Twin Cities Campus

Industrial and Systems Engineering Ph.D.

Industrial and Systems Engineering

College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Industrial and Systems Engineering Graduate Program, University of Minnesota, 1120 Mechanical Engineering, 111 Church Street S.E., Minneapolis, MN 55455 (612-625-2009; fax: 612-624-2010)
Email: gradinfo@ie.umn.edu
Website: http://www.ie.umn.edu

- Program Type: Doctorate
- Requirements for this program are current for Fall 2018
- Length of program in credits: 68
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The industrial and systems engineering (ISyE) program offers coursework and research in industrial and systems engineering, operations research, and human factors. Special emphasis is on methodologies for design, planning, and management of service and manufacturing systems. Examples of research applications include logistics, transportation, healthcare delivery systems, revenue management, and supply chain management.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A baccalaureate degree in engineering or a closely related field is required.

Special Application Requirements:
All application materials should be submitted electronically through the ApplyYourself application system. Students whose native language is not English are required to submit scores from one of the following English proficiency examinations: TOEFL, MELAB, or IELTS. The GRE General Test is required for students applying to the PhD program.

The application deadlines are December 15 for fall semester and October 15 for spring semester. Additional information is available at http://www.isye.umn.edu/apply/apply_phd.shtml

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5

Key to test abbreviations(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

32 credits are required in the major.
12 credits are required outside the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

The Ph.D. degree requires a minimum of 68 credits consisting of 16 required major credits, 12 course credits in a minor or a supporting program outside ISyE, 2 credits of graduate seminar, and 24 thesis credits. The remaining 14 course credits may be taken in the major or any supporting field.

Required Courses

Students may replace a required course with a qualifying replacement course if they have taken the equivalent of the required course elsewhere. A list of qualifying replacements is available on the ISyE program web page.

IE 8521 - Optimization (4.0 cr)
IE 8532 - Stochastic Processes and Queuing Systems (4.0 cr)
ME 8001 - Research Ethics and Professional Practice (0.0 cr)
Take 2 or more course(s) from the following:

- IE 5511 - Human Factors and Work Analysis (4.0 cr)
- IE 5545 - Decision Analysis (4.0 cr)
- IE 5551 - Production and Inventory Systems (4.0 cr)

Minor or Supporting Program

Take 12 credits in a minor or supporting program outside ISyE. The following courses may be used or consult with advisor for further options.

CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
CSCI 5521 - Machine Learning Fundamentals (3.0 cr)
CSCI 8980 - Special Advanced Topics in Computer Science (1.0 - 3.0 cr)
ECON 8101 - Microeconomic Theory (2.0 cr)
ECON 8102 - Microeconomic Theory (2.0 cr)
ECON 8117 - Noncooperative Game Theory (2.0 cr)
ECON 8118 - Noncooperative Game Theory (2.0 cr)
ECON 8119 - Cooperative Game Theory (2.0 cr)
MATH 5615H - Honors: Introduction to Analysis I (4.0 cr)
MATH 5616H - Honors: Introduction to Analysis II (4.0 cr)
MATH 8601 - Real Analysis (3.0 cr)
MATH 8602 - Real Analysis (3.0 cr)
MATH 5485 - Introduction to Numerical Methods I (4.0 cr)
MATH 5486 - Introduction To Numerical Methods II (4.0 cr)
MATH 8651 - Theory of Probability Including Measure Theory (3.0 cr)
MATH 8652 - Theory of Probability Including Measure Theory (3.0 cr)
STAT 8501 - Introduction to Stochastic Processes with Applications (3.0 cr)

Seminar

Take 2 seminar credits. The following may be used or consult with advisor for further options.

IE 8773 - Graduate Seminar (1.0 cr)
IE 8774 - Graduate Seminar (1.0 cr)

Thesis Credits

Take 24 credits after passing preliminary oral exam
IE 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

Program Sub-plans

A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

Industrial Engineering