AERSP 305W	Aerospace Technology Laboratory	3
AERSP 312	Aerodynamics II	3
AERSP 410	Aerospace Propulsion	3
EMCH 315	Mechanical Response of Engineering Materials	2
EMCH 316	Experimental Determination of Mechanical Response of Materials	1
MATH 220	Matrices	2-3
MATH 230	Calculus and Vector Analysis	4
ME 201	Introduction to Thermal Science	3
PHYS 214	General Physics: Wave Motion and Quantum Physics	2
<i>Prescribed Courses: Require a grade of C or better</i>		
AERSP 301	Aerospace Structures	3
AERSP 306	Aeronautics	3
AERSP 309	Astronautics	3
AERSP 311	Aerodynamics I	3
AERSP 313	Aerospace Analysis	3
CHEM 110	Chemical Principles I	3

EDSGN 100	Cornerstone Engineering Design	3
EMCH 212	Dynamics	3
ENGL 202C	Effective Writing: Technical Writing	3
MATH 140	Calculus With Analytic Geometry I	4
MATH 141	Calculus with Analytic Geometry II	4
PHYS 211	General Physics: Mechanics	4
PHYS 212	General Physics: Electricity and Magnetism	4

Additional Courses		
Select 1 credit of First-Year Seminar		1
AERSP 413	Stability and Control of Aircraft	3
	or AERSP 450 Orbit and Attitude Control of Spacecraft	
Select 3 credits from the following:		3
CMPSC 121	Introduction to Programming Techniques	
CMPSC 131	Programming and Computation I: Fundamentals	
CMPSC 200	Programming for Engineers with MATLAB	
CMPSC 201	Programming for Engineers with C++	
Select 3 credits from the following:		3
ECON 102	Introductory Microeconomic Analysis and Policy	
ECON 104	Introductory Macroeconomic Analysis and Policy	
ECON 14	Principles of Economics	
Select 5-6 credits of the following:		5-6
EMCH 210	Statics and Strength of Materials	
EMCH 211	Statics	
& EMCH 213	and Strength of Materials	
Select one of the following sequences:		5
AERSP 401A	Spacecraft Design–Preliminary	
& AERSP 401B	and Spacecraft Design–Detailed	
AERSP 402A	Aircraft Design–Preliminary	
& AERSP 402B	and Aircraft Design–Detailed	
Select 3-4 credits from the following:		3-4
AERSP 424	Advanced Computer Programming	
EE 210	Circuits and Devices	
EE 212	Introduction to Electronic Measuring Systems	

Additional Courses: Require a grade of C or better		
CAS 100A	Effective Speech	3
	or CAS 100B Effective Speech	
ENGL 15	Rhetoric and Composition	3
	or ENGL 30H Honors Rhetoric and Composition	
MATH 250	Ordinary Differential Equations	3-4
	or MATH 251 Ordinary and Partial Differential Equations	

Supporting Courses and Related Areas		
Select 6 credits of Aerospace Technical Elective (ATE) courses from department list		6
Select 3 credits of General Technical Elective (GTE) courses from department list		3
Select 3 credits of Limited Elective (LE) courses from department list		3

<sup>1</sup> Students who complete Basic ROTC may substitute 6 of the ROTC credits for 3 credits of LE and 3 credits of GHW.

## General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills

necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (<https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/>) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

### **Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.)**

- **Quantification (GQ):** 6 credits
- **Writing and Speaking (GWS):** 9 credits

### **Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.)**

- **Arts (GA):** 3 credits
- **Health and Wellness (GHW):** 3 credits
- **Humanities (GH):** 3 credits
- **Social and Behavioral Sciences (GS):** 3 credits
- **Natural Sciences (GN):** 3 credits

### **Integrative Studies**

- **Inter-Domain Courses (Inter-Domain):** 6 credits

### **Exploration**

- **GN,** may be completed with Inter-Domain courses: 3 credits
- **GA, GH, GN, GS, Inter-Domain courses.** This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

## **University Degree Requirements**

### **First Year Engagement**

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

### **Cultures Requirement**

6 credits are required and may satisfy other requirements

- **United States Cultures:** 3 credits
- **International Cultures:** 3 credits

### **Writing Across the Curriculum**

3 credits required from the college of graduation and likely prescribed as part of major requirements.

### **Total Minimum Credits**

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

### **Quality of Work**

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

### **Limitations on Source and Time for Credit Acquisition**

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (<https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80>)). For more information, check the Suggested Academic Plan for your intended program.