Bachelor of Science in Industrial Engineering / Master of Engineering in Industrial and Systems Engineering

Dual Degree Program

Graduate Manual

Effective for Students Enrolling on or after Fall, 2013

Industrial and Systems Engineering Department
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(Revised September 1, 2012)
1. Bachelor of Science in Industrial Engineering/Master of Engineering in Industrial and Systems Engineering Dual Degree Program

The 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 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 dual Bachelor and Master degree programs allow students to complete their B.S. and M.E. degrees in an accelerated manner. This dual degree program offers a unique opportunity for outstanding undergraduate students to pursue. The combination of these programs provides a synergy that allows students to apply their learning between programs.

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

This combined degree offerings are only available for students who are currently matriculated in the undergraduate BSIE program. Students enrolled in the dual degree program must complete all of the dual degree program requirements before receiving either of the two degrees. Advanced planning is required to complete the dual degree program in required time limit. In particular, students will typically begin their first co-op assignment in the summer following their second year of study. In addition, the co-op requirement for the dual degree is reduced to a minimum of 40 weeks, which will typically be accomplished through taking one co-op block during a semester of the third year and three co-op blocks during the summer following the second, third, and fourth years. Finally, the dual degree will allow for the “double-counting” of up to 3 professional elective courses (9 units) at 700-level or above toward both degree programs.

During the first two years, the BS curriculum is followed. The tem-by-term sequence of required courses for this degree program is shown in Table 1. Although the program can be completed in 5 years, students typically take one or two additional semesters to complete the program requirements.
2.1 Time Limits for Completion of BS/ME Degree Requirements

Students admitted to the BS/ME dual degree programs are required to complete all requirements for both degrees by the end of the spring semester of Year 6.

If it is anticipated that the dual degree requirements will not be met by the end of the spring semester of Year 6, the student has the following options:

- The student can be certified with the BS degree.
- The student can be certified with the BS degree and apply for formal admission to the MS or ME programs. (Acceptance is not guaranteed and if accepted additional coursework will be required.)
- The student can apply for a one-term extension (Summer of Year 6) in which the student should submit to the Graduate Program Director the following items prior by the end of the fall semester in Year 6:
  1. Student letter requesting extension of the BS/ME degree completion that states the reasons for not completing degree for certification in the spring of Year 6; and
  2. Timetable for completion of the degree requirements.

The Graduate Program Director and the ISE Department Head will meet with the student's advisor and will decide whether an extension will be granted. There will be no consideration for extensions beyond summer of Year 6 except for circumstances that are CLEARLY beyond the student's control, such as a medical emergency or hospitalization, and when it is clear that a BRIEF (not to exceed one semester) extension will allow the student to complete both degrees.

3. BSIE/MEISE Admission / Curriculum / Graduation Requirements

Students should apply to this combined program during their 3rd year. Decisions with regard to admission to the BS/ME program with be based on the following: a minimum 3.0/4.0 cumulative GPA and an interview with the ISE Department Head. There will be no exceptions for late admittance after the fall semester of the 4th year. A 3.0/4.0 cumulative GPA must be maintained throughout the program. There is a strict 6-year limit for the full completion of the BS/ME program which begins the first semester that the student is enrolled at RIT.

3.1 BS/ME Advisor

The ISE undergraduate advisor or the Master of Engineering program advisor will serve as the student’s advisor for the ME portion of the dual degree program including approval of the ME plan of study. The student's undergraduate advisor for the BS degree will continue to serve as the student’s advisor for the undergraduate degree requirements.
3.2 BS/ME Program Descriptions and Plan of Study

Prior to taking any courses that the student plans to count toward the ME degree and no later than the end of the Fall semester of the 4th year, the student's Plan of Study must be mapped out with and approved by the advisor using the appropriate plan of study form in the Appendix. An approved plan of study must be submitted to the ISE Department.

3.2.1 BSIE/ME in Industrial and Systems Engineering (ISE) Plan of Study

The BS/ME program counts 9 units towards both the BS and ME programs (i.e., 'double-count') and requires 153 units. Thus, for the BS/ME IE degree the student must:

