### Industrial and Systems Engineering

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1371 Calculus I (placement into course, or pre-req)</td>
<td>Math 1372 Calculus II (1371)</td>
</tr>
<tr>
<td>Phys 1301W Intro Physics I (&amp;Math 1371)</td>
<td>Phys 1302W Intro Physics II (1301, &amp;Math 1372)</td>
</tr>
<tr>
<td>CSE 1001 1st Yr Experience</td>
<td>Chem 1065 Chem Princ I Lab (&amp;1061)</td>
</tr>
<tr>
<td>Liberal Education course (recommend Biol 1009)</td>
<td>Liberal Education course or Writ 1301</td>
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<tr>
<td>Liberal Education course or Writ 1301</td>
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#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>IE 3011 Optimization I (UD, Math 2374, 2373)</td>
<td>IE 1101 Foundations of ISyE (Math 1372, CSE)</td>
</tr>
<tr>
<td>Mktg 3001 Princ of Marketing (Econ 1101)</td>
<td>IE 2021 Engineering Econ (Math 1372, CSE)</td>
</tr>
<tr>
<td>Technical Elective I</td>
<td>CSci 1133 Intro to Comp/Prog (&amp;Math 1371)</td>
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<tr>
<td>Liberal Education course</td>
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#### Junior Year

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<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>IE 3553 Simulation (UD, CSci 1133, 3521)</td>
<td>IE 4041W Senior Design (UD, 3012, 3522, 3553, 4011, 4511, 4551, 4541)</td>
</tr>
<tr>
<td>IE 3012 Optimization II (UD, 3011)</td>
<td>IE 4511 Human Factors (ISyE senior)</td>
</tr>
<tr>
<td>IE 4011 Stochastic Models (UD, Math 2373, 2374, 3521)</td>
<td>IE 4541W Project Mgmt (ISyE senior)</td>
</tr>
<tr>
<td>Technical Elective II</td>
<td>Technical Elective II</td>
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<tr>
<td>Liberal Education course</td>
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</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>IE 3522 Qual Eng &amp; Reliab (UD, Math 2373, 2374, 3521)</td>
<td>Technical Elective III</td>
</tr>
<tr>
<td>IE 4511 Human Factors (ISyE senior)</td>
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<tr>
<td>Technical Elective IV</td>
<td>Technical Elective V</td>
</tr>
<tr>
<td>IE 4551 Prod/Inventory Ctrl (UD, 1101, 2021, 3011, 3521)</td>
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### About This Plan

- This plan is not a contract. Curriculum can change. The APAS is the official method for tracking completion of University degree requirements.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title. Upper Division (UD) requires admission to the major prior to enrollment.
- Students can take either the CSE-only or University-wide versions of the math courses (Math 1371/1271, 1372/1272, 2373/2243, 2374/2263).
- Biological Science w/lab must be taken A-F to fulfill Natural Science requirement.

### Applying to your Major

Students who have completed the required courses for admission to this major (indicated with double boxes on plan) and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

### Total Credits Needed for Degree: 122

### Department Contact Information

- Website: www.isye.umn.edu
- Main Phone: 612-624-1582
- Main Office: 130 Mechanical Engineering
- Director of Undergraduate Studies: Professor Lisa Miller
- Email: info@isye.umn.edu

### University Degree Requirements

All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report. See link for full Core & Theme names: z.umn.edu/liberaleducation

### Writing Requirements:

**University Writing:**
Writ 1301/1401 or equivalent

**Writing Intensive (WI):**
Two: 1xxx or 2xxx level **
One: 3/4/5xxx level (in major)*
One: 3/4/5xxx level (any dept.)*

Requirements with an (*) will be fulfilled by taking courses at UM-TC required for this major.

### Liberal Education

<table>
<thead>
<tr>
<th>CORES:</th>
<th>THEMES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio*</td>
<td>4 of 5:</td>
</tr>
<tr>
<td>Phy*</td>
<td>Civ</td>
</tr>
<tr>
<td>Hist*</td>
<td>DSJ</td>
</tr>
<tr>
<td>SocS*</td>
<td>Env</td>
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<tr>
<td>Lit</td>
<td>GP*</td>
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<tr>
<td>AH</td>
<td>TS</td>
</tr>
<tr>
<td>Mth*</td>
<td></td>
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Industrial and Systems Engineering

POSSIBLE POSITIONS

- **Business analyst/consultant**: Perform business process analysis to identify opportunities to re-engineer business processes, improve efficiencies, and reduce costs. Also provides comprehensive assessments and recommendations for existing and potential engineering projects.
- **Data analyst**: Perform statistical analysis to recommend improved business decisions based on data insights.
- **Engineering and manufacturing solutions analyst**: Develop tools, implement designs, or integrate machinery, equipment, or computer technologies to ensure effective manufacturing processes.
- **Industrial engineer**: Design, test, and evaluate systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.
- **Supply chain analyst**: Assist organizations in managing inventory by solving control, warehousing, and transportation issues.
- **Operations engineer**: Evaluate and provide recommendations to improve the effectiveness of manufacturing, supply chain, and service systems.
- **Project manager**: Plan, direct, and coordinate activities of company projects.
- **Systems engineer**: Perform the requirements, analysis, and definition of the overall system and its subsystems.

**Some of these positions may require an advanced degree.**

INDUSTRIES

- Aerospace
- Banking and finance
- Construction
- Consulting
- Electronics assembly
- Energy
- Entertainment
- Forestry and logging
- Insurance
- Medical device
- Healthcare operations
- Manufacturing
- Military
- Oil and gas
- Plastics and forming
- Retail
- State and Federal Government
- Transportation

EMPLOYERS

- 3M
- Amazon
- Andersen Corporation
- Boston Scientific
- Cargill
- Cognizant Technology Solutions
- Deloitte
- Eaton
- Emerson
- ExxonMobil
- General Mills
- Heraeus Medical Components
- Honeywell
- Hormel Foods Corporation
- HUSCO International
- IBM
- Land O’Lakes
- Medtronic
- Seagate Technology
- Target Corporation
- The Schwan Food Company
- UnitedHealth Group/Optum
- United Parcel Service
- West Monroe Partners

More Information

Career Center: cse.umn.edu/career
Salary Information: z.umn.edu/csesalary
More Information on Undergraduate Majors: cse.umn.edu/majors

Please visit the Career Center to continue exploring this major.

*Salary and Career Outcomes gathered from the 2016-2017 CSE Graduation Survey
Post-graduation outcomes reflect the percentage of students who were employed full-time in their field or were enrolled in a graduate program.