Industrial & Systems Engineering
Bachelor of Science (BS)

Industrial & Systems Engineers design, analyze and control complex systems, such as manufacturing systems, global supply chain and service systems. Different from other engineering disciplines that apply skills to the specific areas, Industrial Engineering is the only engineering discipline that focuses on optimizing systems for maximum efficiency, minimum cost, quality improvement, safety and other interests to the stakeholders of the system. It saves time, money, materials, energy and other resources for the companies, industries and essentially for our society. The skills of Industrial & Systems Engineers can be applied in an extremely wide range of organizations.

The Industrial & Systems Engineering program has a strong base of math and the physical sciences, fundamental engineering courses and more specific courses on industrial management, manufacturing and industrial engineering. A goal of the program is to get students to understand and then optimize the products, processes, tools and technologies used in industry and other complex system. Industrial & Systems Engineering students will understand the fundamental concepts required to be a professional in the field, including concepts in mathematics, physical sciences, and engineering while obtaining a more specialized knowledge in industrial management, manufacturing and engineering analysis than can be applied to industrial and other complex systems. Graduates will have the ability to design or optimize complex systems given economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints to meet the needs of society.

**Becoming Career Ready...**

/ Faculty with relevant industry experience work closely with students by providing them with career-ready practical experience and a technology-based curriculum in the state-of-the-art Otto & Della Seabaugh Polytechnic building.

/ Industrial & Systems Engineering graduates work in manufacturing and related industries, as well as municipalities, transportation and logistics, healthcare, and many other fields that use complex systems. Examples of job titles include manufacturing engineer, systems engineer, process engineer, project manager, quality engineer and operations manager.

/ 100% of Southeast programs offer real-world experience. Industrial & Systems Engineering students earn this experience through a senior design capstone course for students to work in teams to solve open-ended industrial projects. Students also gain valuable hands-on experience through required labs that accompany the courses work.

/ The path to a successful career starts with you! You can maximize your career development by working closely with Career Services and Southeast faculty – they are here to help you connect your passions, interests and skills to jobs and opportunities in the field. Career Services provides professional career counseling and coaching, resume critiques, practice interviews, job search strategies, career events, networking opportunities and more.

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**Career Opportunities:**
- Industrial engineer
- Systems engineer
- Manufacturing engineer
- Quality engineer
- Product/process engineer
- Plant engineer
- Engineering analyst

**Transfer and Dual Credit Students**
If you have dual credit or transfer credit, please visit our transfer course equivalencies guide at semo.edu/transfercredit.
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Bachelor of Science (BS)

This is a guide based on the 2019-2020 Undergraduate Bulletin and is subject to change. The time it takes to earn a degree will vary based on several factors such as dual enrollment, remediation, and summer enrollment. Students will meet with an academic advisor each semester and use Degree Works to monitor their individual progress.

### CURRICULUM CHECKLIST

**INDUSTRIAL & SYSTEMS ENGINEERING 84-85 Hour Major** – No minor required

**Required Courses:**
- EG201 Systems Engineering (1)
- EG492 Modeling & Simulation (3)
- EG506 Operations Research (3)
- EP100 Physics & Engineering Concepts (3)
- EP240 Circuit Analysis (4)
- EP361 Thermal Analysis (3)
- ET304 Fundamentals of Programmable Logic Controllers (3)
- IM301 Industrial Safety Supervision (3)
- IM313 Facilities Planning (3)
- IM315 Work Measurement (3)
- IM411 Total Quality Assurance (3)
- IM417 Manufacturing Resources Analysis (3)
- MA140 Analytic Geometry and Calculus I (5)
- MA145 Analytic Geometry and Calculus II (4)
- MA244 Analytic Geometry and Calculus III (3)
- MA345 Linear Algebra (3)
- MA523 Probability & Statistics I (3)
- MN120 Fundamentals of Engineering Design Process (3)
- MN170 Engineering Materials & Testing (3)
- MN203 Engineering Materials & Processes I (3)
- MN324 Mechanical Design Processes (3)
- MN412 Advanced Manufacturing Systems (3)
- PH230 General Physics I (5)
- PH231 General Physics II (5)
- UI410 Manufacturing Research in a Global Society (3)

**Choose one course:**
- MN260 Technical Computer Programming Applications (3)
- CS155 Computer Science I (4)
- CS177 Programming for Scientists & Engineers (3)

**Additional requirements:**
- CH185 General Chemistry (5)
- MN220 Engineering Economic Analysis (3)
- SW207 Understanding Cultural & Social Diversity (3)
- UI400 Business & Ethics (3)

**General Education Requirements** – some requirements may be fulfilled by coursework in major program

- Social and Behavioral Sciences – 6 hours
- Constitution Requirement – 3 hours
- Written Communication – 6 hours
- Oral Communication – 3 hours
- Natural Sciences – 7 hours (from two disciplines, one to include a lab)
- Mathematics – 3 hours
- Humanities & Fine Arts – 9 hours (from at least two disciplines)
- Additional requirements – 5 hours (to include UI100 for native students)
- Civics examination

### SAMPLE FOUR-YEAR PLAN

#### FALL SEMESTER

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Milestone: maintain 2.0 cumulative GPA

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Milestone: maintain 2.0 cumulative GPA

### FOURTH YEAR

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Milestone: maintain 2.0 cumulative GPA

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**Degree requirements for all students:** a minimum of 120 credit hours, completion of the General Education program, completion of 39 senior division hours (300-599), Writing Proficiency Exam (WP003).

Refer to the Undergraduate Bulletin or Degree Works for additional graduation requirements for your program.

A minimum 2.0 GPA in the major and overall are required to graduate with a BS degree.

*Many major courses are on a set rotation and dependent on when prerequisites are completed. The actual semester a course is taken may vary based on the rotation.*