Chemical engineers build a bridge between science and manufacturing, applying the principles of chemistry and engineering to solve problems involving the production or use of chemicals. They design equipment and develop processes for large-scale chemical manufacturing, plan and test methods of manufacturing products and treating byproducts, and supervise production. Chemical engineers also work in a variety of manufacturing industries other than chemical manufacturing, such as those producing electronics, photographic equipment, clothing, and pulp and paper. They also work in the healthcare, biotechnology, and business services industries.

Chemical engineers apply principles of chemistry, physics, mathematics, and mechanical and electrical engineering. They frequently specialize in a particular chemical process such as oxidation or polymerization. Others specialize in a particular field, such as materials science, or in the development of specific products such as fertilizers and pesticides, automotive plastics, or chlorine bleach. They must be aware of all aspects of chemical manufacturing and how it affects the environment, the safety of workers, and the customers. Chemical engineers use computer technology to optimize all phases of research and production, so they need to understand how to apply computer skills to chemical process analysis, automated control systems, and statistical quality control.

**INDUSTRIES**
- Agriculture
- Appliance manufacturing
- Biotechnology
- Clothing/textiles
- Consulting
- Food/beverage
- Healthcare
- Higher education
- Industrial products
- Manufacturing
- Mining
- Packaging
- Parts design
- Pest control
- Petroleum
- Pharmaceutical products
- Pharmaceuticals
- Polymer resins
- Pulp and paper
- Tire and rubber

**EMPLOYERS**
- 3M
- Andersen Corporation
- Boston Scientific
- Brady Corporation
- Cargill
- Ecolab
- Emerson
- Epic Systems
- ExxonMobil
- Flint Hills Resources
- General Electric
- General Mills
- H.B. Fuller
- Kraft Heinz
- Land O'Lakes
- Medtronic
- MOM Brands
- Renewable Energy Group, Inc.
- Schlumberger
- Sherwin Williams
- Stratasys
- The Dow Chemical Company

**TECHNICAL SKILLS**
- Advanced and Basic Chemistry Laboratory Techniques
- Biology Laboratory Techniques
- ChemDraw
- Excel
- LoggerPro
- Mathematica
- MATLAB

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**CSE Career Outcomes**

Average Starting Salary: $62,712*

Post-graduation Outcomes:*
POSSIBLE POSITIONS

- **Chemical engineer:** Design chemical plant equipment and devise processes for manufacturing chemicals and products by applying principles and technology of chemistry, physics, and engineering.
- **Operations and manufacturing engineer:** Design, integrate, or improve manufacturing systems and related processes. Spends time ensuring that a plant is producing the right amount of product to the correct specification.
- **Process engineer:** Designs, implements, controls, and optimizes industrial processes—such as chemical, food, pharmaceutical etc.
- **Product engineer:** Follows the production cycle of a particular product to ensure it is meeting specification. Product engineers may work with marketing and R&D to ensure that a product will meet the needs of customers, then sees the product through production. They may work on new products or variations of existing products.
- **Project engineer:** Organizes and runs projects for engineering companies. This can be anything from managing a small modification to an existing pharmaceutical facility to building a multi-billion dollar petrochemicals complex.
- **Quality control engineer:** Monitors the manufacturing of products to ensure that quality standards are maintained. Quality control engineers may bring samples of a product in from a field test or from a normal application, and then test them to determine how specific properties—such as strength, color, and weatherability—change over time.
- **Research and development engineer:** Develops the ideas for future plants, improving efficiency, environmental performance, and even developing new products.
- **Technical analyst:** Works independently and identifies appropriate course of action to analyze issues, recommend solutions, and administer budget.

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

GET INVOLVED

- Active Energy Club
- Alpha Chi Sigma
- American Institute of Chemical Engineers
- CSE K-12 Outreach
- CSE Ambassadors
- CSE International Ambassadors
- Engineers Without Borders
- Nat’l Org for the Professional Advancement of Black Chemists and Chemical Engineers
- National Society of Black Engineers
- Plumb Bob Honorary Leadership Society
- Society of Asian Scientists and Engineers
- Society of Hispanic Professional Engineers
- Society of Women Engineers
- Tau Beta Pi
- TeslaWorks
- Theta Tau
- Science and Engineering Student Board
- Why Not Chemical Engineering: [whynotchemeng.com](http://whynotchemeng.com)

RESOURCES

- Chemical Engineering Jobs: [chemicalengineer.com](http://chemicalengineer.com)
- Chemistry Jobs: [chemistryjobs.com](http://chemistryjobs.com)
- Department of Chemical Engineering and Materials Science: [cems.umn.edu](http://cems.umn.edu)
- Engineer Jobs: [engineerjobs.com](http://engineerjobs.com)
- Engineer.net: [engineer.net](http://engineer.net)
- Engineering Central: [engcen.com](http://engcen.com)
- Engineering.com: [engineering.com](http://engineering.com)
- Graduating Engineer: [graduatingengineer.com](http://graduatingengineer.com)
- ThinkJobs.com: [thinkjobs.com](http://thinkjobs.com)
- Why Not Chemical Engineering: [whynotchemeng.com](http://whynotchemeng.com)

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.