SYSTEMS ENGINEERING & DESIGN, BS

for the degree of Bachelor of Science in Systems Engineering and Design (formerly General Engineering)

Systems Engineering and Design (SED) is a comprehensive, interdisciplinary program emphasizing interactions between parts of a whole. It brings together basic sciences, engineering analysis, and engineering design. The curriculum offers flexibility through a Secondary Field Option, while providing a broad background in engineering as a whole and decision-making that supports overall design. Systems Engineers understand how to coordinate interacting parts of a whole and to evaluate engineering within economic and physical constraints.

Through the Secondary Field Option electives, students can tailor their studies to one's interests and career goals in both technical and nontechnical areas. Secondary field options are of two types: pre-approved and customized. Pre-approved secondary fields have designated titles and a specified list of courses, from which several may be selected. Approval for the substitution of a course for one on the specified list may be requested via a petition form submitted to the department. Customized secondary fields may be created to achieve goals in areas not provided by pre-approved fields. To do this, a suitable title and all the courses must be petitioned for acceptance by the department. Petition approval is based on the merit of the secondary field and the coherence of the courses within it relative to the student’s goals.

Pursuit of campus minors, dual degrees, and James Scholar contracts may be integrated with customized secondary field options. Courses taken may be applied to minors, dual degrees, or contracts as well as secondary field options.

Pre-approved Secondary Fields

- Automotive Engineering
- Bioengineering
- Business Systems Integration and Consulting
- Civil Engineering Structures
- Communications and Computer Systems
- Computer Science
- Construction
- Control Systems
- Digital Prototyping
- Engineering Administration
- Engineering Marketing
- Environmental Quality
- Internet of Things (IOT)
- Manufacturing Engineering
- Nondestructive Testing and Evaluation
- Operations Research
- Quality Control
- Rehabilitation Engineering
- Robotics
- Theoretical and Applied Mechanics

Customized Secondary Fields

Customized secondary fields differ from pre-approved ones in that no sets of specified courses to choose from have been predefined. For all customized secondary field options, a course list must be constructed and submitted for approval by the department.

The following list contains examples of over fifty titles of customized secondary field options which have been approved. The complete list may be found at the department's secondary field website (https://ise.illinois.edu/undergraduate/systems-engineering-and-design-degree/secondary-field-options/). Additional titles beyond those listed may be proposed.

- A foreign language (several)
- An engineering discipline (several)
- Audio Engineering
- Economics
- Entrepreneurship
- Finance
- Fluid Dynamics
- International Business
- Mathematics
- Pre-Law
- Pre-Med
- Renewable Energy

Design experience and project management are emphasized and integrated across the core with a focus on establishing critical problem-solving skills applied across disciplines, strong communication skills, and the ability to work effectively and get results in a team environment.

The capstone experience for Systems Engineering and Design undergraduates is the Senior Project Course. Students work collaboratively with industry and a team of faculty members on a real-world problem during their final semester. The results are documented in a final written report and a formal presentation at the end of the semester to the company so that the student recommendations may be implemented.

Current Program Educational Objectives (https://ise.illinois.edu/undergraduate/abet/)

for the degree of Bachelor of Science in Systems Engineering and Design (formerly General Engineering)

Graduation Requirements

Minimum Technical GPA (https://go.grainger.illinois.edu/TechnicalGPA/): 2.0

TGPA is required for Engineering and Technical Elective courses and MATH 257. See Technical GPA (https://go.grainger.illinois.edu/TechnicalGPA/) to clarify requirements.

Information listed in this catalog is current as of 06/2023
Minimum Overall GPA: 2.0
Minimum hours required for graduation: 128 hours
General education: Students must complete the Campus General Education (https://courses.illinois.edu/gened/DEFAULT/DEFAULT/) requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). SE 494 and SE 495 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>ENG 100</td>
<td>Grainger Engineering Orientation Seminar</td>
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<tr>
<td>SE 100</td>
<td>Introduction to ISE</td>
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<tr>
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<td>ISE Undergraduate Seminar</td>
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Total Hours 2

Foundational Mathematics and Science

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<td>General Chemistry I</td>
<td>3</td>
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<td>CHEM 103</td>
<td>General Chemistry Lab I</td>
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<tr>
<td>MATH 221</td>
<td>Calculus I (MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)</td>
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<tr>
<td>MATH 231</td>
<td>Calculus II</td>
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<tr>
<td>MATH 241</td>
<td>Calculus III</td>
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<tr>
<td>MATH 257</td>
<td>Linear Algebra with Computational Applications</td>
<td>3</td>
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<tr>
<td>MATH 285</td>
<td>Intro Differential Equations</td>
<td>3</td>
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<tr>
<td>PHYS 211</td>
<td>University Physics: Mechanics</td>
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<tr>
<td>PHYS 212</td>
<td>University Physics: Elec &amp; Mag</td>
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<tr>
<td>PHYS 213</td>
<td>Univ Physics: Thermal Physics</td>
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Total Hours 31

