AEROSPACE ENGINEERING SCIENCES - BACHELOR OF SCIENCE (BS)

The undergraduate curriculum in Aerospace Engineering Sciences (http://www.colorado.edu/aerospace/prospective-students/undergraduates) is designed to prepare students to advance to a distinguished professional career in the aerospace industry or for graduate school, consistent with our stated Program Educational Objectives. In particular, this involves providing students with an interdisciplinary systems perspective of aerospace engineering. The curriculum accomplishes these goals by:

- providing a strong basis in mathematics, science, and engineering fundamentals;
- extending these fundamentals to advanced topics in aerospace engineering;
- complementing the engineering education with sufficient exposure to the humanities and social sciences; and
- beginning and ending in major design experiences that stress an interdisciplinary systems perspective.

AES students are also encouraged to consider a technical minor or double major in electrical engineering, computer science, applied math, engineering physics, astrophysical and planetary sciences, or atmospheric and oceanic sciences. In most cases, the junior- and senior-level courses required for the above-mentioned minors can be applied to the professional area elective requirements.

For students having sufficient ability and interest, planning for graduate study should begin by the start of the junior year. Such a plan should consider the foreign language requirements of appropriate graduate schools and an advanced mathematics program. Students who wish to combine the business and aerospace engineering sciences curricula are advised to consider obtaining the BS degree in aerospace and a master's degree in business rather than a combined BS degree.

Bioengineering Option/Premedical Curriculum

Courses can be specifically designed for students who wish either to attend medical school or to enter graduate work in bioengineering after receiving the BS degree. Students should consult their academic advisor, as well as their prehealth advisor, regularly to assure the adequacy of their curricula.

Concurrent Degree Program

BS/MS in Aerospace Engineering Sciences

The Concurrent BS/MS Program (http://www.colorado.edu/aerospace/current-students/undergraduates/bsms-degree) in Aerospace Engineering Sciences enables the program's top BS students to be admitted to the MS program during the junior or senior year, and to work thereafter toward both the BS and MS degrees in aerospace engineering sciences. This program allows for early planning of the MS portion of the student's education, taking graduate courses as part of the BS degree requirements, more flexibility in the order in which courses are taken, and more efficient use of what would otherwise be a final semester with a light credit hour load. Up to 6 credit hours may be counted towards both the BS and MS degree programs. Therefore, in theory, the minimum number of credit hours required for the concurrent BS/MS degrees will be 152. Current University of Colorado Boulder aerospace students are eligible to apply after they have completed eight core ASEN courses and have a minimum CU Boulder cumulative and ASEN major GPA of 3.250.

Requirements

Prerequisites and Passing Grades

The minimum passing grade for a course that is a prerequisite for another required course is C. If a grade of C- or lower is received in a course which is a prerequisite to another, the student may not register for the subsequent course until the first grade has been raised to a C or higher.

The minimum passing grade for a course that is not specifically a prerequisite for another required course is D-.

The Aerospace Engineering Sciences (AES) department reserves the right to drop students enrolled in ASEN courses who have not met the minimum prerequisite grade requirements. It is the student’s responsibility to communicate with the department if summer course work and/or transfer credit will be used to meet the prerequisite requirement.

Aerospace engineering students are expected to take Applied Math (APPM) courses for the required mathematics courses (APPM 1350, APPM 1360, APPM 2350, APPM 2360) once they have matriculated into the program.

Course Requirements

The BS curriculum in aerospace engineering sciences is revised annually to keep up with new advances in technology, to make use of new educational methodologies, and to satisfy updated program accreditation criteria. A total of 128 credit hours is required.

Students who are unsure of their major selection are advised to take Chemistry for Engineers & Lab (CHEN 1211/CHEM 1221) in the fall of the freshman year in case the student decides to change their major. The 5 credit hours earned for this course may then apply as free electives for ASEN majors who take the class.

Sample Four-Year Plan of Study

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
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<tr>
<td>Fall Semester</td>
<td></td>
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<tr>
<td>APPM 1350</td>
<td>Calculus 1 for Engineers</td>
<td>4</td>
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<tr>
<td>CSCI 1020</td>
<td>Computer Science 1: Starting Computing</td>
<td>4</td>
</tr>
<tr>
<td>Spring Semester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPM 1360</td>
<td>Calculus 2 for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>ASEN 1022</td>
<td>Materials Science for Aerospace Engineers</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 1110</td>
<td>General Physics 1</td>
<td>4</td>
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### Aerospace Engineering Sciences - Bachelor of Science (BS)

<table>
<thead>
<tr>
<th>Humanities or social science elective</th>
<th>Credit Hours</th>
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<td>6</td>
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#### Sophomore

**Fall Semester**

| APPM 2350 | Calculus 3 for Engineers | 4 |
| ASEN 2001 | Aerospace 1: Introduction to Statics, Structures, and Materials | 4 |
| ASEN 2002 | Aerospace 2: Introduction to Thermodynamics and Aerodynamics | 4 |
| ASEN 2012 | Experimental and Computational Methods in Aerospace Engineering Sciences | 2 |
| Free elective | Credit Hours | 3 |

**Spring Semester**

| APPM 2360 | Introduction to Differential Equations with Linear Algebra | 4 |
| ASEN 2003 | Aerospace 3: Introduction to Dynamics and Systems | 5 |
| ASEN 2004 | Aerospace 4: Aerospace Vehicle Design and Performance | 5 |
| Humanities or social science elective | Credit Hours | 3 |

#### Junior

**Fall Semester**

| ASEN 3111 | Aerodynamics | 4 |
| ASEN 3112 | Structures | 4 |
| ASEN 3113 | Thermodynamics and Heat Transfer | 4 |
| PHYS 1120 | General Physics 2 | 4 |
| ASEN 3128 | Aircraft Dynamics | 4 |

**Spring Semester**

| ASEN 3200 | Orbital Mechanics/Attitude Dynamics and Control | 4 |
| ASEN 3300 | Aerospace Electronics and Communications | 4 |

### Professional area elective

<table>
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<th>Credit Hours</th>
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<tr>
<td>15</td>
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#### Senior

**Fall Semester**

| ASEN 4013 | Foundations of Propulsion | 3 |
| ASEN 4018 | Senior Projects 1: Design Synthesis | 4 |
| College-approved writing course | Credit Hours | 3 |
| Professional area electives | Credit Hours | 6 |

**Spring Semester**

| ASEN 4028 | Senior Projects 2: Design Practicum | 4 |
| Professional area electives | Credit Hours | 6 |
| Humanities or social science elective | Credit Hours | 3 |
| Free elective | Credit Hours | 3 |

**Total Credit Hours**

### Professional Area Electives

1 Students may choose courses from the list of college-approved humanities and social sciences (HSS) electives (http://www.colorado.edu/engineering/academics/policies/hss).

2 Students may choose a course from the list of college-approved writing courses (http://www.colorado.edu/engineering/academics/policies/hss).

A full listing of approved PAE courses can be found in the degree audit.