

Healthcare Engineering Emphasis Area

The field of healthcare engineering focuses on the application of engineering methodologies and problem solving skills to tackle the important problems that arise in the healthcare industry. Healthcare engineers aim to improve efficiency, productivity and patient access in healthcare systems. Working in close collaboration with healthcare professionals, these engineers develop tools, methodologies and protocols that allow for the safe, efficient and cost effective delivery of healthcare with improved outcomes.

Healthcare engineers are engaged in knowledge and hypothesis generation, predictive modeling, decision sciences, robust device design, and optimization – all of which should be very familiar to the Industrial Engineering. In addition, Healthcare engineers develop computational algorithms to implement the tools and calibrate them to healthcare data. This multidisciplinary field integrates knowledge from a variety of different areas, such as computer science, communication, public policy, management and all aspects of industrial engineering.

The basic Industrial Engineering curriculum provides the student with the expertise to use many of the tools and techniques that can be applied to Healthcare. As such, employment opportunities for Industrial Engineers in Healthcare are enormous. Healthcare is the largest and fastest-growing industry in the United States. According to the U.S. Department of Labor, wage and salary employment in the healthcare industry is projected to increase twice as fast as all industries combined through 2016. Hospitals, healthcare consulting companies, medical device manufacturers, and healthcare information technology firms, etc. will be looking to Industrial Engineers to help them get their share of this growth in a cost-effective, well-coordinated, patient oriented, and profitable fashion.

Industrial Engineering Healthcare specialists have extensive knowledge of

- Optimization
- Simulation
- Programming
- Healthcare systems

Industrial Engineering Healthcare specialists have effective technical skills in

- Data manipulation and analysis
- Modeling and problem-solving
- Statistics

Courses

Courses taken from the following groupings help to provide students with a deeper understanding of the various aspects of healthcare engineering. More information on each of these courses can be obtained by logging onto [myPurdue](#), navigating to the course catalog page for that department and clicking on the link for the course.

The courses listed below are listed in the course catalog for each department. They are meant to provide guidance as to what a student might take if they are interested in this emphasis area. The list of courses below is not exhaustive. In addition, the regularity of offerings of the listed courses is not guaranteed. Some courses are offered every semester, every other semester, or every other year. Other courses may have been offered at some point, but may not be offered again for a while, and we keep them in this list in hopes they will be offered again. *Therefore, the courses listed here should be considered an unreliable*

source of information. A student wishing to take a particular course should always check the course schedule (via "Look Up Classes" in myPurdue) to see what is available.

Legend:

REQ: Required for IE majors

TE: Technical Elective

GE: General Education Elective

*: Course has not yet been pre-approved by the IE faculty as a TE/GE, but approval is pending. A student may wish to petition for the immediate approval.

Healthcare

- AGECE 596C: The Economics of Health Care and Health Policy *
- COM 491M: Introduction to Health Communication (GE)
- HK 688: Health Policy in the United States *
- HSCI 201: Principles of Public Health Science *

Healthcare Systems

- BCM 499F: Healthcare Construction Management *
- ME 597B: Healthcare Product Design *
- SOC 572: Comparative Healthcare Systems *
- IE 590: Projects in Healthcare Systems (TE)

Simulation and Optimization

- IE 335: Operations Research – Optimization (REQ)
- IE 580: Systems Simulation (TE)
- IE 535: Linear Programming (TE)
- IE 538: Nonlinear Optimization Algorithms and Models (TE)

Related faculty in IE

- Vincent Duffy
- Yuehwern Yih
- Juan Wachs
- Ji Soo Yi
- Sara McComb

Relevant links

- [Regenstrief Center for Healthcare Engineering](#)
- [Society for Health Systems](#)

DISCLAIMER: The emphasis area document is intended for use as an aid to students for developing a coherent curriculum plan. The courses listed are a representation of the courses that may be taken (or are taken as part of the IE curriculum) that develop skills that are needed for a career in a field focusing on this emphasis area. While we list required IE courses, students should strongly consider enhancing their base IE coursework with more advanced courses in one or more of the areas.

