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 691: 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

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

- IOE 413: Optimization Modeling in Health Care
- IOE 438: Occupational Safety Management
- IOE 533: Human Motor Behavior and Engineering Systems
- IOE 534: Occupational Biomechanics
- IOE 539: Safety Engineering Methods
- IOE 567: Work-Related Musculoskeletal Disorders
- HMP 553: Data Management in Health Care
- HMP 610: Cost-Effectiveness Analysis in Health
- HMP 612: Medical Management of Disease
- HMP 625: Health Law
- 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
- NURSING 636: Patient Safety and Quality Outcomes: Methods and Leadership
- BME 510: Medical Imaging Laboratory
- BME 516: Medical Imaging Systems
- EECS 556: Image Processing
- NERS 583: Applied Radiation Dose Assessment

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**At least one course (Statistics/Data Analysis):**

- IOE 460: Decision Analysis
- IOE 465: Design and Analysis 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: Reliability
- IOE 565: Time Series Modeling, Analysis, Forecasting
- IOE 570: Experimental Design
- BIOSTAT 513: Application of Regression Analysis to Public Health Studies
- BIOSTAT 523: Biostatistical Analysis for Health-Related Studies
- BIOSTAT 605: Intro to SAS Statistical Programming
- BIOSTAT 675: Survival Time Analysis
- BIOSTAT 682: Applied Bayesian Inference

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

- IOE 425: Manufacturing Strategies
- 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 574: Simulation Analysis

Revised November 2012
IOE Masters Program:
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**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 474: Simulation (4 cred.)
- IOE 510: Linear Programming (3 cred.)

**Third semester (Fall)**
- Project (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: Control of Quality and Costs of Health Care
- HMP 602: Survey of the U.S. Health Care System
- EPID 503: Strategies and Uses of Epidemiology
- ANAT 403: Human Anatomy: Structure and Function
- PHYS 502: (Human Physiology)
- BME 519: Bioengineering Physiology

**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: Continuous Optimization Methods
- IOE 512: Dynamic Programming
- IOE 515: Stochastic Processes I
- IOE 516: Stochastic Processes II
- IOE 518: Introduction to Integer Programming
- IOE 519: Introduction to Nonlinear Programming
- IOE 522: Theories of Administration
- IOE 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 566: Advanced Quality Control
- IOE 567: Work-Related Musculoskeletal Disorders
- IOE 615: Advanced Stochastic Processes
- IOE 616: Queueing Theory
- IOE 640: Mathematical Modeling of Operational Systems
- EECS 484: Database Management Systems
- EECS 558: Stochastic Control