CalPolyPomona

Name:
Plan: **Aerospace Engineering, B.S.**
SubPlan/Option:
Min. Units Required: **127 units**

2021-2022 University Catalog Degree Curriculum Sheet

Major Required — 89 units

ARO1011L - Introduction to Aeronautics and Air Propulsion Laboratory (1)
ARO1021L - Introduction to Astronautics and Rocket Propulsion Laboratory (1)
ARO2011L - Fundamentals of Systems Engineering and Design Laboratory (1)
ARO2021L - Introduction to Aerospace Computational Methods Laboratory (1)
ARO2041 - Engineering Statics (3)
ARO2150 - Vector Dynamics (3)
ARO2311 - Elements of Avionics (2)
ARO2311L - Elements of Avionics Laboratory (1)
ARO3011 - Fluid Dynamics and Low-Speed Aerodynamics (4)
ARO3090 - Orbital Mechanics (3)
ARO3111 - Gas Dynamics and High-Speed Aerodynamics (4)

ARO3120 - Aircraft Jet Propulsion (3) ***or***
ARO4140 - Rocket Propulsion (3)

ARO3180 - Advanced Engineering Mathematics (2)
ARO3220 - Aerospace Feedback Control Systems (3)
ARO3220L - Aerospace Feedback Control Systems Laboratory (1)
ARO3261 - Aerospace Structural Mechanics I (3)
ARO3271 - Aerospace Structural Mechanics II (3)
ARO3570L - Aerospace Structures Laboratory (1)
ARO4011 - Thermodynamics and Heat Transfer (4)

ARO4050 - Aircraft Stability and Control (3) ***or***
ARO4090 - Space Vehicle Dynamics and Control (3)

ARO4060 - Vibrations and Dynamics of Aerospace Systems (3)
ARO4351L - Wind Tunnel Testing Laboratory (1)

ARO4711L - Space Launch Vehicle Design Laboratory I (2) ***or***
ARO4811L - Space Vehicle Design Laboratory I (2) ***or***
ARO4911L - Air Vehicle Design Laboratory I (2)

ARO4721L - Space Launch Vehicle Design Laboratory II (2) ***or***
ARO4821L - Space Vehicle Design Laboratory II (2) ***or***
ARO4921L - Air Vehicle Design Laboratory II (2)

CHM1150 - General Chemistry for Engineers (3)
EGR4810 - Project Design Principles and Applications (1) (B5)
EGR4820 - Project Design Principles and Applications (1) (B5)
EGR4830 - Project Design Principles and Applications (1) (B5)
IME4020 - Ethical Concepts in Technology and Applied Science (3) (B5 or C3)
MAT1140 - Calculus I (4) (B4)
MAT1150 - Calculus II (4) (B4)
MAT2140 - Calculus III (4)
MAT2240 - Elementary Linear Algebra and Differential Equations (3)
MTE2070 - Materials Science and Engineering (2)
PHY1510 - Introduction to Newtonian Mechanics (3) (B1)
PHY1510L - Newtonian Mechanics Laboratory (1) (B3)
PHY1520 - Introduction to Electromagnetism and Circuits (3)
PHY1520L - Introductory Laboratory on Electromagnetism and Circuits (1)

Major Electives — 6 units

Any combination of courses listed below will satisfy the required 6 units. Emphases are listed to provide guidance for helping students to choose courses of interest that best fit your career goals, but there is no requirement for choosing a specific emphasis for fulfilling these units.

