AEROSPACE ENGINEERING - BS

Coursework in aerodynamics, structures and materials, propulsion, and dynamics and control provide a strong fundamental basis for advanced study and specialization, while technical electives offer a concentration of study in fields of special interest. Design philosophy and practice are developed throughout the curriculum to relate analysis to aerospace engineering design. The design of aerospace system components is particularly emphasized in the junior- and senior-level courses. A senior-level two-semester design sequence, involving specific goals, objectives, and constraints, integrates analysis and design tools and requires students working in small teams to design, build, test, and even fly an aerospace system, such as an aircraft, rocket, or spacecraft. Application of modern engineering and computational tools is required and emphasized in all courses.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, industrial distribution, industrial engineering, manufacturing and mechanical engineering technology, mechanical engineering, multidisciplinary engineering technology, nuclear engineering, ocean engineering, and petroleum engineering (Note: not all programs listed are offered in Qatar). The freshman year is slightly different for chemical engineering in that students take CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Biomedical Engineering also requires a two semester sequence of chemistry courses consisting of CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. Students pursuing degrees in biological and agricultural engineering should refer to the specific curriculum for this major. It is recognized that many students will change the sequence and number of courses taken in any semester. Deviations from the prescribed course sequence, however, should be made with care to ensure that prerequisites for all courses are met.

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students 1,4</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory 1,4</td>
</tr>
<tr>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition 1, or Composition and Rhetoric</td>
</tr>
<tr>
<td>ENGR 102</td>
<td>Engineering Lab I - Computation 1</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I 1,2</td>
</tr>
<tr>
<td>University Core Curriculum (<a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum</a>) 3</td>
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<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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<tr>
<td>Spring</td>
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<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II 1,4</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
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Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>AERO 201</td>
<td>Introduction to Flight 1</td>
</tr>
<tr>
<td>AERO 212</td>
<td>Introduction to Aerothermodynamics 1</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III 1</td>
</tr>
<tr>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering and Science 1</td>
</tr>
<tr>
<td>PHYS 217/ ENGR 217</td>
<td>Experimental Physics and Engineering Lab III - Electricity and Magnetism 1</td>
</tr>
<tr>
<td>Select one from the following:</td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking 1</td>
</tr>
<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions 1</td>
</tr>
<tr>
<td>COMM 243</td>
<td>Argumentation and Debate 1</td>
</tr>
<tr>
<td>ENGL 210</td>
<td>Technical and Business Writing 1</td>
</tr>
<tr>
<td><strong>Total Semester Credit Hours</strong></td>
<td></td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
2 Entering students will be given a math placement exam. Test results will be used in selecting the appropriate starting course which may be at a higher or lower level.
3 Of the 18 hours shown as University Core Curriculum electives, 3 must be from creative arts, 3 from social and behavioral sciences (see IDIS curriculum for more information), 6 from American history and 6 from government/political science. The required 6 hours from international and cultural diversity may be met by courses satisfying the creative arts, social and behavioral sciences and American history requirements if they are also on the approved list of international and cultural diversity courses.
4 BMEN, CHEN and MSEN require 8 hours of freshman chemistry, which may be satisfied by CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112; Credit by Examination (CBE) for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 plus CHEM 102/CHEM 112; or 8 hours of CBE for CHEM 101/CHEM 111 or CHEM 107/CHEM 117 and CHEM 102/CHEM 112. BMEN, CHEN and MSEN should take CHEM 102/CHEM 112 second semester freshman year. CPSC students may take CHEM 101/CHEM 111 or CHEM 107. CHEM 102/CHEM 112 will substitute for CHEM 107.
5 For BS-PETE, allocate 3 hours to core communications course (ENG 210, COMM 203, COMM 205, or COMM 243) and/or 3 hours to UCC elective. For BS-MEEN, allocate 3 hours to core communications course (ENG 203, ENGL 210, or COMM 209) and/or 3 hours to UCC elective.
### Third Year

#### Fall
- AERO 301: Theoretical Aerodynamics 1  
  3
- AERO 304: Aerospace Structural Analysis I 1  
  3
- AERO 307: Aerospace Engineering Laboratory 1  
  3
- AERO 310: Aerospace Dynamics 1  
  3
- University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum) 3  
  6

**Semester Credit Hours**: 18

#### Spring
- AERO 303: High Speed Aerodynamics 1  
  3
- AERO 306: Aerospace Structural Analysis II 1  
  3
- AERO 321: Dynamics of Aerospace Vehicles 1  
  3
- AERO 351: Aerothermodynamics and Propulsion 1  
  3
- University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum) 3  
  6

**Semester Credit Hours**: 15

### Fourth Year

#### Fall
- AERO 401: Aerospace Vehicle Design I 1,6  
  3
- AERO 413: Aerospace Materials Science  
  3
- AERO 423: Orbital Mechanics  
  3
- AERO 430: Numerical Simulation  
  3
- or MATH 401 or Advanced Engineering Mathematics  
  3
- Select one of the following: 3
  - AERO 405: Aerospace Structural Design  
  - AERO 417: Aerospace Propulsion  
  - AERO 426: Space System Design  
  - AERO 428: Electromagnetic Sensing for Space-Borne Imaging  
  - AERO 451: Human Spaceflight Operations  
  - AERO 472: Airfoil and Wing Design  

**Semester Credit Hours**: 15

#### Spring
- AERO 402: Aerospace Vehicle Design II 6  
  2
- AERO 422: Active Controls for Aerospace Vehicles  
  3
- AERO 452: Heat Transfer and Viscous Flows  
  3
- ENGR 482/PHIL 482: Ethics and Engineering  
  3
- Select two of the following: 6

### Total Program Hours 128

6 Three design options are available - Aircraft, Rocket, or Spacecraft Design. A two-semester sequence is required.

7 All students are required to complete a high-impact experience in order to graduate. The list of possible high-impact experiences is available in the AERO advising office.