

Master of Engineering in Industrial and Systems Engineering

Graduate Manual

RIT

Industrial and Systems Engineering Department
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1. Master of Engineering Degree in Industrial and Systems Engineering

The Industrial and Systems Engineering (ISE) discipline centers on the design, improvement, and installation of integrated systems of people, material, information, equipment and energy. ISE uses the specialized knowledge and skills in the mathematical, physical, computer and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems. The overarching goal of ISE is the efficiency and optimization of the enterprise, regardless of whether the activity engaged in is a manufacturing or a service-related industry. Industrial and systems engineers draw on a variety of skills in the academic study areas of applied statistics/quality, ergonomics/human factors, operations research/simulation, manufacturing, and systems engineering.

The Master of Engineering in Industrial and Systems Engineering provides an applied, practical degree and allows students to gain breadth across several different areas in ISE or focus in one area. The purpose of this degree is to provide students with more in-depth knowledge of industrial and systems engineering concepts and methods that will culminate in a capstone project. This degree is intended for students interested in advancing their industrial career and is usually considered a terminal degree. For students with aspirations of obtaining additional advanced degrees such as a Ph.D. degree, the Master of Science degree should be pursued.

2. Admission Requirements

Admission to the ME ISE graduate program is determined based on the full evaluation of the application and accompanying material including undergraduate degree program, transcript, and GPA, GRE scores (if required), TOEFL scores (if required), letters of recommendation, and 1-page statement of purpose. The GRE is required for students without a degree from an ABET accredited institution. The GRE is optional (but recommended) for all other applicants.

Although applications may be submitted at any time, to be sure that your application will receive full consideration for admission to RIT in the fall semester of the next academic year, the following deadlines should be observed:

Application Timeline for Fall Semester:

January 15: All application materials must be received
March 31: Notification of admission decision

The general entrance requirements consist of a BS degree in engineering, mathematics or science, and a minimum equivalent cumulative undergraduate GPA of 3.00/4.00. Minimum TOEFL scores of 580 (paper-based) or 90 (Internet-based) are required for students that do not have English as their first language. For students with a BS in Math or Science (Physics, etc.) but without an engineering degree, some bridge coursework in the basic engineering sciences may be necessary prior to full admission into one of the programs. Students with a Bachelor's degree from a Technology program, with a very high GPA, may be permitted to pursue a degree in Industrial and Systems Engineering at RIT under the following conditions:

- a. They will be required to have completed the RIT undergraduate courses below (or equivalent) with an overall grade point average of 3.00 or higher.
- b. These courses do not carry any graduate credit and are in addition to the credits needed for the ME degree. Equivalent courses at other schools may be substituted. There may be other undergraduate courses that are needed in order to prepare the student for specialization in specific areas.
- c. A student is expected to complete a substantial portion of the set of courses below before submitting an application for admission to the ME program in ISE.

| | | | |
|----------|--|-----------|---|
| MATH 181 | Project-Based Calculus I | MATH 251 | Probability & Statistics I |
| MATH 182 | Project-Based Calculus II | ISEE 325 | Engineering Statistics and Design of Experiments |
| MATH 221 | Multivariate Calculus | ISEE 200 | Computing for Engineers |
| MATH 233 | Linear System and Differential Equations | ISEE XXX+ | At least 3 upper division ISE courses to be selected as appropriate |

3. Graduate Assistantships

In general, graduate assistantships from the ISE Department are not available for Master of Engineering students.

4. Advisor

A designated member of the ISE faculty will serve as the academic advisor for students enrolled in the Master of Engineering programs. It is the responsibility of the student to meet with the advisor on a regular basis to ensure the requirements of the degree are being met. The student should work with the advisor to establish a plan of study for their degree program. (See section 5.1)

5. Graduation Requirements

The ME degree will be awarded upon successful completion of a minimum of 30 credits that is equivalent to 10 courses including a 3 credit capstone project course.

In accordance with Institute policy, all graduate programs must be completed within seven years after taking the first graduate course(s) that applies to the program. Exceptions to the seven year rule require a petition to the Dean of Graduate Studies with an explanation as to why the student will be unable to complete the program within seven years. This request must be accompanied by a letter of from the Director of ISE Graduate Programs. The request must be make prior the reaching the seven year limit. Approval is not automatic.

5.1 Plan of Study

The ME Industrial and Systems Engineering Advisor serves as a student's advisor to select courses. **Prior to the completion of the first semester, the student's plan of study must be mapped out with and approved by the student's advisor using the appropriate plan of study form in the Appendix.** An approved plan of study must be submitted to the ISE office to be placed in the student's department file. Any updates to the plan of study in future terms require a new plan of study form to be completed and submitted to the ISE office.

The ME Industrial and Systems Engineering degree requires that students complete 30 credits consisting of 10 three-credit courses including the capstone course. The coursework must meet the following requirements:

- **A minimum of seven courses in Industrial and Systems Engineering**
- **The following ISE core courses:**
 - ISEE-601 Systems Modeling and Optimization
 - ISEE-760 Design of Experiments
 - ISEE-771 Engineering of Systems I
- **ISE Capstone Project Course**
 - ISEE-792 Engineering Capstone

A list of potential graduate courses for meeting these degree requirements appears in the Appendix. Please note that not all courses may be appropriate for all students/plans of study and must be approved by the ME advisor through the plan of study approval process. In addition, if appropriate, equivalent or more advanced courses in the list of core ISE course areas may be substituted with the approval of the advisor.

