

CHEMICAL ENGINEER

ALSO KNOWN AS:

PROCESS ENGINEER

BIOCHEMICAL ENGINEER

PETROCHEMICAL ENGINEER

MATERIALS ENGINEER

SHAPE OUR MODERN WORLD ONE MOLECULE AT A TIME.

At the molecular frontier of innovation, Chemical Engineers are the architects of matter, transforming raw materials into the products that shape our modern world.

KEY SKILLS

Skills which may benefit anyone considering a job as a chemical engineer include:

- ☑ Chemical Kinetics
- ☑ Fluid Mechanics
- ☑ Process Control
- ☑ Process Engineering
- ☑ Thermodynamics

CAREER PROGRESSION

In this role, you may have the opportunity to progress to other positions. Career progression opportunities include:

- Chief Executive Officer
- Supply Chain Manager
- Chief Operating Officer
- Chief Engineering Officer

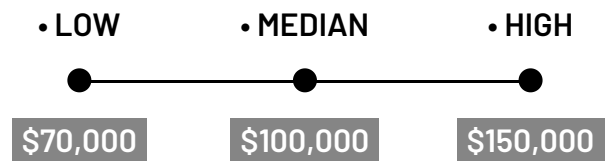
VALUES & ATTRIBUTES

Values and attributes of anyone considering a job as a chemical engineer include:

- ☑ Innovative
- ☑ Safety-conscious
- ☑ Analytical
- ☑ Attention to detail
- ☑ Continuous learning
- ☑ Conventional - "Organiser"

SALARY EXPECTATION

The expected salary for a Chemical Engineer can vary across different areas of manufacturing and may vary as you become more experienced.



RELATED INDUSTRIES

- ▶ Aerospace and Defence ▶ Chemicals, Hydrocarbons and Refining ▶ Food and Beverage ▶ Furniture and Other Products
- ▶ General Manufacturing and Engineering ▶ Meat and Seafood Processing ▶ Pharmaceutical and Medical Technology
- ▶ Polymers, Plastic and Rubber ▶ Printing and Graphic arts ▶ Pulp, Paper and Packaging ▶ Renewables ▶ Textiles, Clothing and Footwear
- ▶ Timber and Wood ▶ Transport Equipment and Machinery

RECOMMENDED SCHOOL SUBJECTS

- Agricultural Practices • Agricultural Science • Engineering Skills • Mathematical Methods • Physics

CORE SCHOOL SUBJECTS

- General Mathematics • Essential English • Biology • Chemistry • Engineering

JOB OVERVIEW

Chemical Engineers apply principles of chemistry, biology, physics, and mathematics to solve problems involving the production or use of chemicals, fuel, drugs, food, and many other products. They design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations.

Chemical Engineers play a crucial role in transforming raw materials into finished products efficiently and safely. They design and optimise production processes, ensuring that chemical reactions occur under controlled conditions to produce desired outcomes. These engineers are responsible for scaling up laboratory processes to industrial-scale production, designing and selecting appropriate equipment, and implementing process control systems to maintain product quality and consistency. They also work on improving existing manufacturing processes to increase yield, reduce waste, and minimise energy consumption, contributing to both economic and environmental sustainability.

In their day-to-day work, Chemical Engineers might be found developing new materials, optimising manufacturing processes, ensuring product quality and safety, or researching alternative energy sources. They work in diverse industries, including pharmaceuticals, energy, food processing, and environmental management. In manufacturing settings, they often collaborate with other engineers, technicians, and production staff to troubleshoot issues, implement new technologies, and ensure smooth operations.

The role of a Chemical Engineer requires a unique combination of scientific knowledge, technical skills, and creative problem-solving abilities. They must understand complex chemical processes, be proficient in process design and control, and be able to apply their knowledge to develop safe, efficient, and sustainable solutions. In manufacturing, this extends to understanding the intricacies of large-scale production, including factors such as heat transfer, fluid dynamics, and process safety management.

WHAT WILL YOU DO?

Your role may include duties as follows:

1. Design and develop chemical manufacturing processes
2. Conduct research to create new and improved chemical products and processes
3. Ensure safety and environmental compliance in chemical production
4. Troubleshoot issues in manufacturing processes and equipment
5. Collaborate with multidisciplinary teams to develop new technologies and products
6. Optimise existing production processes for efficiency and sustainability
7. Implement and maintain quality control systems in manufacturing facilities
8. Develop and scale up new products from laboratory to full-scale production

HOW TO BECOME A CHEMICAL ENGINEER

Becoming a Chemical Engineer typically requires a strong educational background in chemistry and engineering principles. Here are the steps to become a Chemical Engineer:

1. Earn a bachelor's degree in chemical engineering or a closely related field
2. Gain practical experience through internships or co-op programs during your studies
3. Consider pursuing a master's degree in chemical engineering or a specialised area such as Biochemical Engineering or Process Systems Engineering
4. Obtain professional engineering licensure (e.g., Chartered Professional Engineer status in Australia)
5. Stay updated with industry trends and emerging technologies through continuous professional development

VOCATIONAL EDUCATION & TRAINING

While most Chemical Engineer positions require a university degree, there are vocational education and training options that can provide a foundation for supporting roles within chemical processing industries:

- Certificate IV in Process Plant Technology (PMA40116)
- Diploma of Process Plant Technology (PMA50116)
- Advanced Diploma of Process Plant Technology (PMA60116)

These courses can provide practical skills in process operations and plant technology, which can be valuable for those entering the field or looking to enhance their understanding of chemical processing in manufacturing settings.

UNIVERSITY & HIGHER EDUCATION

A university degree is typically required to become a Chemical Engineer. Most employers prefer candidates with a bachelor's degree in chemical engineering or a closely related field. These programs provide a strong foundation in mathematics, physics, and chemistry, along with specialised courses in chemical process design, reactor engineering, and process control.

For those seeking to advance their careers or specialise in specific areas of chemical engineering, postgraduate degrees such as a Master of Chemical Engineering or a Ph.D. in Chemical Engineering can be highly beneficial. These advanced programs often involve in-depth research projects and can lead to leadership roles in industry, academia, or research and development.

Many universities also offer specialised courses or certifications in areas such as process safety management, sustainable chemical engineering, or pharmaceutical engineering, which can be valuable for professionals looking to gain expertise in specific aspects of chemical engineering. For those focused on manufacturing, courses in advanced process control, lean manufacturing principles, or Industry 4.0 technologies can provide valuable knowledge for optimising production processes and implementing cutting-edge technologies in chemical manufacturing facilities.