Decision Sciences/Operations Research

Faculty
- Oguzhan Alagoz, ME 3242
- Laura Albert, ME 3218
- Vicki Bier, ME 3234
- Alberto Del Pia, ME 3025
- Ananth Krishnamurthy, ME 3121C
- Jeff Linderoth, ME 3270A
- Jim Luedtke, ME 3236
- Leyuan Shi, ME 3250
- Xin Wang, ME 3258

**PREREQUISITES:**
- BS Degree or equivalent
- Mathematical statistics (Ex. Stat 312)
- Computer programming (Ex. CS 302)
- Three courses in ISYE (Ex: 313, 315, 320, 323, 349, 415, 417)

The Associate Chair of Graduate Affairs is responsible for evaluating equivalences.

**PROGRAM DESCRIPTION:**
The program in Decision Science and Operations Research aims to improve the quality of decisions about the management of scarce resources. Such resources not only include capital, but also quality of human life (e.g., health status), the quality of the environment, and many other important issues. Problem solving in ISYE entails recognizing and identifying decision problems, as well as generating, evaluating, choosing, and implementing solutions to them. Much of ISYE involves making and implementing decision as efficiently and effectively as possible. The MS degree in DS/OR seeks to train students in the methodology used in DS/OR research, in order to prepare them for careers in government and industry.

**STUDY PLAN:**
Before you register for classes, you must meet with your advisor to develop a study plan listing specific courses that you plan to take to earn your MS. This plan must satisfy the curriculum requirements and it must be approved by your advisor. You can deviate from this plan only if the changes are approved by your advisor in advance.

**MS DEGREE REQUIREMENTS:**
The curriculum is designed to provide both balance and breadth in the student’s understanding of DS/OR research techniques and applications. To accomplish this, students must take a specified number of classes in each of several core areas. The program is rounded out with electives.

Flexibility is built into the curriculum to accommodate a wide range of interests and applications. Please note that for any cross-listed courses, you can enroll through any department. You are not required to enroll through ISYE to receive credit. All students need 30 credits with the following sub-requirements: 12 credits from board core courses; 6 credits from track-specific core courses; and the rest from technical electives. Max of 6 credits of independent study may be used. **If you earn a grade of C or below in a course you CANNOT count that course toward the 30-credit requirement.**

**BROAD CORE COURSES - 12 Credits**
Select one course from each:

1. **Optimization**
   - ISyE 525: Linear Programming Methods
   - ISyE 524: Introduction to Optimization

2. **Probability and Stochastic Modeling**
   - ISyE 624: Stochastic Modeling Technique
   - ISyE 632: Introduction to Stochastic Modeling
   - ISyE 643: Performance Analysis of Manufacturing Systems

3. **Simulation**
   - ISyE 620: Simulation Modeling and Analysis

4. **Statistics and Decision Analysis**
   - ISyE 412: Fundamentals of Industrial Data Analytics
   - ISyE 512: Inspection, Quality Control, and Reliability
   - ISyE 516: Introduction to Decision Analysis
   - ISyE 575*: Introduction to Quality Engineering
   - Stat 424*: Statistical Experimental Design for Engineers

*Only one of ISyE 575 and Stat 424 may count toward MS degree.*
TRACK CORE COURSES - 6 credits

Select two courses from:
- ISyE 517: Decision Making in Health Care
- ISyE 633: Queuing Theory and Stochastic Modeling
- ISyE 719: Stochastic Programming
- ISyE 728: Integer Optimization
- ISyE 723: Dynamic Programming and Associate Topics
- ISyE 726: Nonlinear Programming Theory and Applications
- ISyE 727: Convex Analysis
- ISyE 730: Nonlinear Programming Algorithms
- ISyE 425: Intro to Combinatorial Optimization
- ISyE 645: Engineering Models for Supply Chains

TRACK CORE COURSES CONT'D

Additional courses taken from the list of BROAD CORE courses may be used to fulfill TRACK CORE course requirements.

TECHNICAL ELECTIVES - 12 credits

6 credits must be ISyE courses or cross-listed with ISyE

These courses are chosen to meet your interests and career goals. Remember that your advisor must approve these courses in advance. Courses need to be at the 400 level or above.

Any of the courses listed above are acceptable as electives, provided that they are not used to fulfill other requirements.

Any other courses in ISyE such as:
- ISyE 415: Introduction to Manufacturing Systems, Design and Analysis
- ISyE 449: Sociotechnical Systems in Industry
- ISyE 515: Engineering Management of Continuous Process Improvement

ISyE 612: Information Sensing and Analysis for Manufacturing Processes
ISyE 641: Design and Analysis of Manufacturing Systems
ISyE 658: Managing Technological Change in Manufacturing Systems
ISyE 671: E-Business: Technologies, Strategies and Applications

Any courses 400 level or above in Engineering, Mathematics, Statistics, Business, Computer Sciences, Economics, Population Health Sciences, or Psychology if it is approved by your advisor.

EXIT REQUIREMENTS:

In order to be eligible for graduation, a Master’s student must:
- Have a GPA of 3.0 or above
- Meet all MS degree requirements for focus area
- Have all grades entered, except for the current semester. No Is or NRs can show on transcript
- Be enrolled in at least 2 credits the semester in which they graduate
- Have their MS degree warrant signed and dated by the degree deadline.