## Aerospace Engineering and Mechanics

### Freshman Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1371 Calculus I</td>
<td>Math 1372 Calculus II</td>
</tr>
<tr>
<td>(placement into course or pre-req)</td>
<td>(1371)</td>
</tr>
<tr>
<td>Chem 1065 Chem Princ I Lab</td>
<td>Phys 1301W Intro Physics I</td>
</tr>
<tr>
<td>(1&amp;1061)</td>
<td>(1301, &amp;Math 1371)</td>
</tr>
<tr>
<td>Chem 1061 Chem Princ I</td>
<td>CSci 1113 Intro to C/C++</td>
</tr>
<tr>
<td>(placement into course or 1015, &amp;1065)</td>
<td>(Math 1371)</td>
</tr>
<tr>
<td>CSE 1001 1st Yr Experience</td>
<td>Liberal Education course or Writ 1301</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>3/4</td>
</tr>
<tr>
<td>Liberal Education course or Writ 1301</td>
<td>3/4</td>
</tr>
</tbody>
</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 2374 Multivariable Calc</td>
<td>Math 2373 Lin Alg/Diff Eq</td>
</tr>
<tr>
<td>(1372)</td>
<td>(1372)</td>
</tr>
<tr>
<td>Phys 1302W Intro Physics II</td>
<td>Phys 2303 Phys III: Matter</td>
</tr>
<tr>
<td>(1301, &amp;Math 1372)</td>
<td>(1302)</td>
</tr>
<tr>
<td>AEM 2011 Statics</td>
<td>AEM 2012 Dynamics</td>
</tr>
<tr>
<td>(Phys 1301, &amp;Math 2374)</td>
<td>(2011, &amp;Math 2373)</td>
</tr>
<tr>
<td>Mat 2001 Intro to Engr Mats</td>
<td>AEM 2301 Mechanics of Flight</td>
</tr>
<tr>
<td>(Chem 1061/65, Math 1372, Phys 1301, CSE)</td>
<td>(Phys 1301, &amp;Math 2373)</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>Liberal Education course</td>
</tr>
<tr>
<td>3/4</td>
<td>3/4</td>
</tr>
</tbody>
</table>

### Junior Year

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<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEM 4201 Fluid Mechanics</td>
<td>AEM 4202 Aerodynamics</td>
</tr>
<tr>
<td>(UD, 2012, Math 2373, Math 2374)</td>
<td>(UD, 4201)</td>
</tr>
<tr>
<td>AEM 3031 Deform Body Mech</td>
<td>AEM 4501 Aerospace Structures</td>
</tr>
<tr>
<td>(2011, Math 2374, &amp;Math 2373)</td>
<td>(UD, 3031)</td>
</tr>
<tr>
<td>AEM 3101 Simulation</td>
<td>AEM 4601 Instrumentation Lab</td>
</tr>
<tr>
<td>(UD, Math 2373)</td>
<td>(UD, EE 3005, 3006, CSci 1113)</td>
</tr>
<tr>
<td>EE 3005 Fundamentals EE</td>
<td>AEM 4301 Orbital Mechanics</td>
</tr>
<tr>
<td>(Phys 1302, Math 2373)</td>
<td>(UD, 2012, Math 2373)</td>
</tr>
<tr>
<td>EE 3006 Fund EE Lab</td>
<td>LIBERAL EDUCATION COURSE</td>
</tr>
<tr>
<td>(and 3005)</td>
<td>3/4</td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 3324 Intro to Thermal Sci</td>
<td>AEM 4203 Aerospace Propulsion</td>
</tr>
<tr>
<td>(Chem 1061/65, Phys 1301, Math 2373)</td>
<td>(UD, 4202)</td>
</tr>
<tr>
<td>AEM 4331 Aero Vehicle Design</td>
<td>AEM 4303W Flight Dyn Control</td>
</tr>
<tr>
<td>(AEM Sr., 2301, 4202)</td>
<td>(UD, 2012, 2301, 3101, Writ 1301</td>
</tr>
<tr>
<td>AEM 4602W Aeromechanics Lab</td>
<td>Technical Elective I</td>
</tr>
<tr>
<td>(UD, 4201, 4501, 4601, Writ 1301)</td>
<td>3</td>
</tr>
<tr>
<td>Technical Elective III</td>
<td>3/4</td>
</tr>
</tbody>
</table>

## About This Plan

- This plan is not a contract. Curriculum can change. The APAS is the official method for tracking completion of University degree requirements.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title. Upper Division (UD) requires admission to the major prior to enrollment.
- Students can take either the CSE-only or University-wide versions of the math courses (1371/1271, 1372/1272, 2373/2243, 2374/2263).

## Applying to Your Major

Students who have completed the required courses for admission to this major (indicated with double boxes on plan) and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

## Total Credits Needed for Degree: 122
Aerospace Engineering and Mechanics

**POSSIBLE POSITIONS**

- **Analytical engineer**: Conducts in-depth assessments of proposed products and evaluates whether the design of each product meets customer requirements.
- **Design engineer**: Takes the concept or working model of a product to create a design that meets the customer’s requirements, industry standards, and can be manufactured economically.
- **Development engineer**: Applies research findings to develop new or improved products or manufacturing processes.
- **Field service engineer**: Examines performance reports on products and makes recommendations to solve problems.
- **Manufacturing engineer**: Plans the tooling, construction, and assembly of the product as dictated by the design specifications.
- **Project engineer**: Plans, directs, and coordinates activities of company projects.
- **Systems engineer**: Performs the requirements, analysis, and definition of the overall system and its subsystem.
- **Test engineer**: Designs and oversees the performance testing of products in wind tunnels and in flight.

**INDUSTRIES**

- Aircraft design
- Aircraft parts manufacturing
- Airlines
- Consulting
- Heating, Ventilation, AC
- Higher education
- Insurance
- Marketing
- National defense
- Propulsion Engineering
- Research
- Rocketry
- Satellites
- Space flight
- Transportation

**EMPLOYERS**

- 3M
- Aster Labs
- Boeing
- Boston Scientific
- Carl Zeiss Industrial Metrology, LLC
- Eaton Corporation
- Federal Aviation Administration
- Ford Motor Company
- General Electric
- Honeywell
- HUSCO International
- Lockheed Martin
- NASA
- NAVAIR
- Northrop Grumman
- Medtronic
- Orbital ATK
- Sierra Nevada Corporation
- United Launch Alliance
- UTC Aerospace Systems
- Virgin Galactic

**CSE Career Outcomes**

**Average Starting Salary:**

$66,280*

**Post-graduation Outcomes:**

- Employed: 78.3%
- Grad School: 20%
- Other: 1.7%

*Some of these positions may require an advanced degree.*

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- HUSCO International
- Lockheed Martin
- NASA
- NAVAIR
- Northrop Grumman
- Medtronic
- Orbital ATK
- Sierra Nevada Corporation
- United Launch Alliance
- UTC Aerospace Systems
- Virgin Galactic

**More Information**

Career Center: [cse.umn.edu/career](http://cse.umn.edu/career)

Salary Information: [z.umn.edu/csesalary](http://z.umn.edu/csesalary)

More Information on Undergraduate Majors: [cse.umn.edu/majors](http://cse.umn.edu/majors)

Please visit the Career Center to continue exploring this major.

*Salary and Career Outcomes gathered from the 2016-2017 CSE Graduation Survey.

Post-graduation outcomes reflect the percentage of students who were employed full-time in their field or were enrolled in a graduate program.*