Aeronautics Emphasis — 6 units

Emphasis Recommended — **6 units**

ARO3281 - Aerospace Structural Analysis and Design (3)
ARO3191 - Space Environment (3)
ARO4020 - Numerical Methods (3)
ARO4070 - Trajectory Design (3)
ARO4080 - Finite Element Analysis of Structures (3)
ARO4090 - Space Vehicle Dynamics and Control (3)
ARO4120 - Wing Theory (3)
ARO4140 - Rocket Propulsion (3)
ARO4180 - Computational Fluid Dynamics (3)
ARO4200 - Aerospace Program Management (3)
ARO4210 - Helicopter Aerodynamics and Performance (3)
ARO4220 - Robust Control of Nonlinear Systems (3)
ARO4260 - Surface Transportation and Power Generation Systems (3)
ARO4270 - Structural Dynamics and Aeroelasticity (3)
ARO4330 - Digital Flight Control Systems (3)
ARO4360 - Mechanics of Composite Materials (3)
ARO4430 - Aircraft System Identification (3)
ARO4450 - Optimal Control and Estimation (3)
ARO4460 - Orbit Determination and Estimation (3)
ARO4510 - Model-Based Systems Architecture (3)

Astronautics Emphasis — 6 units

Emphasis Recommended — **6 units**

ARO3120 - Aircraft Jet Propulsion (3)
ARO3191 - Space Environment (3)
ARO3281 - Aerospace Structural Analysis and Design (3)
ARO4020 - Numerical Methods (3)
ARO4050 - Aircraft Stability and Control (3)
ARO4070 - Trajectory Design (3)
ARO4080 - Finite Element Analysis of Structures (3)
ARO4120 - Wing Theory (3)
ARO4180 - Computational Fluid Dynamics (3)
ARO4200 - Aerospace Program Management (3)
ARO4210 - Helicopter Aerodynamics and Performance (3)
ARO4220 - Robust Control of Nonlinear Systems (3)
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ARO4360 - Mechanics of Composite Materials (3)
ARO4430 - Aircraft System Identification (3)
ARO4450 - Optimal Control and Estimation (3)
ARO4460 - Orbit Determination and Estimation (3)
ARO4510 - Model-Based Systems Architecture (3)

General Education Requirements — 48 Units

Students should view their Degree Progress Report (DPR) for information regarding their General Education requirements. Unless specific GE courses are required for their major, please refer to the list of approved courses in the General Education Program in the University Catalog, catalog.cpp.edu. When viewing the catalog, students should select the catalog year associated with the GE requirements listed in their Degree Progress Report.

Area A. English Language Communication and Critical Thinking (9 units)
At least 3 units from each sub-area
1. Oral Communication
2. Written Communication
3. Critical Thinking (Satisfied by completion of undergraduate Engineering degree)

Area B. Scientific Inquiry and Quantitative Reasoning (12 units)
At least 3 units from B1, B2, B4, and B5 including 1 unit of lab from B1 or B2 to fulfill B3
1. Physical Sciences
2. Life Sciences
3. Laboratory Activity
4. Mathematics/Quantitative Reasoning
5. Science and Technology Synthesis

Area C. Arts and Humanities (12 units)
At least 3 units from each sub-area and 3 additional units from sub-areas 1 and/or 2
1. Visual and Performing Arts
2. Literature, Modern Languages, Philosophy and Civilization
3. Arts and Humanities Synthesis

Area D. Social Sciences (9 units)
At least 3 units from each sub-area
1. U.S. History and American Ideals
2. U.S. Constitution and California Government
4. Social Science Synthesis

Area E. Lifelong Learning and Self-Development (3 units)
Area F. Ethnic Studies (3 units)

Interdisciplinary General Education — 18 Units

An alternate pattern for partial fulfillment of GE Areas A, C, and D available for students is the Interdisciplinary General Education (IGE) program. Students should see an advisor for specific GE coursework required by their major. Please refer to the University Catalog General Education Program section for additional information.

How IGE fulfills General Education Requirements:

Year	*Completion of IGE Courses*	*Satisfies GE Requirements*
First	*IGE 1100, IGE 1200*	*A2 and C2*
Second/Third	*IGE 2150, IGE 2250*	*D1 and C2*
	IGE 2350	*C1*
	IGE 3100	*C3 or D4*

American Institutions — 6 Units

Courses that satisfy this requirement may also satisfy GE Area D1 and D2.

Graduation Writing Test

All persons who receive undergraduate degrees from Cal Poly Pomona must pass the Graduation Writing Test (GWT). The test must be taken by the semester following completion of 60 units for undergraduates.