Problem solving in Industrial and Systems Engineering entails recognizing and identifying decision problems, as well as generating, evaluating, choosing, and implementing solutions to them. Much of Industrial Engineering involves making and implementing decisions as efficiently and effectively as possible.

The MS degree in DS/OR seeks to train students in the methodology used in decision science and operations 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 the specific courses that you plan to take to earn your MSIE. This plan must satisfy the curriculum requirement listed below, 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 decision science and operations 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.

CORE COURSES (18 credits minimum)

Optimization (6 cr min)

ISyE/CS 525  Linear Programming Methods
ISyE/CS 635  Tools and Environments for Optimization
ISyE/CS 719  Network Flows
ISyE/CS 720  Integer Programming
ISyE 723  Dynamic Programming and Associated Topics
ISyE/CS 726  Nonlinear Programming Theory and Applications
ISyE/CS 727  Non-smooth Optimization
ISyE/CS 730  Nonlinear Programming Algorithms

Stochastic Processes (6 cr min)

ISyE 624  Stochastic Modeling Techniques
ISyE/Math 632  Intro to Stochastic Processes
ISyE/Math 633  Queuing Theory and Stochastic Modeling
ISyE/ME 643  Performance Analysis of Manufacturing Systems

Simulation (3 cr min)

ISyE/OTM 620  Simulation Modeling and Analysis

Organizations, Decisions, And Implementation Issues (3 cr min)

ISyE/ME 513  Analysis of Capital Investments
ISyE 516  Introduction to Dec. Analysis
ISyE 517  Decision Making in Health Care
ISyE/ME 641  Design & Analysis of Manufac. Systems
ISyE 658/OTM 758  Managing Technological Change in Manufacturing Systems
ISyE/OTM 671  E-Business - Technologies, Strategies and Applications
ISyE/OTM 672  E-Business Transformation - Design, Analysis and Justification
MHR 700  Organizational Behavior
MHR 720  Organization & Management Processes

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 the quality of human life (e.g., health status), the quality of the environment, and many other important issues.

FACULTY

O. Alagoz, 3025 ME, 608-890-0399
V. Bier, 3234 ME, 608-262-2064
A. Krishnamurthy, 3258 ME, 608-890-2236
J. Linderoth, 3226 ME, 608-890-1931
J. Luedtke, 3239 ME, 608-890-2560
L. Shi, 3250 ME, 608-265-5969
D. Zimmerman, 1163 WARF, 608-263-4875

PREREQUISITES

- BS degree or equivalent
- Mathematical statistics course (Ex: Stat312)
- Computer programming course (Ex: CS302)
- 3 courses in ISyE (Ex: 313, 315, 320, 323, 349, 415, 417)
The Associate Chair of Graduate Affairs is responsible for evaluating equivalencies.

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OTHER COURSES (12 credits)

These courses are chosen to meet your interests and career goals. **Remember that your advisor must approve these courses in advance.** Keep the following guidelines in mind when you plan your program.

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

2. Any course in CS, Math, Statistics, Business, Economics, or Engineering 300 level or above is acceptable **if it is approved by your advisor.**

3. Independent study and project work (up to 6 credits) are encouraged but not required.

4. The following courses are some of the most popular electives.

   **Popular Electives:**

   - ISyE/CS/Math 425: Combinatorial Optimization
   - ISyE/ME 510: Facilities Planning
   - ISyE/ME 512: Inspection, Quality Control, & Reliability
   - ISyE 575: Introduction to Quality Engineering
   - ISyE 605: Computer Integrated Manufacturing
   - ISyE/Psych 653: Organization and Job Design
   - OTM 700: Operations Management

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 their focus area
- Have all grades entered, except for the current semester. No Is or NRs can show on the student’s transcript.
- Be enrolled in at least 2cr the semester in which they graduate.
- Have their MS degree warrant signed and dated by the degree deadline.

LABORATORIES & CENTERS

- Discrete Event Simulation Lab
- Integrated Systems Optimization & Applications Laboratory
- Manufacturing Systems Analysis Lab
- Operations Research Lab
- Optimization Lab
- Stochastic Systems Lab
- Stochastic Systems Control & Simulation Lab

JOB PLACEMENT

Engineering Career Services Office
1550 Engineering Drive, Room M1002
Madison, WI 53706
Tel: (608) 262-3471
FAX: (608) 262-7262
http://www.engr.wisc.edu/services

FURTHER INFORMATION

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