Aerospace Engineering, B.S.

Program Educational Objectives: Graduates of the program will have the professional and scientific education that allows them to be successful as career engineers and in graduate programs. Specifically, they will be able to (1) function in professional environments in industry, government, and academia applying and building upon engineering science knowledge, problem-solving skills, and communication skills; (2) function as members of teams and in leadership roles applying ethical and inclusive standards including the AIAA code of ethics within and beyond traditional Aerospace Engineering disciplines; and (3) remain current with technology and contemporary scientific, environmental, and societal issues, and consequently improve skills and knowledge through a lifelong process of learning. (Program educational objectives are those aspects of engineering that help shape the curriculum; achievement of these objectives is a shared responsibility between the student and UCI.)

The undergraduate Aerospace Engineering curriculum includes a core of mathematics, physics, and chemistry. Engineering courses in fundamental areas constitute much of the remaining curriculum. A few technical electives allow the undergraduate student to specialize somewhat or to pursue broader understanding. A senior capstone design experience culminates the curriculum.


Transfer Students: Preference will be given to junior-level applicants with the highest grades overall, and who have satisfactorily completed the following required courses: two years of approved calculus, one year of calculus-based physics with laboratories (mechanics, electricity and magnetism), completion of lower-division writing, one course in general chemistry (with laboratory), and one course in introductory programming. For course equivalency specific to each college, visit http://assist.org.

Students are encouraged to complete as many of the lower-division degree requirements as possible prior to transfer. Students who enroll at UCI in need of completing lower-division coursework may find that it will take longer than two years to complete their degrees. For further information, contact The Henry Samueli School of Engineering at 949-824-4334.

All students must meet the University Requirements (http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/).

All students must meet the School Requirements (http://catalogue.uci.edu/thehenrysamuelischoolofengineering/#undergraduatestudytext).

Mathematics and Basic Science Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>CHEM 1A</td>
<td>General Chemistry</td>
</tr>
<tr>
<td>or ENGR 1A</td>
<td>General Chemistry for Engineers</td>
</tr>
<tr>
<td>CHEM 1LE</td>
<td>Accelerated General Chemistry Lab</td>
</tr>
<tr>
<td>MATH 2A-2B</td>
<td>Single-Variable Calculus and Single-Variable Calculus</td>
</tr>
<tr>
<td>MATH 2D</td>
<td>Multivariable Calculus</td>
</tr>
<tr>
<td>MATH 2E</td>
<td>Multivariable Calculus</td>
</tr>
<tr>
<td>MATH 3A</td>
<td>Introduction to Linear Algebra</td>
</tr>
<tr>
<td>MATH 3D</td>
<td>Elementary Differential Equations</td>
</tr>
<tr>
<td>PHYSICS 7C</td>
<td>Classical Physics</td>
</tr>
<tr>
<td>PHYSICS 7LC</td>
<td>Classical Physics Laboratory</td>
</tr>
<tr>
<td>PHYSICS 7D-7E</td>
<td>Classical Physics and Classical Physics</td>
</tr>
<tr>
<td>PHYSICS 7LD</td>
<td>Classical Physics Laboratory</td>
</tr>
<tr>
<td>PHYSICS 52A</td>
<td>Fundamentals of Experimental Physics</td>
</tr>
</tbody>
</table>

One additional General Education Category II course offered by the Schools of Physical Sciences, Biological Sciences, or Information and Computer Sciences.

Engineering Topics Courses:

Students must complete a minimum of 24 units of engineering design.

<table>
<thead>
<tr>
<th>Core Courses:</th>
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</thead>
<tbody>
<tr>
<td>ENGR 54</td>
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<tr>
<td>ENGRMAE 10</td>
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<tr>
<td>ENGRMAE 30</td>
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<tr>
<td>ENGRMAE 60</td>
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<tr>
<td>or EECS 70A</td>
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<tr>
<td>ENGRMAE 80</td>
</tr>
</tbody>
</table>
ENGRMAE 91  Introduction to Thermodynamics
ENGRMAE 106  Mechanical Systems Laboratory
ENGRMAE 108  Aerospace Laboratory
ENGRMAE 112  Propulsion
ENGRMAE 130A  Introduction to Fluid Mechanics
ENGRMAE 130B  Introduction to Viscous and Compressible Flows
ENGRMAE 135  Compressible Flow
ENGRMAE 136  Aerodynamics
ENGRMAE 146  Astronautics
ENGRMAE 150  Mechanics of Structures
ENGRMAE 150L  Mechanics of Structures Laboratory
ENGRMAE 157  Lightweight Structures
ENGRMAE 158  Aircraft Performance
ENGRMAE 159  Aircraft Design
ENGRMAE 170  Introduction to Control Systems
ENGRMAE 175  Dynamics and Control of Aerospace Vehicles

