# DOUBLE-DEGREE BS IN INDUSTRIAL ENGINEERING AND BS IN HEALTH SCIENCE STUDIES

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Industrial engineering is a diverse discipline that includes healthcare as one of the major focus areas of interest. Health Sciences and Industrial Engineering as a double major enables students to learn concepts and gain experience in both science and engineering of health systems. The graduates of the double major are not only expected to grow in knowledge in health systems but also to become strong members of the health system societies. They would be able to apply their health systems engineering knowledge along with the health science knowledge for a better-working health system.

Industrial engineers are employed throughout various industries, including manufacturing, healthcare and service, to determine the most effective and efficient ways to utilize resources. Industrial engineers are concerned with increasing productivity through the effective management of people, processes and technology. Through exposure to the University Curriculum, foundational coursework in science, mathematics, major field courses and extracurricular activities, students graduating with a BS in Industrial Engineering achieve intellectual proficiencies in critical thinking and reasoning, scientific literacy, quantitative reasoning, information fluency and creative thinking and visual literacy.

**A total of 142 credits is required for completion of the double-degree.**

| Course | Title | Credits |
|---|---|---|
| **First Year** | | |
| **Fall Semester** | | |
| BIO 101 & 101L | General Biology I and General Biology I Lab | 4 |
| EN 101 | Introduction to Academic Reading and Writing | 3 |
| ENR 110 | The World of an Engineer | 3 |
| FYS 101 | First-Year Seminar | 3 |
| MA 151 | Calculus I | 4 |
| | **Credits** | **17** |
| **Spring Semester** | | |
| MA 153 | Calculus II: Part A | 2 |
| MA 154 | Calculus II: Part B | 2 |
| EN 102 | Academic Writing and Research | 3 |
| BIO 102 & 102L | General Biology II and General Biology Lab II | 4 |
| HSC 202 | Medical Terminology | 2 |
| MA 285 | Applied Statistics | 3 |
| | **Credits** | **16** |
| **Summer Semester** | | |
| UC Elective | | 3 |
| | **Credits** | **3** |
| **Second Year** | | |
| **Fall Semester** | | |
| HSC 220 | Health Care Essentials: Structure, Policy and Professionalism | 3 |
| CHE 110 & 110L | General Chemistry I and General Chemistry I Lab | 4 |
| IER 220 | Production Systems (MER 225) | 3 |
| IER 240 | Physical Human Factors and the Workplace (MER 245) | 1 |
| IER 265 | Cognitive Human Factors and the Workplace (MER 265) | 2 |
| Science Elective | | 3 |
| | **Credits** | **16** |
| **Spring Semester** | | |
| CSC 106 | Introduction to Programming for Engineers | 3 |
| CHE 111 & 111L | General Chemistry II and General Chemistry II Lab | 4 |
| UC Elective | | 3 |
| IER 280 | Data Analytics I | 3 |
| IER 450 | Health Care Systems Engineering | 3 |
| | **Credits** | **16** |
| **Summer Semester** | | |
| UC Elective | | 3 |
| | **Credits** | **3** |
| **Third Year** | | |
| **Fall Semester** | | |
| IER 360 | Operations Planning and Control | 3 |
| IER 230 | Lean Systems Engineering (MER 235) | 3 |
| PHY 121 | University Physics | 4 |
| IER Elective | | 3 |
| HSC Elective | | 3 |
| ENR 395 | Professional Development Seminar | 1 |
| | **Credits** | **17** |
| **Spring Semester** | | |
| ENR 210 | Engineering Economics and Project Management | 3 |
| IER 370 | Industrial Robotics (MER 375) | 3 |
| IER 440 | Simulation | 3 |
| HSC 221 | Introduction to Health Care | 2 |
| Science Elective | | 3 |
| UC Elective | | 3 |
| | **Credits** | **17** |
| **Summer Semester** | | |
| UC Elective | | 3 |
| | **Credits** | **3** |
| **Fourth Year** | | |
| **Fall Semester** | | |
| IER 310 | Operations Research I (MER 315) | 3 |
| IER 375 | Statistical Process Control | 3 |
| IER 491 | Capstone Project I | 3 |
| HSC Elective | | 3 |
| Science Elective | | 3 |

| | | |
|---|---|---|
| Science Elective | | 3 |
| | **Credits** | **18** |
| **Spring Semester** | | |
| IER 498 | Capstone Project II | 3 |
| IER 410 | Designing and Managing the Supply Chain | 3 |
| IER 490 | Engineering Professional Experience | 1 |
| ENR 410 | School of Computing and Engineering Integrative Capstone | 3 |
| Science Elective | | 3 |
| Science Elective | | 3 |
| | **Credits** | **16** |
| | **Total Credits** | **142** |

NOTE Chemistry courses and additional math courses depend on intended professional goal or career plan and math placement score.

# Student Learning Outcomes: Health Science Studies

Upon completion of the Health Science Studies program, students will demonstrate the following competencies:

1. **Scientific Knowledge:** Demonstrate proficiency in understanding and explaining fundamental scientific principles in the disciplines of biology, chemistry and physics.
2. **Interprofessional Skills:** Effectively communicate information across the medical professions using advanced medical vocabulary.
3. **Teamwork:** Apply an advanced understanding of the interprofessional nature of healthcare.
4. **Health Systems**: Develop an advanced knowledge of the U.S. healthcare system and effectively describe challenges/issues that affect it.
5. **Evidence Informed Practice:** Critically evaluate biomedical information and sources to confirm validity and reliability.
6. **Responsible Citizen:** Evaluate the social, moral and ethical implications of scientific discoveries on medical practice.

# Student Learning Outcomes: Industrial Engineering

Attainment of the following outcomes prepares graduates to enter the professional practice of engineering:

1. Ability to **identify, formulate and solve** complex engineering problems by applying principles of engineering, science and mathematics.
2. Ability to **apply engineering design** to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors.
3. Ability to **communicate effectively** with a range of audiences.
4. Ability to **recognize ethical and professional responsibilities** in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts.
5. Ability to **function effectively** on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
6. Ability to **develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment** to draw conclusions.
7. Ability to **acquire and apply new knowledge** as needed, using appropriate learning strategies.

# Admission Requirements

Admission into the Double-Degree BS in Industrial Engineering and BS in Health Science Studies program is dependent on the applicant's potential to pursue a university program and on past academic performance. The high school student applying for admission into the program should have a strong background in mathematics and the biological sciences. To remain in good standing within the program, the student must maintain a science GPA of 2.50. First-year biology (8 credits) must be successfully completed, at the latest, by the end of a student's sophomore year.

# Transfer Students from within Quinnipiac University

Students currently attending Quinnipiac in another program may be accepted into the program based upon a review of qualification by the program director. Students with a science GPA of 2.50 minimum may apply upon completion of at least one semester at Quinnipiac. Students transferring in as a junior (i.e., 57 credits or more) must have completed the general biology requirements, specifically, the equivalent of 8 credits of Quinnipiac's BIO 101 & BIO 102, *or* BIO 150 & BIO 151 or BIO 211 & BIO 212, prior to entry into the upper-class component of the program.

# Transfer Students from Other Colleges and Universities

Transfer students from other colleges and universities may be accepted into the program. These students must meet the program's performance standards and course requirements. For all transfer students, a minimum GPA of 2.67 is required. These students must have earned at least 8 credits of biology if entering their junior or senior year (i.e., having earned 57 credits or more), and performance standards of the program (science GPA minimum 2.50).