IOE INDUSTRIAL & OPERATIONS ENGINEERING
UNIVERSITY OF MICHIGAN

Requirements for Concentration in Healthcare Engineering

Requirements for Concentration in HEPS

- Fulfill all requirements for IOE masters program
- 3 semesters (Fall, Winter, Fall)
- Complete year-long program-designed hands-on project (3 credits 2nd semester, full-time summer, 3 credits 3rd semester)
- Satisfy the following course requirements:
  - ∗ IOE 813: Providing Better Healthcare Through Systems Engineering: Seminars and Discussions—*must be taken first semester* (Fall):
  - ∗ Statistics/Data Analysis: 1 course
  - ∗ Intro to Healthcare: 2 courses
  - ∗ Technical Core: 2 courses
  - ∗ Methodology: 2 courses
  - ∗ Program Focus: 2 courses
- Students may petition for special permission to count additional courses towards the HEPS requirements

At least one course (Statistics/Data Analysis):

IOE 460: Decision Analysis and Bounded Rationality

IOE 465: Design of Experiments

IOE 466: Statistical Quality Control

STATS 500: Applied Statistics I

STATS 503: Multivariate Statistics

IOE 560 / STAT 550: Bayesian Decision Analysis

IOE 562 / STAT 535: Reliability

IOE 565 / MFG 561: Time Series Modeling, Analysis, Forecasting

IOE 570 / STAT 570: Experimental Design

BIOSTAT 502: Application of Regression Analysis to Public Health Studies

BIOSTAT 521: Applied Biostatistics

BIOSTAT 522: Biostatistical Analysis for Health-Related Studies

BIOSTAT 605: Intro to SAS Statistical Programming

BIOSTAT 675: Survival Time Analysis

BIOSTAT 682: Applied Bayesian Inference

LHS 610: Exploratory Data Analysis for Health

At least two of the following courses (Program Focus):

IOE 413: Optimization Modeling in Health Care

IOE 438: Occupational Safety Management

IOE 513: Healthcare Operations Research: Theory and Applications

IOE 533 / MFG 535: Human Motor Behavior and Engineering Systems

IOE 534: Occupational Biomechanics

IOE 539: Safety Engineering Methods

HMP 553: Data Management in Health Care

HMP 610: Cost-Effectiveness Analysis in Health

HMP 624: Health Policy Challenges in Developing Countries

HMP 625: Comparative Health Policy and Management in High Income Countries

HMP 654: Operations Research and Control Systems

HMP 655: Decision Making Models in Health Care

HMP 668: Introduction to Health Informatics

HMP 669: Database Systems and Internet Applications in Health Care

HMP 826: Applied Econometrics in Health Services Research

BME 510: Medical Imaging Laboratory

BME 516 / EECS 516: Medical Imaging Systems

EECS 556: Image Processing

NERS 583: Applied Radiation Dose Assessment

At least two of the following courses (Technical Core):

IOE 425 / MFG 426: Lean Manufacturing and Services

IOE 432: Industrial Engineering Instrumentation Methods

IOE 434: Human Error and Complex System Failures

IOE 463: Measurement and Design of Work

IOE 474: Simulation

IOE 536: Cognitive Ergonomics

IOE 574: Simulation Analysis

IOE Masters Program:
Requirements for Concentration in Healthcare Engineering

At least two of the following courses
     (Intro to Healthcare):

HMP 600: The Health Service System I

HMP 601: Healthcare Quality, Performance Measurement and Improvement

HMP 602: Survey of the U.S. Health Care System

HMP 685: The Politics of Public Health Policy

EPID 503: Strategies and Uses of Epidemiology

ANAT 403: Human Anatomy: Structure and Function

PHYSIOL 502: Human Physiology

BIOMEDE 499.002: Clinical Observation and Needs Finding

PUBHLTH 626: Understanding and Improving the US Healthcare System

PUBHLTH 512 : Principles Of Epidemiology For Public Health

At least two of the following courses (Methodology):

IOE 416: Queueing Systems

IOE 419: Service Operations Management

IOE 421: Work Organizations

IOE 440: Operations Analysis and Management

IOE 449: Material Handling Systems

IOE 510: Linear Programming I

IOE 511 / MATH 562: Continuous Optimization Methods

IOE 512: Dynamic Programming

IOE 515: Stochastic Processes I

IOE 516: Stochastic Processes II

IOE 518: Introduction to Integer Programming

IOE 522: Theories of Administration

IOE 534 / BIOMEDE 534: Occupational Biomechanics

IOE 536: Cognitive Ergonomics

IOE 541: Inventory Analysis and Control

IOE 543: Scheduling

IOE 545: Queueing Networks

IOE 551: Benchmarking, Productivity Analysis and Performance Measurement

IOE 615: Advanced Stochastic Processes

Continued in next column….

Methodology Courses (Cont.):

IOE 616: Queueing Theory

IOE 640: Mathematical Modeling of Operational Systems

EECS 558: Stochastic Control

Sample Course Schedule for Concentration in HEPS

First semester (Fall)

- IOE 813: Providing Better Healthcare through Systems Engineering: Seminars & Discussions (2 cred.)
- IOE 413: Optimization Modeling in Health Care (3 cred.)
- STATS 500: Applied Statistics I (3 cred.)
- HMP 600: The Health Services System I (3 cred.)
- HMP 610: Cost-Effectiveness Analysis in Health (3 cred.)

Second semester (Winter)

- Project (3 cred.)
- HMP 601: Control of Quality & Costs of Health Care (3 cred.)
- IOE 463: Measurement & Design of Work (3 cred.)
- IOE 434: Human Error & Complex System Failures (3 cred.) or IOE 474: Simulation (4 cred.)
- IOE 510: Linear Programming (3 cred.)

Third semester (Fall)

- Project (3 cred.)
- IOE 513: Providing Better Health Care through Systems Engineering: Operations Research Applications & Techniques (3 cred.)
- IOE 515: Stochastic processes (3 cred.)
- IOE 425: Manufacturing Strategies (2 cred.)

**CENTER FOR
HEALTHCARE ENGINEERING & PATIENT SAFETY**
UNIVERSITY OF MICHIGAN