Systems Engineering and Design Technical Core

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<tr>
<td>CS 101</td>
<td>Intro Computing: Engrg &amp; Sci (CS 124 may be substituted.)</td>
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<tr>
<td>ECE 110</td>
<td>Introduction to Electronics</td>
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<tr>
<td>ECE 211</td>
<td>Analog Circuits &amp; Systems</td>
<td>2</td>
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<tr>
<td>IE 300</td>
<td>Analysis of Data</td>
<td>3</td>
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<tr>
<td>IE 310</td>
<td>Deterministic Models in Optimization</td>
<td>3</td>
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<tr>
<td>SE 101</td>
<td>Engineering Graphics &amp; Design</td>
<td>3</td>
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<tr>
<td>SE 261</td>
<td>Business Side of Engineering</td>
<td>2</td>
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<tr>
<td>SE 310</td>
<td>Design of Structures and Mechanisms</td>
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<tr>
<td>SE 311</td>
<td>Engineering Design Analysis</td>
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<tr>
<td>SE 312</td>
<td>Instrumentation and Test Lab</td>
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<td>SE 320</td>
<td>Control Systems</td>
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<tr>
<td>SE 424</td>
<td>State Space Design for Control</td>
<td>3</td>
</tr>
<tr>
<td>SE 494</td>
<td>Senior Engineering Project I</td>
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<tr>
<td>SE 495</td>
<td>Senior Engineering Project II</td>
<td>2</td>
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<tr>
<td>TAM 211</td>
<td>Statics</td>
<td>3</td>
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<tr>
<td>TAM 212</td>
<td>Introductory Dynamics</td>
<td>3</td>
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<tr>
<td>TAM 251</td>
<td>Introductory Solid Mechanics</td>
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TAM 335 | Introductory Fluid Mechanics | 4 |

Total Hours 51

Secondary Field Option Electives

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<tbody>
<tr>
<td>ECE 470</td>
<td>Introduction to Robotics (same as AE 482 and ME 445)</td>
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<tr>
<td>ECE 486</td>
<td>Control Systems</td>
<td>4</td>
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<tr>
<td>ME 460</td>
<td>Industrial Control Systems</td>
<td>4</td>
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<tr>
<td>TAM 412</td>
<td>Intermediate Dynamics</td>
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<tr>
<td>TAM 416</td>
<td>Introduction to Nonlinear Dynamics and Vibrations</td>
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Automotive Engineering

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<tr>
<td>ECE 431</td>
<td>Electric Machinery</td>
<td>4</td>
</tr>
<tr>
<td>ECE 464</td>
<td>Power Electronics</td>
<td>3</td>
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<tr>
<td>ME 400</td>
<td>Energy Conversion Systems</td>
<td>3</td>
</tr>
<tr>
<td>ME 403</td>
<td>Internal Combustion Engines</td>
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Other Elective Options - complete remaining courses from this list:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CS 173</td>
<td>Discrete Structures</td>
<td>3</td>
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<tr>
<td>CS 440</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CS 446</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>ME 320</td>
<td>Heat Transfer</td>
<td>4</td>
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<tr>
<td>ME 360</td>
<td>Signal Processing</td>
<td>3.5</td>
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<td>ME 461</td>
<td>Computer Cntrl of Mech Systems</td>
<td>3</td>
</tr>
<tr>
<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>SE 422</td>
<td>Robot Dynamics and Control</td>
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<tr>
<td>SE 497</td>
<td>Independent Study (May be taken for up to 3 credit hours, based on automotive Engineering project approved by SFO faculty mentor.)</td>
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Autonomous Systems and Robotics

