

# 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

Fall		Semester Credit Hours
CHEM 107	General Chemistry for Engineering Students <sup>1,4</sup>	3
CHEM 117	General Chemistry for Engineering Students Laboratory <sup>1,4</sup>	1
ENGL 103 or ENGL 104	Introduction to Rhetoric and Composition <sup>1</sup> or Composition and Rhetoric	3
ENGR 102	Engineering Lab I - Computation <sup>1</sup>	2
MATH 151	Engineering Mathematics I <sup>1,2</sup>	4
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> ) <sup>3</sup>		3
Semester Credit Hours		16

### Spring

ENGR 216/ PHYS 216	Experimental Physics and Engineering Lab II - Mechanics <sup>1</sup>	2
MATH 152	Engineering Mathematics II <sup>1</sup>	4

PHYS 206	Newtonian Mechanics for Engineering and Science <sup>1</sup>	3
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> ) <sup>3</sup>		3
Select one of the following:		3-4
CHEM 120	Fundamentals of Chemistry II <sup>4</sup>	
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> ) <sup>3,5</sup>		
Semester Credit Hours		15-16
Total Semester Credit Hours		31-32

- <sup>1</sup> A grade of C or better is required.
- <sup>2</sup> 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.
- <sup>3</sup> 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 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.
- <sup>4</sup> 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.
- <sup>5</sup> 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

Fall		Semester Credit Hours
ENGR 217/ PHYS 217	Experimental Physics and Engineering Lab III - Electricity and Magnetism <sup>1</sup>	2
MATH 251	Engineering Mathematics III	3
MMET 181	Manufacturing and Assembly Processes I	3
PHYS 207	Electricity and Magnetism for Engineering and Science <sup>1</sup>	3
STAT 211	Principles of Statistics I	3
Select one of the following:		4
CSC 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**

MATH 304	Linear Algebra	3
ISEN 210	Fundamentals of Industrial Engineering Design	4
ISEN 230	Informatics for Industrial Engineers	3
MEEN 222/ MSEN 222	Materials Science	3
MEEN 221	Statics and Particle Dynamics	3
Semester Credit Hours		16

**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
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 Business Writing	
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 ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/</a> ) <sup>3</sup>		3
High Impact Experience <sup>6</sup>		0
ISEN 399	Professional Development	
Semester Credit Hours		15

**Fourth Year****Fall**

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> ) <sup>3</sup>		6
Technical electives <sup>7</sup>		9
Semester Credit Hours		15

**Spring**

ISEN 460	Capstone Senior Design	3
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Technical electives <sup>7</sup>		9
Semester Credit Hours		15
Total Semester Credit Hours		97

<sup>6</sup> 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.

<sup>7</sup> 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