Industrial Engineering, M.S.

Requirements

The Master of Science program in industrial engineering requires a minimum of 30 s.h. of graduate credit. Students must maintain a cumulative g.p.a. higher than 3.25 to earn the degree.

Students must enroll in ENGR:7270 Engineering Ethics, typically in the first or second semester of enrollment. ISE:5000 Graduate Seminar: Industrial Engineering must be taken in the first two consecutive semesters of enrollment, and one semester (fall or spring) in subsequent academic years. More information about graduate seminar requirements can be found in the Graduate Student Handbook on the Department of Industrial and Systems Engineering Graduate Program website. Credit in ISE:5000 Graduate Seminar: Industrial Engineering and ENGR:7270 Engineering Ethics may not be applied toward the 30 s.h. of required coursework.

Breadth Requirement

All students must successfully complete at least one approved graduate-level course in each of three focus areas—analytics, human factors, and systems. Those with relevant academic background in these areas may be excused from this requirement by the director of graduate studies.

For more detailed information about program requirements and focus area courses, see the Graduate Student Handbook on the Department of Industrial and Systems Engineering website.

Analytics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ISE:3610</td>
<td>Stochastic Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ISE:3660</td>
<td>Data Analytics with R</td>
<td>3</td>
</tr>
<tr>
<td>ISE:3700</td>
<td>Operations Research</td>
<td>3</td>
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<tr>
<td>ISE:4172</td>
<td>Big Data Analytics</td>
<td>3</td>
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<tr>
<td>ISE:5730</td>
<td>Digital Industry</td>
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<td>ISE:5740</td>
<td>Design and Analysis of Computer Experiments</td>
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<tr>
<td>ISE:6300</td>
<td>Innovation Science and Studies</td>
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<tr>
<td>ISE:6380</td>
<td>Deep Learning</td>
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<tr>
<td>ISE:6650</td>
<td>Human Analytics and Behavioral Operations</td>
<td>3</td>
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<tr>
<td>ISE:6760</td>
<td>Pattern Recognition for Financial Data</td>
<td>3</td>
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<tr>
<td>ISE:6780</td>
<td>Financial Engineering and Optimization</td>
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<tr>
<td>ISE:6790</td>
<td>Advanced Data Analytics and Informatics</td>
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Human Factors

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ISE:3400</td>
<td>Human Factors</td>
<td>3</td>
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</table>

ISE:3450 | Ergonomics                      | 3     |
ISE:4175 | Safety Engineering              | 3     |
ISE:5420 | Automated Vehicle Systems       | 3     |
ISE:5460 | User Experience Design          | 3     |
ISE:6211 | Human Factors in Healthcare Systems | 3 |
ISE:6220 | Cognitive Engineering           | 3     |
ISE:6410 | Research Methods in Human Factors Engineering | 3 |
ISE:6420 | Human/Computer Interaction      | 3     |
ISE:6450 | Human Factors in Aviation       | 3     |
ISE:6460 | The Design of Virtual Environments | 3 |
ISE:6480 | Unmanned Aircraft Systems       | 3     |

Systems

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<tr>
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<th>Title</th>
<th>Hours</th>
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<tr>
<td>ISE:3300</td>
<td>Manufacturing Systems</td>
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<tr>
<td>ISE:3350</td>
<td>Process Engineering</td>
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<tr>
<td>ISE:3500</td>
<td>Information Systems Design</td>
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<tr>
<td>ISE:3600</td>
<td>Quality Control</td>
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<tr>
<td>ISE:3750</td>
<td>Digital Systems Simulation</td>
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<tr>
<td>ISE:4620</td>
<td>Design of Experiments for Quality Improvement</td>
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<tr>
<td>ISE:4900</td>
<td>Introduction to Six Sigma</td>
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</tr>
<tr>
<td>ISE:5310</td>
<td>Advanced Computational Design and Manufacturing</td>
<td>3</td>
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<tr>
<td>ISE:5520</td>
<td>Renewable Energy</td>
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<tr>
<td>ISE:5620</td>
<td>Design of Experiments</td>
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<tr>
<td>ISE:5650</td>
<td>Mechatronics Engineering for Smart Device Design</td>
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<tr>
<td>ISE:6350</td>
<td>Computational Intelligence</td>
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<tr>
<td>ISE:6810</td>
<td>Advanced Topics on Additive Manufacturing</td>
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Master of Science Degree Without Thesis

The M.S. in industrial engineering without thesis requires at least 21 s.h. in Department of Industrial and Systems Engineering courses (prefix ISE), including at least 12 s.h. of graduate-level courses at the 5000 level or above. Courses offered by other College of Engineering departments or courses from other colleges may be selected with consent of the academic advisor.

Master of Science with Thesis

Nonthesis students may petition for entry into the M.S. thesis program or the Ph.D. program by requesting a change of status through the department. Typically, students make this request at the invitation of a faculty member who is ready to serve as a student's research advisor. The request is then reviewed by the Graduate Admissions Committee. The committee forwards approved requests to the department chair, who may authorize a change of status petition from the department to the Graduate College.

Students are encouraged to write their thesis as a publishable journal article and submit the article for publication. The thesis option consists of a minimum of 21 s.h. of coursework
and up to 9 s.h. of research. Students pursuing the thesis option are permitted to enroll in ISE:5999 Research: Industrial Engineering M.S. Thesis. Up to 9 s.h. in the thesis course may count toward the graduate-level course requirement. In addition, students must submit the Final Examination: Advanced Degree form, complete a Report of Thesis Approval, and submit a copy of their thesis to the Graduate College by following the published guidelines and deadlines.