



## 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 2<sup>nd</sup> semester, full-time summer, 3 credits 3<sup>rd</sup> 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

### **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

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

IOE 413: Optimization Modeling in Health Care  
IOE 438: Occupational Safety Management  
IOE 513: Providing Better Health Care through Systems Engineering: Operations Research Applications and Techniques  
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

### **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



## IOE Masters Program:

# Requirements for Concentration in Healthcare Engineering

### 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

### Sample Course Schedule for Concentration in HEPS

#### First semester (Fall)

- IOE 691: 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.)