Technical Elective Courses:
Students select a minimum of 12 units of technical electives. For students majoring in both Aerospace Engineering and Mechanical Engineering, a core course in one major cannot be counted as a technical elective in the other major. Any upper-division course in the department not used for the degree may be used as a technical elective. At least 4 units of technical electives must come from ENGRMAE upper-division courses and no more than 4 units of the technical electives should come from ENGRMAE 188, ENGRMAE 189, and ENGRMAE 199. With approval of the Undergraduate Advisor, students may choose from other departments’ upper-division courses that have primarily technical content. Preapproved courses are listed on the MAE website: http://engineering.uci.edu/files/mae-technical-electives.pdf

Engineering Professional Topics Course:
ECON 20A  Basic Economics I
or  ECON 23  Basic Economics for Engineers
ENGR 190W  Communications in the Professional World

At most an aggregate total of 4 units of 199 or H199 courses may be used to satisfy degree requirements.

(The nominal Aerospace Engineering program will require 185 units of courses to satisfy all university and major requirements. Because each student comes to UCI with a different level of preparation, the actual number of units will vary.)

Design unit values are indicated at the end of each course description. The faculty advisors and the Undergraduate Student Affairs Office can provide necessary guidance for satisfying the design requirements. Selection of elective courses must be approved by the student's faculty advisor and the departmental undergraduate advisor.

Freshman
Fall
MATH 2A
ENGRMAE 10
CHEM 1A or ENGR 1A
ENGR 7A
General Education
Winter
MATH 2B
PHYSICS 7C
PHYSICS 7LC
CHEM 1LE
ENGR 7B
General Education
Spring
MATH 2D
PHYSICS 7D
PHYSICS 7LD
Basic Science
Sophomore
Fall
MATH 3A
PHYSICS 7E
PHYSICS 52A
ENGRMAE 30
General Education
Winter
MATH 3D
ENGR 54
ENGRMAE 60
ENGRMAE 80
Spring
MATH 2E
ENGRMAE 91
ECON 23 or 20A
Junior
Fall
ENGRMAE 130A
ENGRMAE 150
ENGRMAE 150L
ENGR 190W
Winter
ENGRMAE 130B
ENGRMAE 146
ENGRMAE 157
General Education
Spring
ENGRMAE 106
ENGRMAE 108
ENGRMAE 135
General Education
<table>
<thead>
<tr>
<th>Senior</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
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<tr>
<td>ENGRMAE 112</td>
<td>ENGRMAE 158</td>
<td>ENGRMAE 159</td>
</tr>
<tr>
<td>ENGRMAE 136</td>
<td>ENGRMAE 175</td>
<td>Technical Elective</td>
</tr>
<tr>
<td>ENGRMAE 170</td>
<td>Technical Elective</td>
<td>Technical Elective</td>
</tr>
<tr>
<td>General Education</td>
<td>General Education</td>
<td>General Education</td>
</tr>
</tbody>
</table>

*ENGR 7A-ENGR 7B is a technical elective, available only to lower-division students in Fall and Winter quarters. Both ENGR 7A and ENGR 7B must be taken to count as a technical elective. If ENGR 7A-ENGR 7B is taken, this will replace one technical elective course in the senior year.

The sample program of study chart shown is typical for the major in Aerospace Engineering. This program is based upon a set of prerequisites, beginning with adequate preparation in high school mathematics, physics, and chemistry. Students should consult with their academic counselor to structure their program of study. Aerospace Engineering majors are encouraged to consult with academic counselors as needed, and students who are academically at risk are mandated to see a counselor as frequently as deemed necessary by the advising staff.