



Department of Industrial and Systems Engineering

UNIVERSITY OF WISCONSIN-MADISON

Decision Sciences/ Operations Research

Faculty

- Oguzhan Alagoz, 3242 ME
- Laura Albert, 3218 ME
- Vicki Bier, 3234 ME
- Alberto Del Pia, 4174 WID
- Ananth Krishnamurthy, 3121C ME
- Jeff Linderoth, 3270A ME
- Jim Luedtke, 3236 ME
- Carla Michini, 3025 ME
- Leyuan Shi, 3250 ME
- Gabriel Zayas-Caban, 3011 ME

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

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 425: Intro to Combinatorial Optimization
- ISyE 513: Analysis of Capital Investments
- ISyE 517: Decision Making in Health Care
- ISyE 633: Queuing Theory and Stochastic Modeling
- ISyE 645: Engineering Models for Supply Chains
- ISyE 719: Stochastic Programming
- ISyE 723: Dynamic Programming and Associate Topics
- ISyE 726: Nonlinear Programming Theory and Applications
- ISyE 727: Convex Analysis
- ISyE 728: Integer Optimization
- ISyE 730: Nonlinear Programming Algorithms

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 425: Intro to Combinatorial Optimization
- 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 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 I's or NR's 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.
- Please note if you earn a grade of C or below in a course you **CANNOT** count that course toward the 30-credit requirement.

LABORATORIES & CENTERS

- Large System Advanced Planning and Scheduling Lab
- Operations Research Lab
- Stochastic Systems Lab

JOB PLACEMENT

Engineering Career Services Office

1150 Engineering Hall
1415 Engineering Drive
Madison, WI 53706
Tel: (608) 262-3471
Email: ecs@engr.wisc.edu
<https://ecs.wisc.edu>

FURTHER INFORMATION

ISyE Graduate Student Services

3182 Mechanical Engineering
1513 University Avenue
Madison, WI 53706
Tel: (608) 263-4025
Fax: (608) 890-2204

Email: iegradadmission@engr.wisc.edu
<http://www.engr.wisc.edu>