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>CS 173</td>
<td>Discrete Structures</td>
<td>3</td>
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<tr>
<td>CS 225</td>
<td>Data Structures</td>
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<tr>
<td>CS 440</td>
<td>Artificial Intelligence</td>
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<tr>
<td>CS 446</td>
<td>Machine Learning</td>
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<tr>
<td>ECE 470</td>
<td>Introduction to Robotics</td>
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<tr>
<td>ECE 486</td>
<td>Control Systems</td>
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<td>ECE 490</td>
<td>Introduction to Optimization</td>
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<tr>
<td>ME 270</td>
<td>Design for Manufacturability</td>
<td>3</td>
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<tr>
<td>ME 461</td>
<td>Computer Cntrl of Mech Systems</td>
<td>3</td>
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<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
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<tr>
<td>SE 411</td>
<td>Reliability Engineering</td>
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<tr>
<td>SE 420</td>
<td>Digital Control Systems</td>
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<tr>
<td>SE 422</td>
<td>Robot Dynamics and Control</td>
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<tr>
<td>SE 423</td>
<td>Mechatronics</td>
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<tr>
<td>Bioengineering</td>
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<tr>
<td>BIOE 120</td>
<td>Introduction to Bioengineering</td>
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<td>BIOE 414</td>
<td>Biomedical Instrumentation (same as ECE 414)</td>
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<td>BIOE 415</td>
<td>Biomedical Instrumentation Lab (same as ECE 415)</td>
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<td>BIOE 498</td>
<td>Special Topics</td>
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<tr>
<td>BIOP 401</td>
<td>Introduction to Biophysics</td>
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<tr>
<td>CHEM 232</td>
<td>Elementary Organic Chemistry I</td>
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<td>Elementary Organic Chem Lab I</td>
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<tr>
<td>IE 340</td>
<td>Human Factors (same as PSYC 358)</td>
<td>4</td>
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<tr>
<td>KIN 355</td>
<td>Molec &amp; Cellular Basis of Life (recommended only if a prerequisite to another listed course.)</td>
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<tr>
<td>MCB 150</td>
<td>Molecular Genetics (recommended only if a prerequisite to another listed course.)</td>
<td>3</td>
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<tr>
<td>MCB 250</td>
<td>Exp Techniqs in Molecular Biol (recommended only if a prerequisite to another listed course.)</td>
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<tr>
<td>MCB 251</td>
<td>Cellular Physiology</td>
<td>3</td>
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<tr>
<td>MCB 401</td>
<td>Sys &amp; Integrative Physiology</td>
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<td>MCB 403</td>
<td>Cell &amp; Membrane Physiology Lab</td>
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</tr>
<tr>
<td>MCB 404</td>
<td>Sys &amp; Integrative Physiol Lab</td>
<td>2</td>
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<tr>
<td>MCB 450</td>
<td>Introductory Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
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**Business Systems Integration & Consulting**

- **Core Requirement:**
  - SE 400 Engineering Law 3
- **Group I Requirement - complete at least 1 course from this list:**
  - BADM 352 Database Design and Management 3
  - BADM 353 Info Sys Analysis and Design 3
  - IE 405 Computing for ISE 3
- **Group II - select remaining courses from this list. Of these courses, only 1 selected may be at the 100 or 200 level.**
  - ACCY 200 Fundamentals of Accounting (A basic accounting course is highly recommended.) 3
  - ACCY 201 Accounting and Accountancy I (A basic accounting course is highly recommended.) 3
  - ACCY 202 Accounting and Accountancy II (A basic accounting course is highly recommended.) 3
  - ADV 150 Introduction to Advertising 3
  - BADM 310 Mgmt and Organizational Beh 3
  - BADM 311 Leading Individuals and Teams 3
  - BADM 312 Designing and Managing Orgs 3
  - BADM 320 Principles of Marketing 3
  - BADM 445 Small Business Consulting 4
  - BADM 446 Entrepreneurship: New Venture Creation 4
  - BTW 250 Principles Bus Comm 3
  - BTW 261 Principles Tech Comm 3
  - FIN 221 Corporate Finance 3

- FIN 300 Financial Markets 3
- IE 420 Financial Engineering 3

**Civil Engineering Structures**

- CEE 380 Geotechnical Engineering 3
- CEE 460 Steel Structures I 3
- CEE 461 Reinforced Concrete I 3
- CEE 462 Steel Structures II 3
- CEE 463 Reinforced Concrete II 3
- CEE 465 Design of Structural Systems 3
- SE 400 Engineering Law 3

**Computer Science**

- Core Courses:
  - CS 173 Discrete Structures 3
  - CS 225 Data Structures 4
- **Elective Options - complete 2 of the following courses:**
  - CS 410 Text Information Systems 3
  - CS 441 Database Systems 3 or 4
  - CS 425 Distributed Systems 3 or 4
  - CS 438 Communication Networks 3 or 4
- **All 200-, 300-, and 400-level CS courses excluding CS 210, CS 211, CS 397, CS 398, and CS seminar and senior project courses.**
- SE 400 Engineering Law 3

