Industrial and Management Systems Engineering

The mission of the undergraduate program in Industrial and Management Systems Engineering (IMSE) is to produce graduates well-grounded in industrial and management systems engineering knowledge and skills consistent with the land-grant mission of MSU. Graduates will be prepared to be productive citizens and contributors to the economic well-being of employers.

The educational objectives for the IMSE program are that Industrial and Management Systems Engineering graduates will:

1. Use industrial and management systems engineering tools and knowledge in their chosen career paths.
2. Employ effective communication.
3. Work in multidisciplinary professional teams.
4. Engage in life-long learning, including post-graduate education for some graduates.
5. Contribute to industry and society, including involvement in professional and other service activities.
6. Design, manage, improve, and integrate systems across a broad range of organizations.
7. Participate in ethical leadership in design and operational activities that contribute to their organization and community.

The undergraduate curriculum in Industrial and Management Systems Engineering (IMSE) includes mathematics, basic sciences, humanities, social sciences, engineering sciences, design, and communication courses distributed over a four-year period. An important feature of the program is to teach students to foster the ability to comprehend, define, and analyze problems; synthesize alternatives; and rationally choose appropriate solutions. This requires a broad technical education that motivates life-long learning to keep pace with technological and social changes.

Industrial and Management Systems Engineering is a broad engineering discipline. Since IMSEs are employed in every facet of American business and industry, they are “people-oriented problem solvers” who enjoy diversity in their assignments and careers. For example, IMSE alumni include plant managers, manufacturing engineers, teachers, hospital administrators, consultants, quality assurance managers and engineers, technical sales engineers, production supervisors, and department heads. Today IMSEs are active in all kinds of manufacturing, as well as in service operations such as hospitals, banks, airlines, transportation and distribution companies, retailers, utilities, and local, state, and federal governments.

IMSEs are qualified for this wide variety of careers because their education is unique: they are people-oriented and technically trained. IMSEs take the standard core of engineering courses, including two years of advanced math, to provide a background for understanding production, fabrication, assembly processes, etc., required to design systems for business and industry. All engineering curricula require graduates to meet accreditation standards in mathematics, basic science, engineering science, engineering design, as well as in humanities and social sciences. However, IMSEs are more knowledgeable of management functions in companies than are other engineering majors. An IMSE graduate is a technically trained, management-oriented man or woman who can solve problems by working with people.

The IMSE is an integrator of resources, people, material, and equipment. This is accomplished by designing systems so that the right people with the proper mix of skills, combined with the right quantities of equipment and materials, are available at the right time to produce a product or provide a service at a cost that will allow a profit to be made. Since these professionals frequently work on problem solving teams, the ability to communicate, coordinate, and work with others is essential. Because IMSEs design systems for producing products, specifying processes, or providing services, their expertise is applicable to many businesses and industries. Frequently, they become supervisors and managers of the same systems they design.

Today much is written about business process re-engineering. IMSE graduates are uniquely qualified to analyze a company’s customer needs, relate those to products or services, and examine the flow of materials, processes, documentation, information, etc., that result in “re-engineering” the company to compete more effectively. World class companies must have systems that consistently provide on-time delivery of defect-free products (or services) that delight customers—and for a competitive price that allows the company to make a reasonable profit. Industrial and Management Systems Engineers are actively involved in designing these systems, integrating the resources required to make them function, and quite often managing them.

Graduate Program

Students who have graduated from a four-year degree program which has sharpened their mathematical and communication skills will greatly benefit by completing the Master of Science degree in Industrial & Management Engineering or the Doctor of Philosophy in Engineering with Industrial Engineering option. Emphasizes in Human Factors/Ergonomics, Service Engineering, Quality Management, and Systems Analysis and Modeling are available. Flexible guidelines permit broadening or customizing to meet career objectives. Further details may be found in the Graduate Catalog.

Student Performance and Retention Requirements

No further requirements apply in order to advance in the Industrial and Management Systems Engineering Program.

Freshman Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Fall</th>
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<tr>
<td>COMX 111US</td>
<td>Introduction to Public Speaking (formerly COM 110US)</td>
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<td>EIND 101</td>
<td>Introduction to Industrial &amp; Management Systems Engineering</td>
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<td>EMEC 103</td>
<td>CAE I-Engineering Graphics Communications</td>
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<tr>
<td>M 171Q</td>
<td>Calculus I</td>
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<td>EIND 142</td>
<td>Introduction to Systems Engineering</td>
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<td>PHSX 220</td>
<td>Physics I (w/ calculus)</td>
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<td>WRIT 101W</td>
<td>College Writing I</td>
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Sophomore Year

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<td>M 273Q</td>
<td>Multivariable Calculus</td>
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<td>EGEN 201</td>
<td>Engineering Mechanics--Statics</td>
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<td>PHSX 222</td>
<td>Physics II (w/ calculus)</td>
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<td>EMAT 251</td>
<td>Materials Structures and Prop</td>
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<td>University Core Elective</td>
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<td>EIND 313</td>
<td>Work Design and Analysis</td>
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<td>CSCI 127 - Joy and Beauty of Data</td>
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<td>M 221 - Introduction to Linear Algebra</td>
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<td>EGEN 205 - Mechanics of Materials</td>
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<td>ETME 215 - Manufacturing Processes</td>
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**Junior Year**

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<td>EIND 413 - Ergonomics &amp; Human Factors</td>
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<td>EIND 300 - Engineering Management &amp; Ethics</td>
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<td>EIND 354 - Engineering Probability and Statistics</td>
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<tr>
<td>EIND 364 - Principles of Operations Research</td>
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<tr>
<td>EIND 371 - Introduction to Computer Integrated Manufacturing</td>
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<tr>
<td>EIND 410 - Interaction Design</td>
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<tr>
<td>EGEN 310R - Multidisciplinary Engineering Design</td>
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<td>EIND 325 - Engineering Economic Analysis</td>
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<td>Take one of the following:</td>
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<td>EIND 455 - DOE for Engineers</td>
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<tr>
<td>EIND 457 - Regres &amp; Multivar Analysis</td>
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<tr>
<td>EIND 464 - Prin of Operations Research II</td>
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<tr>
<td>EIND 458 - Production &amp; Engineering Mgmt</td>
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**Senior Year**

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<tr>
<td>EIND 442 - Facility and Material Handling Systems Design</td>
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<td>EIND 434 - Project Management for Engineers</td>
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<td>EIND 422 - Introduction to Simulation</td>
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<td>IMSE Cognate Elective^2</td>
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<td>EIND 499R - Industrial Engineering Design Capstone</td>
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<td>EIND 477 - Quality Management Systems</td>
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<td>EGEN 488 - Fundamentals of Engineer Exam</td>
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<td>IMSE Cognate Elective^2</td>
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<td><strong>Total Program Credits:</strong></td>
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1. Students exempt from MSU writing requirement may substitute WRIT 201, WRIT 221, UH201, UH202, or add 3 credits to their Industrial and Management Systems Engineering cognate.

2. See IMSE Cognate Policy (http://www.montana.edu/mie/students/advising_forms_spring16/IMSE%20Cognate%20Policy.pdf) for details.

3. Engineering Core Elective: Choose EELE 250, EGEN 202, or EGEN 324.

A minimum of 128 credits is required for graduation; 42 of these credits must be in courses numbered 300 or above.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.