INDUSTRIAL ENGINEERING - BS

Industrial and systems engineering is a discipline devoted to the design, installation, improvement and control of integrated systems of people, materials, and facilities across a wide range of organizations that produce goods or render services. Like other engineering fields, industrial and systems engineering is concerned with solving problems through the application of specialized knowledge in mathematics and science, as well as the principles of engineering. Two major distinctions of our discipline, among the engineering disciplines, is the unique focus of industrial and systems engineering on human factors and the quantification and systematic removal of uncertainty from production systems. Industrial and systems engineering has five major focus areas: advanced manufacturing, operations research, data sciences and machine learning, health and human systems, and systems 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 Credit Hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></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 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>
<td>3</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
</tr>
<tr>
<td>ENGR 216/</td>
<td>Experimental Physics and Engineering Lab II - Mechanics 1</td>
</tr>
<tr>
<td>PHYS 216</td>
<td>Engineering Mathematics II 1</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics I 1</td>
</tr>
</tbody>
</table>

Second Year

<table>
<thead>
<tr>
<th>Semester Credit Hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ENGR 217/PHYS 217</td>
<td>Experimental Physics and Engineering Lab III - Electricity and Magnetism 1</td>
</tr>
<tr>
<td>ISEN 210</td>
<td>Fundamentals of Industrial Engineering Design</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Engineering Mathematics III</td>
</tr>
<tr>
<td>PHYS 207</td>
<td>Electricity and Magnetism for Engineering and Science 1</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>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>4</td>
</tr>
<tr>
<td>CSCE 110</td>
<td>Programming I</td>
</tr>
<tr>
<td>CSCE 111</td>
<td>Introduction to Computer Science Concepts and Programming</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.
CSCE 121  | Introduction to Program Design and Concepts  |  |  
CSCE 206  | Structured Programming in C  |  |  

**Semester Credit Hours** 16

### Spring

- ISEN 230  | Informatics for Industrial Engineers  | 3  
- MATH 304  | Linear Algebra  | 3  
- MEEN 221  | Statics and Particle Dynamics  | 3  
- MMET 181  | Manufacturing and Assembly Processes I  | 3  
  or ISEN 281  | Essentials of Modern Manufacturing Methods for Engineering Design  |  |  
- STAT 211  | Principles of Statistics I  | 3  
- Select one of the following:  | 3  
  - COMM 203  | Public Speaking  |  
  - COMM 205  | Communication for Technical Professions  |  
  - ENGL 203  | Writing about Literature  |  
  - ENGL 210  | Technical and Professional Writing  |  

**Semester Credit Hours** 18

### Third Year

#### Fall

- ISEN 310  | Uncertainty Modeling for Industrial Engineering  | 3  
- ISEN 320  | Operations Research I  | 3  
- ISEN 330  | Human Systems Interaction  | 3  
- MATH 308  | Differential Equations  | 3  
- MSEN 222/MEEN 222  | Materials Science  | 3  
- Select one of the following:  | 3  
  - BAEN 320  | Engineering Thermodynamics  |  
  - ECEN 215  | Principles of Electrical Engineering  |  
  - MEEN 315  | Principles of Thermodynamics  |  

**Semester Credit Hours** 18

#### Spring

- ISEN 340  | Operations Research II  | 3  
- ISEN 350  | Quality Engineering  | 3  
- ISEN 355  | System Simulation  | 3  
- ISEN 370  | Production Systems Engineering  | 3  
- University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  | 3  
- High Impact Experience  | 0  
- ISEN 399  | Professional Development  |  

**Semester Credit Hours** 15

### Fourth Year

#### Fall

- University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  | 6  
- Technical electives  | 9  

**Semester Credit Hours** 15

#### Spring

- ISEN 460  | Capstone Senior Design  | 3  

**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 INEN advising office.

7 A total of 18 hours of technical electives is required, of which 12 hours must be industrial engineering courses. The choice of courses to be taken must be made in consultation with the student’s advisor and/or the Industrial Engineering Advising Office.

The Bachelor of Science degree in Industrial Engineering requires a grade of C or better for required industrial engineering (ISEN) courses. If a course is repeated, only the most recent grade is used in fulfilling this requirement.

**Total Program Hours 128**