INDUSTRIAL ENGINEERING, M.S.

The Department of Industrial and Systems Engineering offers opportunities for graduate study leading to the master of science and the doctor of philosophy degrees in industrial engineering. Five areas of specialization are available, each designed to produce graduates capable of leading new and developing areas within industrial and systems engineering. The five areas, each with its own courses of study and admission procedures, are: decision science/operations research, health systems, human factors and ergonomics, manufacturing and production systems, and quality engineering. Since each area offers faculty, research, and courses that are unique, both with respect to each other and to much of industrial and systems engineering taught elsewhere, it is advisable to see Graduate Program (https://www.engr.wisc.edu/academics/graduate-academics) on the department website for further information.

The specialization in decision science/operations research trains students in analytical methodologies useful for solving decision problems, especially problems that involve the allocation of sparse resources. Graduate study focuses on applied probability and statistics, decision analysis, optimization modeling, and optimization algorithms.

The health systems specialization seeks to train students to look at broad issues in health care, including long-term care, prevention, quality improvement, health care financing, and system evaluation. Understanding how people solve problems is a basic requirement for health systems engineers, who must apply scientific methods in a value-laden setting.

The specialization in human factors and ergonomics is concerned with the quality of work lives, ergonomics, and occupational safety and health for both workers and management. By examining, designing, testing, and evaluating the workplace and how people interact within it, human systems engineers can create productive, safe, and satisfying work environments.

The specialization in manufacturing and production systems is intended to provide the skills and knowledge necessary to compete successfully in a manufacturing environment. These skills include knowledge of the theory of manufacturing materials and processes and their control; knowledge of the essentials of manufacturing systems design and analysis; and knowledge of and hands-on experience with modern manufacturing technology.

The quality engineering specialization is designed to provide the necessary background for quality engineering careers in industry or government. Emphasis is on the foundations of quality improvement, job and organizational design, and process control.

REQUIREMENTS

MINIMUM DEGREE REQUIREMENTS AND SATISFACTORY PROGRESS

To make progress toward a graduate degree, students must meet the Graduate School Minimum Degree Requirements and Satisfactory Progress (http://guide.wisc.edu/graduate/#policiesandrequirementstext) in addition to the requirements of the program.

MASTER'S DEGREES

M.S.

MINIMUM GRADUATE DEGREE CREDIT REQUIREMENT

30 credits

MINIMUM GRADUATE RESIDENCE CREDIT REQUIREMENT

16 credits

MINIMUM GRADUATE COURSEWORK (50%) REQUIREMENT

Half of degree coursework (15 credits out of 30 total credits) must be completed in graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university's Course Guide (http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle).

PRIOR COURSEWORK REQUIREMENTS: GRADUATE WORK FROM OTHER INSTITUTIONS

Not allowed for graduate residence credit requirement but allowed for graduate degree credit requirement and graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master's degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNDERGRADUATE

Not allowed for graduate residence credit requirement but allowed up to 6 credits numbered 300 level or above toward the graduate degree credit requirement but not toward the 50% graduate coursework except for 700 level or above courses. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PRIOR COURSEWORK REQUIREMENTS: UW–MADISON UNIVERSITY SPECIAL

Allowed up to 15 credits numbered 300 or above toward graduate residence credit requirement and graduate degree credit requirement. If the courses were numbered 700 or above they may count toward the minimum graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

CREDITS PER TERM ALLOWED

12 credits

PROGRAM-SPECIFIC COURSES REQUIRED

Yes, consult with program for details.

OVERALL GRADUATE GPA REQUIREMENT

3.0

OTHER GRADE REQUIREMENTS

Grades of C and D received by a candidate in any graduate course will not be counted as credit toward the degree. These grades will be counted in the graduate GPA.
PROBATION POLICY
The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

ADVISOR / COMMITTEE
Every graduate student is required to have an advisor. To ensure that students are making satisfactory progress toward a degree, the Graduate School expects them to meet with their advisor on a regular basis.

An advisor generally serves as the thesis advisor. In many cases, an advisor is assigned to incoming students. Students can be suspended from the Graduate School if they do not have an advisor. An advisor is a faculty member, or sometimes a committee, from the major department responsible for providing advice regarding graduate studies.

A committee often accomplishes advising for the students in the early stages of their studies.

ASSESSMENTS AND EXAMINATIONS
Examinations: No

TIME CONSTRAINTS
Master's degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

LANGUAGE REQUIREMENTS
No language requirements.

ADMISSIONS
Although an undergraduate industrial engineering degree is recommended, students from any discipline with a strong quantitative science emphasis are encouraged to apply. Applicants are strongly advised to review the prerequisites for each area of specialization at the department website (https://www.engr.wisc.edu/academics/graduate-academics).

Each application is judged on the basis of previous academic record, Graduate Record Exam (GRE) scores for the general test, three letters of recommendation, and the statement of purpose. Admission is very competitive and application deadlines are extremely important.

LEARNING OUTCOMES
KNOWLEDGE AND SKILLS
- Articulates, critiques, or elaborates the theories, research methods, and approaches to inquiry or schools of practice in industrial and systems engineering including areas such as decision science and operations research, quality engineering, manufacturing and health systems, and/or human factors.
- Identifies sources and assembles evidence pertaining to questions or challenges in industrial and systems engineering.
- Demonstrates understanding of the industrial and systems engineering field of study in a historical, social, or global context.
- Selects and/or utilizes the most appropriate industrial and systems engineering methodologies and practices.
- Evaluates or synthesizes information pertaining to questions or challenges in industrial and systems engineering.
- Communicates clearly in ways appropriate to industrial and systems engineering.

PROFESSIONAL CONDUCT
- Recognizes and applies principles of ethical and professional conduct.

PEOPLE
Faculty: Professors Bier (chair), Brennan, Carayon, Lee, Li, Linderoth, Radwin, Shi, Vanderheiden, Veeramani, Zhou; Associate Professors Alagoz, Krishnamurthy, Li, Luedtke, McLay, Wiegmann; Assistant Professors: Del Pia, Liu, Wang, Werner; Affiliate Professors Bowers, Burnside, Carnes, DeCroix, Ferris, Greenberg, Finster, Maravelias, Noyce, Pugh, Qian, Sesto, Shah, Smith, Steege, Thomadsen, Vanness, Wright