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.

**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.

**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.

**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 Techniques
   - 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 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 the MS degree.

**TRACK CORE COURSES (6 credits)**

Select two courses from:

- ISyE 513 Analysis of Capital Investments
- 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 Associated Topics
ISyE 726  Nonlinear Programming Theory and Applications
ISyE 727  Convex Analysis
ISyE 730  Nonlinear Programming Algorithms
ISyE 425  Intro to Combinatorial Optimization

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 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

Large System Advanced Planning and Scheduling Laboratory
Operations Research Laboratory
Stochastic Systems Laboratory

JOB PLACEMENT

Engineering Career Services Office
Suite 170,1410 Engineering Drive (CAE) Madison, WI 53706
Tel: (608) 262-3471
FAX: (608) 262-7262
https://www.engr.wisc.edu/academics/student-services/career-services/

FURTHER INFORMATION

Department of Industrial and Systems Engineering
1513 University Avenue, Room 3270
Madison, WI 53706-1572

Tel: (608) 262-2686
FAX: (608) 262-8454
Email: ie-admission@engr.wisc.edu
https://www.engr.wisc.edu/department/industrial-systems-engineering/

Sample electives:

- 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

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

TECHNICAL ELECTIVES (12 credits)
Six 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.