**Construction**

- CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) 4
- CEE 310 Transportation Engineering 3
- CEE 320 Construction Engineering 3
- CEE 380 Geotechnical Engineering 3
- CEE 420 Construction Productivity 3
- CEE 421 Construction Planning 3
- CEE 422 Construction Cost Analysis 3
- CEE 460 Steel Structures I 3
- CEE 461 Reinforced Concrete I 3
- CEE 465 Design of Structural Systems 3
- ME 330 Engineering Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) 4
- ME 460 Industrial Control Systems 4
- ME 461 Computer Cntrl of Mech Systems 3
<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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<tr>
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<td>Engineering Law</td>
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<td>SE 420</td>
<td>Digital Control Systems</td>
<td>4</td>
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<td>SE 422</td>
<td>Robot Dynamics and Control</td>
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<tr>
<td>SE 423</td>
<td>Mechatronics</td>
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<tr>
<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
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<tr>
<td>SE 402</td>
<td>Comp.-Aided Product Realization</td>
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<td>SE 410</td>
<td>Component Design (This course cannot count as an SFO elective and an SED Design Elective.)</td>
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<td>SE 413</td>
<td>Engineering Design Optimization (This course cannot count as an SFO elective and an SED Design Elective.)</td>
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<td>SE 423</td>
<td>Mechatronics (This course cannot count as an SFO elective and an SED Design Elective.)</td>
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<tr>
<td>TAM 302</td>
<td>Computational Mechanics</td>
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<td>TAM 470</td>
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**Engineering Administration**

Core Requirement:

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<td>Engineering Law</td>
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Elective Options - select remaining courses from this list. Of these courses, only 1 selected may be at the 100 or 200 level.

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<tr>
<td>ACCY 200</td>
<td>Fundamentals of Accounting</td>
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<td>ACCY 201</td>
<td>Accounting and Accountancy I</td>
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<tr>
<td>ACCY 202</td>
<td>Accounting and Accountancy II</td>
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<tr>
<td>ADV 150</td>
<td>Introduction to Advertising</td>
<td>3</td>
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<tr>
<td>BADM 310</td>
<td>Mgmt and Organizational Beh</td>
<td>3</td>
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<tr>
<td>BADM 320</td>
<td>Principles of Marketing</td>
<td>3</td>
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<tr>
<td>BADM 322</td>
<td>Marketing Research</td>
<td>3</td>
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<td>BADM 323</td>
<td>Marketing Communications</td>
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<td>BADM 325</td>
<td>Consumer Behavior</td>
<td>3</td>
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<td>BADM 327</td>
<td>Marketing to Business and Govt</td>
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<td>BADM 380</td>
<td>International Business</td>
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<td>BADM 382</td>
<td>International Marketing</td>
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<td>BADM 420</td>
<td>Advanced Marketing Management</td>
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<td>BTW 250</td>
<td>Principles Bus Comm</td>
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<td>BTW 261</td>
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<td>PSYC 245</td>
<td>Industrial Org Psych</td>
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**Environmental Quality**

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<tr>
<td>ACE 310</td>
<td>Natural Resource Economics</td>
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<tr>
<td>CEE 330</td>
<td>Environmental Engineering</td>
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<tr>
<td>CEE 437</td>
<td>Water Quality Engineering</td>
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<tr>
<td>CEE 440</td>
<td>Fate Cleanup Environ Pollutant</td>
<td>4</td>
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<td>CEE 442</td>
<td>Environmental Engineering Principles, Physical</td>
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<td>CEE 443</td>
<td>Env Eng Principles, Chemical</td>
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<td>CEE 444</td>
<td>Env Eng Principles, Biological</td>
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<td>CEE 446</td>
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<tr>
<td>ENVS 336</td>
<td>Tomorrow's Environment</td>
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<td>ENVS 431</td>
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<tr>
<td>IB 105</td>
<td>Environmental Biology</td>
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<tr>
<td>NRES 419</td>
<td>Env and Plant Ecosystems</td>
<td>3</td>
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<tr>
<td>NRES 472</td>
<td>Environmental Psychology</td>
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<tr>
<td>SE 400</td>
<td>Engineering Law</td>
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**Manufacturing Engineering**

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<th>Course Title</th>
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<tbody>
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<td>IE 370</td>
<td>Stochastic Processes and Applications</td>
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</tr>
<tr>
<td>ME 330</td>
<td>Engineering Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.)</td>
<td>4</td>
</tr>
<tr>
<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>SE 402</td>
<td>Comp.-Aided Product Realization</td>
<td>3</td>
</tr>
<tr>
<td>SE 420</td>
<td>Digital Control Systems</td>
<td>4</td>
</tr>
<tr>
<td>SE 422</td>
<td>Robot Dynamics and Control</td>
<td>4</td>
</tr>
<tr>
<td>SE 423</td>
<td>Mechatronics</td>
<td>3</td>
</tr>
</tbody>
</table>

Any courses from Digital Prototyping and Control Systems Secondary Field Option.

