

# BS AEROSPACE ENGINEERING

## Program Learning Outcomes

### ABET-Defined Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to 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. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

## Degree Requirements and Curriculum

In addition to the program requirements listed on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>) section of this catalog, including:

- 60 units of upper-division courses
- 2.0 GPA
- Graduation Writing Requirement (GWR)
- U.S. Cultural Pluralism (USCP)

Note: No Major, Support or Concentration courses may be selected as credit/no credit.

### MAJOR COURSES

AERO 121	Aerospace Fundamentals	2
AERO 215	Introduction to Aerospace Design	2
AERO 220	Aerospace Systems Engineering and Integration	1
AERO 299	Aerospace Thermodynamics	4
AERO 300	Aerospace Engineering Analysis	5
AERO 302	Aerospace Fluid Mechanics	4
AERO 303	Aerospace Gas Dynamics and Heat Transfer	4
AERO 320	Fundamentals of Dynamics and Control	4
AERO 321	Experimental Sensors, Actuators and Control	1

AERO 331	Aerospace Structural Analysis I	4
AERO 350	Fundamentals of Systems Engineering	2
AERO 431	Aerospace Structural Analysis II	4
AERO 433	Experimental Stress Analysis	1
AERO 460	Aerospace Engineering Professional Preparation	1
AERO 465	Aerospace Systems Senior Laboratory	1
CE 204 & CE 207 or CE 208	Mechanics of Materials I and Mechanics of Materials II Mechanics of Materials	5
EE 201 & EE 251	Electric Circuit Theory and Electric Circuits Laboratory	4
Concentration courses (see below)		40

### SUPPORT COURSES

CHEM 124	General Chemistry for Physical Science and Engineering I (B1 & B3) <sup>1</sup>	4
IME 144	Introduction to Design and Manufacturing	4
MATE 210	Materials Engineering	3
MATH 141	Calculus I (B4) <sup>1</sup>	4
MATH 142	Calculus II (B4) <sup>1</sup>	4
MATH 143	Calculus III (Area B Electives) <sup>1</sup>	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
ME 211	Engineering Statics	3
ME 212	Engineering Dynamics	3
PHYS 141	General Physics I (Area B Electives) <sup>1</sup>	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4
STAT 312	Statistical Methods for Engineers (Upper-Division B) <sup>1</sup>	4

### GENERAL EDUCATION (GE)

(See GE program requirements below.) 48

### FREE ELECTIVES

Free Electives 0

**Total units 190**

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.

## Concentrations (select one)

- Aeronautics (<https://catalog.calpoly.edu/collegesandprograms/collegeofengineering/aerospaceengineering/bsaerospaceengineering/aeronauticsconcentration/>)
- Astronautics (<https://catalog.calpoly.edu/collegesandprograms/collegeofengineering/aerospaceengineering/bsaerospaceengineering/astronauticsconcentration/>)

## General Education (GE) Requirements

- 72 units required, 24 of which are specified in Major and/or Support.
- If any of the remaining 48 units is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.

- See the complete GE course listing (<https://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext>).
- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

<b>Area A</b>	<b>English Language Communication and Critical Thinking</b>	
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
<b>Area B</b>	<b>Scientific Inquiry and Quantitative Reasoning</b>	
B1	Physical Science (4 units in Support) <sup>1</sup>	0
B2	Life Science	4
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (8 units in Support) <sup>1</sup>	0
Upper-Division B (4 units in Support) <sup>1</sup>		0
Area B Electives (8 units in Support) <sup>1</sup>		0
<b>Area C</b>	<b>Arts and Humanities</b>	
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English	4
Lower-Division C Elective - Select a course from either C1 or C2.		4
Upper-Division C		4
<b>Area D</b>	<b>Social Sciences</b>	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
<b>Area E</b>	<b>Lifelong Learning and Self-Development</b>	
Lower-Division E		4
<b>Area F</b>	<b>Ethnic Studies</b>	
F	Ethnic Studies	4
<b>Total units</b>		<b>48</b>

<sup>1</sup> Required in Major or Support; also satisfies General Education (GE) requirement.