What can I do with a major in...

Industrial and Systems Engineering

Industrial engineers determine the most effective ways to use the basic factors of production—people, machines, materials, information, and energy—to make a product or provide a service. They are concerned primarily with increasing productivity through the management of people, methods of business organization, and technology. To maximize efficiency, industrial engineers study product requirements carefully and then design manufacturing and information systems to meet those requirements with the help of mathematical methods and models. They develop management control systems to aid in financial planning and cost analysis, and they design production planning and control systems to coordinate activities and ensure product quality.

Industrial engineers also design or improve systems for the physical distribution of goods and services and determine the most efficient plant locations. Industrial engineers analyze data to find insights to make better business decisions. Many industrial engineers move into management positions because the work is closely related to the work of managers. Generally, industrial engineers are more widely distributed among industries than other engineers.

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

TECHNICAL SKILLS

- AMPL
- Arena
- EOR Production and Supply Chain Models
- Excel
- Mathematica
- MATLAB
- MS Project
- NPV & IRR Financial Analysis
- Optimization

CSE Career Outcomes

Average Starting Salary: $63,876*

Post-graduation Outcomes:*

Grad School: 8.1%
Employed: 91.9%
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.
- **Manufacturing engineer:** Plan the tooling, construction, and assembly of product as dictated by design specifications.
- **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.
- **Production engineer:** Improve manufacturing efficiency by analyzing and planning work flow, space requirements, and equipment layout. Assure product and process quality by designing testing methods.
- **Project manager:** Plan, direct, and coordinate activities of company projects.
- **Quality engineer:** Test and inspect procedures using metrology, statistics, and cost concepts and techniques. Diagnose and correct improper quality control practices.
- **Systems engineer:** Perform the requirements, analysis, and definition of the overall system and its subsystems.

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

GET INVOLVED

- CSE K-12 Outreach
- CSE Ambassadors
- CSE International Ambassadors
- Engineers without Borders
- Institute for Operations Research and the Management Sciences
- Institute of Industrial and Systems Engineers
- National Society of Black Engineers
- Science and Engineering Student Board
- Society of Asian Scientists and Engineers
- Society of Hispanic Professional Engineers
- Society of Manufacturing Engineers
- Society of Women Engineers

RESOURCES

- American Council of Engineering Companies: [acec.org](http://acec.org)
- American Council of Engineering Companies-MN chapter: [acecmn.org](http://acecmn.org)
- Balanced Scorecard Institute: [balancedscorecard.org](http://balancedscorecard.org)
- Decision Sciences Institute: [decisionsciences.org](http://decisionsciences.org)
- Department Website: [isye.umn.edu](http://isye.umn.edu)
- Institute for Operations Research and the Management Sciences: [informso.org](http://informso.org)
- Institute of Industrial and Systems Engineers: [iiise.org](http://iiise.org)
- Intelligent Transportation Systems America: [itsa.org](http://itsa.org)
- International Council on Systems Engineering: [incose.org](http://incose.org)
- Minnesota Society of Professional Engineers: [mnspe.org](http://mnspe.org)
- National Society of Professional Engineers: [nspe.org](http://nspe.org)
- Production and Operation Management Society: [poms.org](http://poms.org)
- Society of Manufacturing Engineers: [sme.org](http://sme.org)
- Society of Women Engineers: [swe.org](http://swe.org)

See the Major Binders available in the CSE Career Center’s Resource Center for more information about this major and career.

*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. For detailed starting salary information see the CSE Career Center website.*