AEROSPACE ENGINEERING - BS

Coursework in aerodynamics, materials and structures, propulsion, and dynamics and control of aircraft and spacecraft provide a strong fundamental basis for advanced study and specialization, while senior technical electives offer a concentration of study in fields of special interest. Design is emphasized particularly in senior design electives and a senior-level two-semester design sequence involving specific goals, objectives, and constraints, which integrates analysis and design tools and requires students working in teams to design, and in some cases build, test, and deploy an aerospace system, such as an aircraft, rotorcraft, flight simulator, morphing air or space structure, space suit, space habitat, or a mission to Mars. Application of modern engineering and computational tools is required and emphasized in most courses.

Program Requirements

The freshman year is identical for degrees in aerospace engineering, architectural engineering, civil engineering, computer engineering, computer science, electrical engineering, electronic systems engineering technology, environmental engineering, industrial distribution, industrial engineering, interdisciplinary 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, biomedical engineering and materials science and engineering degrees in that students take CHEM 119 or CHEM 107/CHM 117 and CHEM 120. 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>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 216/217</td>
<td>Experimental Physics and Engineering Lab II - Mechanics</td>
<td>2</td>
</tr>
<tr>
<td>Fall</td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Spring</td>
<td>PHYS 206</td>
<td>Newtonian Mechanics for Engineering and Science</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>ENGL 103</td>
<td>Introduction to Rhetoric and Composition</td>
<td>1</td>
</tr>
<tr>
<td>Spring</td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>Fall</td>
<td>ENGR 102</td>
<td>Engineering Lab I - Computation</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>University Core Curriculum</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>AERO 201</td>
<td>Introduction to Flight</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>AERO 211</td>
<td>Aerospace Engineering Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>AERO 212</td>
<td>Introduction to Aerothermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td>Spring</td>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering and Science</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>PHYS 217/218</td>
<td>Experimental Physics and Engineering Lab III - Electricity and Magnetism</td>
<td>2</td>
</tr>
<tr>
<td>Fall</td>
<td>AERO 214</td>
<td>Introduction to Aerospace Mechanics of Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

Semester Credit Hours: 15-16

Total Semester Credit Hours: 31-32

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 21 hours shown as University Core Curriculum electives, 3 must be from creative arts (see AREN curriculum for more information), 3 from social and behavioral sciences (see IDSIS curriculum for more information), 3 from language, philosophy and culture (see CVEN, EVEN and PETE curriculum for more information), 6 from American history and 6 from government/political science. The required 3 hours of international and cultural diversity and 3 hours of cultural discourse may be met by courses satisfying the creative arts, social and behavioral sciences, language, philosophy and culture, and American history requirements if they are also on the approved list of international and cultural diversity (http://catalog.tamu.edu/undergraduate/general-information/degree-information/international-cultural-diversity-requirements/) courses and cultural discourse (http://catalog.tamu.edu/undergraduate/general-information/degree-information/cultural-discourse-requirements/) courses.
4 BMEN, CHEN and MSEN require 8 hours of fundamentals of chemistry which are satisfied with CHEM 119 or CHEM 107/CHM 117 and CHEM 120; Students with an interest in BMEN, CHEN and MSEN can take CHEM 120 second semester freshman year. CHEM 120 will substitute for CHEM 107/CHM 117.
5 For BS-PETE, allocate 3 hours to core communications course (ENGL 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 (ENGL 203, ENGL 210, or COMM 205) and/or 3 hours to UCC elective.
Aerospace Engineering - BS

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERO 222</td>
<td>Introduction to Aerospace Computation</td>
<td>3</td>
</tr>
<tr>
<td>AERO 301</td>
<td>Theoretical Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:  

- COMM 203 Public Speaking  
- COMM 205 Communication for Technical Professions  
- COMM 243 Argumentation and Debate  
- ENGL 210 Technical and Professional Writing

High Impact Experience  

AERO 299 Mid-Curriculum Professional Development  

Semester Credit Hours 15

Third Year  

Fall  

- AERO 303 High Speed Aerodynamics  
- AERO 304 Aerospace Structural Analysis I  
- AERO 310 Aerospace Dynamics  
- ECEN 215 Principles of Electrical Engineering  

University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  

Semester Credit Hours 18

Spring  

- AERO 306 Aerospace Structural Analysis II  
- AERO 307 Aerospace Engineering Laboratory  
- AERO 321 Dynamics of Aerospace Vehicles  
- AERO 351 Aerothermodynamics and Propulsion  

University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  

Semester Credit Hours 15

Fourth Year  

Fall  

- AERO 401 Aerospace Design Principles  
- AERO 413 Aerospace Materials Science  
- AERO 423 Orbital Mechanics  

Select one of the following:  

- AERO 430 Numerical Simulation  
- MATH 401 Advanced Engineering Mathematics  
- MATH 412 Theory of Partial Differential Equations

Select one of the following:  

- AERO 405 Aerospace Structural Design  
- AERO 417 Aerospace Propulsion  
- AERO 419 Chemical Rocket 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 Systems Design  
- AERO 422 Active Controls for Aerospace Vehicles  
- AERO 452 Heat Transfer and Viscous Flows  

Select two of the following:  

- AERO 404 Mechanics of Advanced Aerospace Structures  
- AERO 405 Aerospace Structural Design  
- AERO 411 Applications of Fracture Mechanics to Aerospace Structures  
- AERO 414 Human Performance in Aerospace Environments  
- AERO 415 Computational Fluid Dynamics for Aerospace Applications  
- AERO 417 Aerospace Propulsion  
- AERO 419 Chemical Rocket Propulsion  
- AERO 420 Aeroelasticity  
- AERO 424 Spacecraft Attitude Dynamics and Control  
- AERO 425 Flight Test Engineering  
- AERO 426 Space System Design  
- AERO 428 Electromagnetic Sensing for Space-Borne Imaging  
- AERO 430 Numerical Simulation  
- AERO 435 Aerothermochemistry  
- AERO 440 Cockpit Systems and Displays  
- AERO 445 Vehicle Management Systems  
- AERO 451 Human Spaceflight Operations  
- AERO 455 Helicopter Aerodynamics  
- AERO 472 Airfoil and Wing Design  
- AERO 489 Special Topics in...  
- ECEN 421 Digital Control Systems  

University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  

Semester Credit Hours 17

Total Semester Credit Hours 97

6 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.

7 A two-semester sequence is required.

Total Program Hours 128