INDUSTRIAL ENGINEERING - 5-YEAR BACHELOR OF SCIENCE/MASTER OF PUBLIC HEALTH IN OCCUPATIONAL SAFETY AND HEALTH

The National Science Foundation (NSF) Engineering Research Center (ERC) on Precise Advanced Technologies and Health Systems for Underserved Populations (PATHS-UP), has a goal of addressing the grand challenge of overcoming the human and economic burden of diabetes and heart disease in underserved communities. The proposed combined program, BS in Industrial Engineering and MPH in Occupational Safety & Health, helps satisfy the need for engineers with formal education in health to bolster the quality of life to the public in underserved areas. In particular, our engineers will be immersed in the practical health related issues prevalent in these areas and help engineer technologies that can overcome the barriers usually faced by point-of-care devices. A second goal of the PATHS-UP program is to recruit and educate a diverse group of scientists and engineers who will lead the future in developing enabling technologies to improve health in underserved communities. This combined program is targeted at accomplishing this second goal, thus enabling the first.

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</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>CHEM 107, General Chemistry for Engineering Students 1,4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CHEM 117, General Chemistry for Engineering Students Laboratory 1,4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ENGL 103, Introduction to Rhetoric and Composition 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 102, Engineering Lab I - Computation 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151, 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>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGR 216/PHYS 216, Experimental Physics and Engineering Lab II - Mechanics 1</td>
<td>2</td>
</tr>
<tr>
<td>MATH 152, Engineering Mathematics II 1</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 206, Newtonian Mechanics for Engineering and Science 1</td>
<td>3</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>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 120, Fundamentals of Chemistry II 4</td>
<td>3-4</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>) 3,5</td>
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</tr>
</tbody>
</table>

Total Semester Credit Hours: 15-16

Second Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGR 217/PHYS 217, Experimental Physics and Engineering Lab III - Electricity and Magnetism 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>ENGL 103, Introduction to Rhetoric and Composition 1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ENGR 102, Engineering Lab I - Computation 1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>MATH 151, 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>
</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, 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 cultural, 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 freshman chemistry, which may be satisfied by CHEM 119 or CHEM 107/CHEM 117 and CHEM 120; Credit by Examination (CBE) for CHEM 119 plus CHEM 120; or 8 hours of CBE for CHEM 119 and CHEM 120. BMEN, CHEN and MSEN should 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.
MATH 251  Engineering Mathematics III  3  
MMET 181  Manufacturing and Assembly Processes I  3  
PHYS 207  Electricity and Magnetism for Engineering and Science  3  
STAT 211  Principles of Statistics I  3  
Select one of the following:  4  
CSCE 110  Programming I  
CSCE 111  Introduction to Computer Science Concepts and Programming  
CSCE 121  Introduction to Program Design and Concepts  
CSCE 206  Structured Programming in C  

Semester Credit Hours  18  
Spring  
ISEN 310  Uncertainty Modeling for Industrial Engineering  3  
ISEN 210  Fundamentals of Industrial Engineering Design  4  
ISEN 230  Informatics for Industrial Engineers  3  
MATH 304  Linear Algebra  3  
MEEN 221  Statics and Particle Dynamics  3  
Select one of the following:  
ENGL 210  Technical and Business Writing  
ENGL 203  Writing about Literature  
COMM 203  Public Speaking  
COMM 205  Communication for Technical Professions  
Semester Credit Hours  16  

Third Year  
Fall  
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  15  
Spring  
ISEN 340  Operations Research II  3  
ISEN 350  Quality Engineering  3  
ISEN 355  System Simulation  3  
ISEN 370  Production Systems Engineering  3  
High Impact Experience  0  
ISEN 399  Professional Development  
University Core Curriculum (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/)  6  
Semester Credit Hours  18  

Fourth Year  
Fall  
PHEO 618  Occupational Safety  3  
SOPH 601  Thinking in Populations: The Public Health Mindset  2  
SOPH 602  Investigation and Control: Acute Public Health Events  3  
SOPH 603  Assessment and Intervention: Wicked Problems in Public Health  3  
Technical elective  6  
Spring  
ISEN 460  Capstone Senior Design  3  
PHEO 640  Industrial Hygiene  3  
PHEO 678  Occupational Biomechanics  3  
SOPH 604  Framing and Persuasion: Public Health in the Public Sphere  1  
University Core Curriculum  3  
Semester Credit Hours  17  

Summer  
PHEO 684  Practicum  3  
University Core Curriculum  3  
Semester Credit Hours  13  
Fifth Year  
Fall  
ISEN 630  or ISEN 631  Human Operator in Complex Systems or Cognitive Systems Engineering  3  
PHEO 630  Environmental/Occupational Diseases  3  
PHEO 682  Industrial and System Safety  3  
PHEB 602  Biostatistics I  3  
Semester Credit Hours  12  
Spring  
PHEO 655  Human Factors  3  
PHEO 679  Ergonomics of the Upper Extremities  3  
SOPH 680  Public Health Capstone  3  
Select one of the following:  3  
PHEO 645  Health and Safety at Hazardous Waste Sites  
ISEN/PHEO elective  8  
Semester Credit Hours  12  
Total Semester Credit Hours  127  

Courses taken for credit in both the undergraduate and graduate degree for a combined total of 12 hours: PHEO 618, PHEO 640, PHEO 678, PHEO 679.  
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.  
ISEN/PHEO electives are approved by the BS/MPH program director and graduate advisor.  
The program includes a total of 170 hours which up to 12 hours may be applied toward both the Bachelor of Science in Industrial Engineering and the Master of Public Health in Occupational Safety and Health.
Total Program Hours 170