## 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

### At least one course (Statistics/Data Analysis):
- IOE 460: Decision Analysis and Bounded Rationality
- 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 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 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

Revised August 2017
**IOE Masters Program:**

**Requirements for Concentration in Healthcare Engineering**

### Sample Course Schedule for Concentration in HEPS

**First semester (Fall)**
- 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: Stochastic processes (3 cred.)
- IOE 425: Manufacturing Strategies (2 cred.)

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**At least two of the following courses (Intro to Healthcare):**
- HMP 601: Healthcare Quality, Performance Measurement and Improvement
- HMP 602: Survey of the U.S. Health Care System
- EPID 503: Strategies and Uses of Epidemiology
- ANAT 403: Human Anatomy: Structure and Function
- PHYSIO 502: Human Physiology
- BIOMEDE 499.002: Clinical Observation and Needs Finding
- PUBHLTH 626: Understanding and Improving the US Healthcare System

**At least two of the following courses (Methodology):**
- IOE 416: Queueing Systems
- 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
- IOE 616: Queueing Theory
- IOE 640: Mathematical Modeling of Operational Systems
- EECS 558: Stochastic Control