**Nondestructive Testing and Evaluation**

Core Requirement:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 412</td>
<td>Nondestructive Evaluation</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Options - complete remaining courses from this list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 300</td>
<td>Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.)</td>
<td>4</td>
</tr>
</tbody>
</table>
Technical Electives

Design Electives below:

Design elective selected from the departmentally approved list of

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAM 456</td>
<td>Experimental Stress Analysis</td>
<td>3</td>
</tr>
<tr>
<td>TAM 412</td>
<td>Intermediate Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>TAM 400</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>TAM 370</td>
<td>Fund of Engrq Acoustics</td>
<td>3</td>
</tr>
<tr>
<td>ME 471</td>
<td>Design for Manufacturability</td>
<td>3</td>
</tr>
<tr>
<td>ME 471</td>
<td>Finite Element Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SE 400</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>SE 270</td>
<td>Design for Manufacturability</td>
<td>3</td>
</tr>
<tr>
<td>ME 200</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MSE 280</td>
<td>Engineering Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

Free Electives

Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives/)

Total Hours of Curriculum to Graduate 128

for the degree of Bachelor of Science in Systems Engineering and Design (formerly General Engineering)

Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrollment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/systems-engineering-map/), which include prerequisite sequencing.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). SE 494 and SE 495 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.

First Year

First Semester Hours  Second Semester Hours

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 100</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>ME 200</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 280</td>
<td>Engineering Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 200</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME 280</td>
<td>Engineering Materials</td>
<td>3</td>
</tr>
</tbody>
</table>

Technical Electives

Design elective selected from the departmentally approved list of

Design Electives below:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAM 400</td>
<td>Engineering Law</td>
<td>3</td>
</tr>
<tr>
<td>TAM 412</td>
<td>Intermediate Dynamics</td>
<td>4</td>
</tr>
<tr>
<td>TAM 424</td>
<td>Mechanics of Structural Metals</td>
<td>3</td>
</tr>
<tr>
<td>TAM 428</td>
<td>Mechanics of Composites</td>
<td>3</td>
</tr>
<tr>
<td>TAM 435</td>
<td>Intermediate Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>TAM 445</td>
<td>Continuum Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>TAM 451</td>
<td>Intermediate Solid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>TAM 456</td>
<td>Experimental Stress Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAM 456</td>
<td>Experimental Stress Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>
### Systems Engineering & Design, BS

#### First Year

<table>
<thead>
<tr>
<th>Composition I course or SE 101</th>
<th>4-3</th>
</tr>
</thead>
</table>

#### Second Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 261</td>
<td>2 IE 300</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 241</td>
<td>4 MATH 285</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>4 PHYS 213</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>TAM 211</td>
<td>3 TAM 212</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECON 102 or ECON 103 (counts as General Education course)</td>
<td>3 TAM 251</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SE 290</th>
<th>General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)</th>
<th>3</th>
</tr>
</thead>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE 310</td>
<td>3 SE 311</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>SE 320</td>
<td>4 SE 312</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MATH 257</td>
<td>3 SE 424</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECE 211</td>
<td>2 IE 310</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Secondary Field Option course</td>
<td>3 TAM 335</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

| SE 494 & SE 495 or Secondary Field Option course | 5-3 |

| General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation) | 3 |

#### Fourth Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Hours</th>
<th>Second Semester</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Field Option course or SE 494 &amp; SE 495</td>
<td>3-5 SE 494 &amp; SE 495 or Secondary Field Option course</td>
<td>5-3</td>
<td></td>
</tr>
<tr>
<td>Design elective course</td>
<td>3 Secondary Field Option course</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Engineering Science elective course</td>
<td>3 Language Other Than English (3rd level) course</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Secondary Field Option course</td>
<td>3 Free elective course</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| 3 Free elective course | 3 |

**Total Hours 128**

*for the degree of Bachelor of Science in Systems Engineering and Design (formerly General Engineering)*

### Student Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

*for the degree of Bachelor of Science in Systems Engineering and Design (formerly General Engineering)*

### Contact Information

- [Industrial & Enterprise Systems Website](https://ise.illinois.edu/)
- [Industrial & Enterprise Systems Faculty](https://ise.illinois.edu/directory/faculty.html)
- [The Grainger College of Engineering Admissions](https://grainger.illinois.edu/admissions/)
- [The Grainger College of Engineering](https://grainger.illinois.edu/)

*Information listed in this catalog is current as of 06/2023*