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 February 2018
IOE Masters Program:
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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
EPI D 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

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 515: Stochastic processes (3 cred.)
- IOE 425: Manufacturing Strategies (2 cred.)

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