5.2 Capstone Requirement for Master of Engineering Degrees

The Master of Engineering degree in Industrial and System Engineering requires the successful completion of the following three-credit capstone course:

ISEE-792 Engineering Capstone

Catalog Description: For the Master of Engineering programs in Industrial and Systems Engineering and Engineering Management. Students must investigate a discipline-related topic in a field related to industrial and systems engineering or engineering management. The general intent of the engineering capstone is to demonstrate the students' knowledge of the integrative aspects of a particular area. The capstone should draw upon skills and knowledge acquired in the program.

6. Cooperative Education (Co-op)

Co-operative education (Co-op) is an optional part of the ISE graduate programs. Co-op is a paid work experience at a company designed to help educate students through the application of academic course material in a work environment. If a graduate student elects to pursue a co-op position, the co-op must be done as an integral part of the plan of study for the graduate degree program.

Communication with the faculty advisor about your intent to co-op is extremely important. You should have a discussion with your faculty advisor to determine how the co-op will be integrated into the degree program to ensure continued progress toward your degree and the effect on your expected graduation date (if any).

The RIT Office of Career Service and Cooperative Education has a process that students must follow to enroll in co-op. This includes attending a Co-op Prep Session before using their services. This Co-op Prep Session is typically held a group session for ISE Department degree programs (date and time will be announced).

For international students, additional co-op rules and guidelines may apply and are available through the International Student Services Office.

Appendix

Potential Graduate Courses

The list of potential courses below represents courses that will earn credit as valid graduate courses. **The ISE Department requires that you complete a plan of study approved by your academic advisor even if the courses you plan to select appear on the approved list.** To assist in planning, unless otherwise noted, most ISE courses are taught once per year.

The ISE faculty will continue to entertain other courses on a case-by-case basis and courses will only be accepted if the student has discussed the choice with his/her advisor and received permission from the advisor in writing. Students should not assume that a graduate course deemed appropriate for one will be appropriate for all.

ISE Department (ISEE)

- ISEE-610 Systems Simulation
- ISEE-626 Contemporary Production Systems
- ISEE-640 Computer-Aided Design & Manufacturing
- ISEE-660 Applied Statistical Quality Control
- ISEE-661 Linear Regression Analysis
- ISEE-682 Lean Six Sigma Fundamentals
- ISEE-684 Engineering and the Developing World
- ISEE-701 Linear Programming
- ISEE-702 Integer and Nonlinear Programming
- ISEE-704 Logistics Management
- ISEE-711 Advanced Simulation
- ISEE-720 Production Control
- ISEE-728 Production Systems Management
- ISEE-730 Biomechanics
- ISEE-731 Advanced Topics in Human Factors and Ergonomics
- ISEE-732 Systems Safety Engineering
- ISEE-740 Design for Manufacture and Assembly
- ISEE-741 Rapid Prototyping and Manufacturing
- ISEE-750 Systems and Project Management
- ISEE-752 Decision Analysis
- ISEE-772 Engineering of Systems II
- ISEE-785 Fundamentals of Sustainable Engineering
- ISEE-786 Lifecycle Assessment
- ISEE-787 Design for the Environment
- ISEE-789 Special Topics
- ISEE-799 Independent Study

Masters in Manufacturing Leadership/Master in Product Development

MML and MPD courses have limited availability to ISE students. Prior to registering ISE students must obtain approval from their advisor and the Director of the MML/MPD programs, Mark Smith.

- ISEE-703 Supply Chain Management
- ISEE-723 Global Facilities Planning
- ISEE-745 Manufacturing Systems
- ISEE-751 Decision and Risk Benefit Analysis

Mechanical Engineering Department

- MECE-629 Renewable Energy Systems

Microelectronic Engineering Department

- MCEE-601 Microelectronic Fabrication

GCCIS - Information Science and Technology

- ISTE-608 Database Design and Implementation

SCOB - Accounting

- ACCT-603 Accounting for Decision Makers
- ACCT-706 Cost Management
- ACCT-794 Cost Management in Technical Organizations

SCOB - Management

- MGMT-710 Managing for Environmental Sustainability
- MGMT-720 Entrepreneurship and New Venture Creation
- MGMT-740 Organizational Behavior and Leadership
- MGMT-741 Managing Organizational Change
- MGMT-742 Technology Management

SCOB Finance

- FINC-721 Financial Analysis for Managers
- FINC-761 Stock Market Algorithmic Trading

SCOB - Marketing

- MKTG-761 Marketing Concepts and Commercialization
- MKTG-771 Marketing Research Methods

SCOB - Management Information Systems

- MGIS-725 Data Management and Analytics
- MGIS-755 Information Technology Strategy and Management
- MGIS-760 Integrated Business Systems

SCOB – International Business

- INTB-730 Cross-Cultural Management

Master of Engineering in Industrial and Systems Engineering (ISEE-ME)
 Plan of Study

Name: _____
 Address: _____

RIT ID: _____
 Ph(w): _____
 Ph(h): _____
 Email: _____

Entry Term: _____

7-Year Limit: _____

| <i>Course</i> | <i>Semester</i> | <i>Grade</i> | <i>Credits</i> |
|---|-----------------|--------------|----------------|
| 1. ISEE-601 Systems Modeling and Optimization | | | 3 |
| 2. ISEE-760 Design of Experiments | | | 3 |
| 3. ISEE-771 Engineering of Systems I | | | 3 |
| 4. ISEE- | | | 3 |
| 5. ISEE- | | | 3 |
| 6. ISEE- | | | 3 |
| 7. | | | 3 |
| 8. | | | 3 |
| 9. | | | 3 |
| 10. ISEE-792 Engineering Capstone | | | 3 |
| *11. | | | |
| *12. | | | |
| *13. | | | |
| Total | | | 30 |

Advisor: _____ Signature: _____ Date: _____

* Course not required to fulfill degree requirements

Ending GPA: _____