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 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 2019*
## IOE Masters Program: 
Requirements for Concentration in Healthcare Engineering

### 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 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.)

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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
- **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
- **IOE 616:** Queueing Theory
- **IOE 640:** Mathematical Modeling of Operational Systems
- **EECS 558:** Stochastic Control