NUCLEAR ENGINEERING - BS

The Bachelor of Science in Nuclear Engineering degree program aims to educate and prepare future nuclear engineering professionals, researchers and leaders in the fields of nuclear science and nuclear technologies, including nuclear reactor design/operation/simulation/maintenance, nuclear energy production, radiation detection, radiological health technologies, computational methods/developments, nuclear materials, nuclear security and nuclear policies. The program is built upon a solid foundation and training from physics, mathematics and mechanical engineering. The program integrates fundamentals, applications and hands-on practices in nuclear-specific topics. Upon graduation, students are ready for jobs in academic fields, national laboratories, industry and professional schools. Students can expect to be instilled with the highest standards of professional and ethical behavior, and prepared to meet the complex challenges associated with nuclear science and engineering.

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>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 107</td>
<td>General Chemistry for Engineering</td>
<td>3</td>
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<tr>
<td></td>
<td>CHEM 117</td>
<td>General Chemistry for Engineering Students</td>
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<tr>
<td></td>
<td>ENGL 103 or ENGL 104</td>
<td>Introduction to Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 102</td>
<td>Engineering Lab I - Computation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
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<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>)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab II - Mechanics</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 216</td>
<td>Engineering Mathematics II</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td></td>
<td>Total Semester Credit Hours</td>
<td>15-16</td>
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<td>PHYS 216</td>
<td>Engineering Mathematics II</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</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 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>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGR 217/</td>
<td>Experimental Physics and Engineering Lab III - Electricity and Magnetism</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PHYS 217</td>
<td>Electricity and Magnetism and Science</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MEEN 221</td>
<td>Statics and Particle Dynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>NUEN 101</td>
<td>Principles of Nuclear Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>NUEN 201</td>
<td>Introduction to Nuclear Engineering I</td>
<td>3</td>
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</table>

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<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab II - Mechanics</td>
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<tr>
<td></td>
<td>PHYS 216</td>
<td>Engineering Mathematics II</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
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<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab II - Mechanics</td>
<td>2</td>
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<td>PHYS 216</td>
<td>Engineering Mathematics II</td>
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<td></td>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
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</table>
### Nuclear Engineering - BS

#### University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/) ³

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEN 215</td>
<td>Principles of Electrical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MATH 308</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 265</td>
<td>Materials Science for Nuclear Energy Applications</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 315</td>
<td>Principles of Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or NUEN 315</td>
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</tr>
<tr>
<td>NUEN 302</td>
<td>Introduction to Nuclear Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>High Impact Experience</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>NUEN 102</td>
<td>Nuclear Engineering Practice</td>
<td>3</td>
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</table>

**Semester Credit Hours**  **18**

#### Third Year

### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 309</td>
<td>Linear Algebra for Differential Equations ¹</td>
<td>3</td>
</tr>
<tr>
<td>MEEN 344</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 301</td>
<td>Nuclear Reactor Theory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 309/SENG 309</td>
<td>Radiological Safety</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
<td></td>
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<tr>
<td>COMM 203</td>
<td>Public Speaking</td>
<td>3</td>
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<tr>
<td>COMM 205</td>
<td>Communication for Technical Professions</td>
<td></td>
</tr>
<tr>
<td>ENGL 203</td>
<td>Writing about Literature</td>
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<tr>
<td>ENGL 210</td>
<td>Technical and Professional Writing</td>
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</table>

**Semester Credit Hours**  **15**

### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ISEN 302</td>
<td>Economic Analysis of Engineering Projects</td>
<td>2</td>
</tr>
<tr>
<td>MEEN 461</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 303</td>
<td>Radiation Detection and Isotope Technology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 304</td>
<td>Nuclear Reactor Analysis</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 329</td>
<td>Analytical and Numerical Methods</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MATH 417</td>
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</table>

**Semester Credit Hours**  **14**

### Fourth Year

### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN 405</td>
<td>Nuclear Engineering Experiments</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 406</td>
<td>Nuclear Engineering Systems and Design</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
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<td></td>
</tr>
<tr>
<td>NUEN 418</td>
<td>Fuel Assembly and 3-D Reactor Core Design and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>NUEN 430</td>
<td>Computer Applications in Nuclear Engineering</td>
<td></td>
</tr>
<tr>
<td>NUEN 460</td>
<td>Nuclear Plant Systems and Transients</td>
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</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>
<td>3</td>
<td></td>
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<tr>
<td>Technical elective ⁷</td>
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</table>

**Semester Credit Hours**  **15**

### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEN 410</td>
<td>The Design of Nuclear Reactors</td>
<td>4</td>
</tr>
</tbody>
</table>

**Semester Credit Hours**  **17**

**Total Semester Credit Hours**  **94**

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 NUEN advising office.

⁷ As approved by departmental advisor.

**Total Program Hours 125**