MASTER'S PROGRAM IN INDUSTRIAL AND MANAGEMENT ENGINEERING

No. of credits required for degree\(^1\)__________  Degree: MS\(^2\) ME

Concentration_________ Degree to be completed by___________

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<tr>
<th>Prerequisites</th>
<th>Offered</th>
<th>Prerequisite</th>
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<tbody>
<tr>
<td>DSES.6610 Systems Modeling &amp; Decision Sciences (or equivalent)(^1)</td>
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<tr>
<td>DSES.6110 Introduction to Applied Statistics (or equivalent)</td>
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<tr>
<th>Core Requirements</th>
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<tr>
<td>Offered</td>
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<td>Prerequisite</td>
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<tr>
<td>DSES.6470 Global Strategic Management of Technological Innovation</td>
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<tr>
<td>DSES.6500 Information &amp; Decision Technologies for Industrial &amp; Service Systems</td>
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<tr>
<td>DSES.6600 Models for Production Control &amp; Svc. Logistics</td>
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<tr>
<td>DSES.6620 Discrete-Event Simulation</td>
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<td>DSES.6xx Applied Statistics (elective)</td>
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<th>Concentration Requirements (3 or more-including one from within core requirements)</th>
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<th>Thesis/Project Option(^2)</th>
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<tr>
<td>DSES.6970 Project (Master’s)</td>
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<td>DSES.6980 Project (Master’s)</td>
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<tr>
<td>DSES.6990 Thesis (Master’s)</td>
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<tr>
<th>Elective(s)</th>
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\(^1\) A minimum of 30 credits is required for the MS or ME degree.

\(^2\) Students seeking the Master of Science degree must complete a Master’s Project/Thesis under the supervision of a faculty member by registering for 3-6 credit hours under DSES.6970/6980/6990-Master’s Project/Thesis.
The plan of study must include a concentration area, which is defined as a set of three or more courses that reflects a logical progression for developing a base of expertise in an area of study. In addition, candidates for the Master of Science degree must complete a master’s thesis or project and register for 3-6 credits of DSES.6990 or DSES.6980, respectively. Several concentration areas and acceptable courses applicable to each area are listed below:

**Applied Operations Research Concentration**
- DSES.4770 Math Models of Operations Research
- DSES.4780 Computational Optimization
- DSES.6050 Stochastic Processes
- DSES.6200 Models in Facilities Planning and Materials Handling
- DSES.6210 Theory of Production Scheduling
- DSES.6630 Financial Mathematics and Simulation
- DSES.6760 Combinatorial Optimization and Integer Programming
- DSES.6770 Linear Programming
- DSES.6780 Nonlinear Programming
- DSES.6820 Queuing Systems and Applications
- DSES.6830 Large-Scale Systems: Case Studies and Analyses
- DSES.6840 Modeling Large-Scale Systems
- DSES.6860 Evaluation Methods for Decision Making
- DSES.6890 Multiple Criteria Decision Making

**Applied Probability & Statistics and Quality Control Concentration**
- DSES.4750 Probability Theory and Applications
- DSES.4760 Mathematical Statistics
- DSES.6010 Applied Regression Analysis
- DSES.6020 Design of Experiments
- DSES.6030 Sampling Methods
- DSES.6040 Nonparametric Methods
- DSES.6050 Stochastic Processes
- DSES.6060 Applied Multivariate Analysis
- DSES.6070 Statistical Methods for Reliability Engineering
- DSES.6090 Decision Analysis
- DSES.6100 Time Series Analysis
- DSES.6140 Exploratory Data Analysis
- DSES.6150 Advanced Probability for Statistical Inference
- DSES.6170 Management of Quality Processes and Reliability
- DSES.6180 Intro to Knowledge Discovery with Data Mining
- DSES.6230 Quality Control and Reliability

**Management of Technology Concentration**
- MGMT.6690 Supply Chain Management for E-Business
- MGMT.6996 Knowledge Based Operations Management
- MGMT.6240 Financial Trading and Investment
- MGMT.6490 Competitive Advantage and Operations Strategy
- DSES.6470 Global Strategic Management of Technological Innovation
- DSES.6480 Service Operations Management
- DSES.6830 Large-Scale Systems: Case Studies and Analyses
- DSES.6860 Evaluation Methods for Decision Making