- Perform at least 4 co-op blocks totaling a minimum of 40 weeks
- Complete all required coursework for BS degree
- Complete the following coursework for ME degree:
  - ISEE-760 Design of Experiments
  - ISEE-771 Engineering of Systems I
  - 3 approved Professional Electives (PEs - done as part of BS degree, credit counted towards both degrees, courses must be 600-level or above)
  - 5 elective graduate courses
- At least 7 courses out of the total of 11 courses must be ISE courses (ISEE)
- Complete capstone and final three units of degree by either:
  - Serve as a project leader for a multidisciplinary senior design team for two semesters with a grade requirement of B or better in both Multidisciplinary Senior Design I and II, and
    - Register for ISEE-791 Leadership Capstone (0 credit),
    - Take one additional graduate level course (700-level or above),
    - Students are encouraged to take ISEE-770 Design Project Leadership for preparation as a project leader
    - Students are strongly advised to take MDS I & II during their final year to have the potential to integrate and apply their graduate course content
  - Successfully complete the three-unit capstone course (ISEE-792 Engineering Capstone)
| Table 1: Sample plan of study for BS IE/ME ISE program |
|---|---|---|
| **Fall 1** | **Spring 1** | **Summer 1** |
| First-Year Seminar | ISEE-140 Materials Processing | Vacation |
| ISEE-120 Fundamentals of IE | MATH-182 Project-based Calculus II | |
| CHMG-131 General Chemistry for Engineers | PHYS-211 University Physics I | |
| MATH-181 Project-based Calculus I | Writing Course | |
| University Arts & Science Perspectives (1) | University Arts & Science Perspectives (2) | |
| **Fall 2** | **Spring 2** | **Summer 2** |
| ISEE-200 Computing for Engineers | MECE-200 Fundamentals of Mechanics | CO-OP |
| MATH-221 Multivariable Calculus | MATH-233 Linear Systems and Diff Eq | |
| PHYS-212 University Physics II | CQAS-252 Prob & Stats for Engineers II | |
| CQAS-251 Prob & Stats for Engineers I | ISEE-250 Engineering Economy | |
| University Arts & Science Perspectives (3) | University Arts & Science Perspectives (4) | |
| **Fall 3** | **Spring 3** | **Summer 3** |
| CO-OP | | |
| **Fall 4** | **Spring 4** | **Summer 4** |
| ISEE-420 Production Control | ISEE-301 Operations Research | CO-OP |
| ISEE-460 Statistical Quality Control | ISEE-350 Engineering Management | |
| ISEE-410 Simulation | ISEE-330 Ergonomics & Human Factors | |
| ISEE-421 D/A Production Systems | ISEE-323 Facilities Planning | |
| Professional Elective (1) | MECE-306 Materials Science | |
| Free Elective (1) | | |
| **Fall 5** | **Spring 5** | **Graduation** |
| ISEE-590 Senior Design I | ISEE-591 Senior Design II | |
| ISEE-561 Linear Regression Analysis | University Arts & Science Concentration (3) | |
| ISEE-771 Engineering of Systems I | Grad. Elective (4) | |
| Grad. Elective (1) | Grad. Elective (5) | |
| Grad. Elective (2) | ISEE-792 Engineering Capstone or ISEE-791 Leadership Capstone & Grad. Elective (6) | |
| Grad. Elective (3) | | |

BS and ME degrees in industrial engineering will be awarded upon successful completion of the approved undergraduate program consisting of 129 units and graduate program consisting of a minimum of 33 units including an engineering capstone course. As indicated above, 9 units would be counted towards both the BS and ME programs (i.e., 'double-counted').
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-626 Contemporary Production Systems
- 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-760 Design of Experiments
- ISEE-771 Engineering of Systems I
- ISEE-772 Engineering of Systems II
- ISEE-775 Advanced Systems Integration
- ISEE-785 Fundamentals of Sustainable Engineering
- ISEE-786 Lifecycle Assessment
- ISEE-787 Design for the Environment

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-751 Decision and Risk Benefit Analysis

Mechanical Engineering Department

- MECE-710 Fuel Cell Technology
- MECE-729 Renewable Energy Systems

Microelectronic Engineering Department

- MCEE-601 Microelectronic Fabrication

Center for Quality and Applied Statistics

- CQAS-721 Theory of Statistics I
- CQAS-722 Theory of Statistics II
- CQAS-747 Principles of Statistical Data Mining
- CQAS-751 Nonparametric Statistics
- CQAS-756 Multivariate Analysis
- CQAS-762 SAS Database Programming
- CQAS-773 Time Series Analysis and Forecasting
- CQAS-775 Design and Analysis of Clinical Trials
- CQAS-784 Categorical Data Analysis

CAST - Information Science and Technology

- ISTE-608 Database Design and Implementation
SCOB - Accounting

- ACCT-703  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

SCOB - Marketing

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

SCOB - Management Information Systems

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

SCOB – International Business

- INTB-730  Cross-Cultural Management
Bachelor of Science in Industrial Engineering/
Master of Engineering in Industrial and Systems Engineering
Graduate Student Plan of Study

Name: ________________________________   RIT ID#: ______________________
Address: ___________________________   Ph(w): ________________________
                        ___________________________   Ph(h): ________________________
                        ___________________________   Email: ________________________
Employer: ____________________________________________________________
Entry Term: ____________________    6-Year Limit: _____________

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Total 33

Advisor: ___________________________   Signature: ___________________________   Date: ________
Completion Date: _____________

* Course not required to fulfill degree requirements
** Indicate with an “X” if this course also counts as a PE for the BSIE degree (Up to 3 courses).

Ending GPA: __________