MATERIALS SCIENCE AND ENGINEERING - BS

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/CHEM 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>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students 1,4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students Laboratory 1,4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition or Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 102</td>
<td>Engineering Lab I - Computation 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I 1,2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<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>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab II - Mechanics 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 216</td>
<td>II - Mechanics 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II 1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>PHYS 206</td>
<td>Newtonian Mechanics for Engineering and Science 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<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>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>CHEM 120</td>
<td>Fundamentals of Chemistry II 1,4</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<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>) 3,3</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>15-16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Semester Credit Hours</td>
<td>31-32</td>
</tr>
</tbody>
</table>

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 IDIS 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/CHEM 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/CHEM 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.

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGR 217/</td>
<td>Experimental Physics and Engineering Lab III - Electricity and Magnetism 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 217</td>
<td>III - Electricity and Magnetism 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 251</td>
<td>Engineering Mathematics III 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 201</td>
<td>Fundamentals of Materials Science and Engineering 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 205</td>
<td>Materials in Society 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering and Science 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<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>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>16</td>
</tr>
<tr>
<td>Spring</td>
<td>COMM 205 or ENGL 210</td>
<td>Communication for Technical Professions 1 or Technical and Professional Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 210</td>
<td>Thermodynamics of Materials 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 250</td>
<td>Soft Matter 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 260</td>
<td>Structure of Materials 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 281</td>
<td>Materials Science and Engineering Seminar 1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MSEN 301</td>
<td>Unified Materials Lab I 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MSEN 380</td>
<td>Communicating Materials Science and Engineering 1,6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semester Credit Hours</td>
<td>17</td>
</tr>
</tbody>
</table>

1 A grade of C or better is required.
<table>
<thead>
<tr>
<th>Third Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>MATH 307</td>
<td>Mathematical Methods for Material Scientists and Engineers</td>
</tr>
<tr>
<td>MSEN 302</td>
<td>Unified Materials Lab II</td>
</tr>
<tr>
<td>MSEN 305</td>
<td>Kinetics of Materials</td>
</tr>
<tr>
<td>MSEN 320</td>
<td>Deformation and Failure Mechanisms in Engineering Materials</td>
</tr>
<tr>
<td>University Core Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>High Impact Experience</td>
<td>0</td>
</tr>
<tr>
<td>MSEN 399</td>
<td>High Impact Professional Development</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MSEN 325</td>
<td>Properties of Functional Materials</td>
</tr>
<tr>
<td>MSEN 330</td>
<td>Numerical Methods for Materials Scientists and Engineers</td>
</tr>
<tr>
<td>MSEN 360</td>
<td>Materials Characterization</td>
</tr>
<tr>
<td>MSEN 400</td>
<td>Design and Analysis of Materials Experiments</td>
</tr>
<tr>
<td>University Core Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fourth Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>MSEN 401</td>
<td>Materials Design</td>
</tr>
<tr>
<td>MSEN 410</td>
<td>Materials Processing</td>
</tr>
<tr>
<td>University Core Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>Specialty elective</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MSEN 402</td>
<td>Materials Design II</td>
</tr>
<tr>
<td>University Core Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>Specialty elective</td>
<td>6</td>
</tr>
<tr>
<td>Technical elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

| Total Semester Credit Hours | 96 |

---

6. This is a writing intensive course.

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

8. With MSEN department approval, students may use up to a combined total of 6 hours of 484, 485, 491, and ENGR 385 courses to meet Specialty and Technical Elective requirements on their degree plan.

9. Select from any MSEN 300-499 (http://catalog.tamu.edu/undergraduate/course-descriptions/msen/) course not used elsewhere.