**Manufacturing Systems Concentration**
- DSES.4200 Design and Analysis of Work Systems
- DSES.4250 Facilities Design and Industrial Logistics
- DSES.6200 Models in Facilities Planning and Materials Handling
- DSES.6210 Theory of Production Scheduling
- DSES.6220 Concurrent Engineering
- DSES.6230 Quality Control and Reliability
- DSES.6560 Information Technology and Systems for Enterprise Engineering
- DSES.6600 Models for Production Control and Service Logistics
- DSES.6960 Management of Manufacturing Supply Chains

**Service Systems Concentration**
- DSES.6480 Service Operations Management, AND at least two courses from the list below:*†
- MGMT.4370 Risk Management
- DSES.6170 Management of Quality Processes and Reliability
- DSES.6860 Evaluation Methods for Decision Making
- DSES.6980 Master’s Project in Service Systems

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*† Students can also satisfy this part of the requirement for the service systems concentration through two application-focused courses approved by the academic advisor. Examples of applications foci include financial services, health systems, transportation, retailing, public systems, quality systems, and marketing.
Rensselaer's Professional Master of Engineering Program in Industrial and Management Engineering

The Department of Decision Sciences and Engineering Systems (DSES) offers plans of study leading to the Master of Engineering and the Master of Science degrees in Industrial and Management Engineering. Industrial and Management Engineering (IME) draws upon specialized knowledge in the mathematical, physical and behavioral sciences as well as principles of engineering analysis and design to specify, predict, evaluate, maintain and improve the performance of productive systems. It is an engineering discipline that emphasizes interpersonal as well as technical skills. Among other functions, IME's are typically the "change masters" in organizations who serve as management advisers and technical resource persons in contact with every phase of the organization. Perhaps this explains why many IME's accept positions with management consulting firms. Due to the breadth of his or her background and the profession's emphasis on interpersonal skills, the IME graduate is well prepared for positions of leadership and authority in a wide variety of organizations. As an example, Lee Iacocca (former Chairman of Chrysler Corporation), Tom Landry (former Head Coach of the Dallas Cowboys), and senior executives at such companies as Delta Airlines, Prudential Insurance, United Technologies and many other major corporations are industrial engineers.

Rensselaer's Master of Engineering program in IME is designed to educate engineers who can develop, implement and integrate systems made up of people, machines, materials, information and technology. Graduates from the program lead efforts aimed at achieving productivity growth, quality leadership, cultural change in the workplace, the application of new technologies, and other important initiatives affecting the competitiveness and effectiveness of organizations. The program is delivered by a professionally active faculty including members of the National Academy of Engineering, Fellows of the Institute of Industrial Engineers and the Institute of Electrical and Electronics Engineers, and world class scholars in such areas as material flow systems design, manufacturing systems, simulation modeling, quality and reliability engineering, applied statistics, systems modeling, materials handling engineering, information systems and other industrial engineering specializations.

Although the majority of applicants hold a bachelor's degree in an engineering discipline, this is not a requirement for acceptance to the program. The DSES Department welcomes applications from individuals having a variety of educational backgrounds. Experience has shown that students with backgrounds in such areas as mathematics, management, computer science and the physical sciences can complete the program in nearly the same amount of time as those with an engineering background.

The Master's programs in IME can be completed in one calendar year and students may enter the program in either the fall, spring or summer terms. The prerequisites for the program are introductory courses in applied statistics and operations research; they may be taken as part of the Master's degree plan of study. The program includes core courses in information systems, simulation modeling, strategic management of technological innovation, analytical models in manufacturing and logistical systems and design of experiments (or regression analysis). The core courses provide a foundation in the areas of information systems, computer based modeling, analytical modeling, statistical analysis and management. Based on the student's interest and technical background, a concentration area is selected which provides depth in at least one area of specialization. In most cases, the concentration builds directly on one or more core courses. Concentration areas available to students through the IME Master's programs include information systems, manufacturing systems, management of technology, service systems, applied operations research, applied probability and statistics. In addition to these areas, students in Rensselaer's IME Master's program have designed individualized concentrations in such areas as financial services, quality systems, materials handling engineering and simulation modeling.

Placement opportunities for program graduates are outstanding. A wide variety of service, manufacturing, government and management consulting firms actively recruit program graduates. In recent years, program graduates have accepted positions with a wide variety of firms including Proctor and Gamble, IBM, General Electric, Citicorp, Intel, North American Philips Corp., the U.S. Postal Service, and many others.

For more information on Rensselaer's Master's program in Industrial and Management Engineering contact:

**DSES Student Operations Coordinator**
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