

WHAT DO CHEMICAL ENGINEERS DO?

They work in manufacturing, pharmaceuticals, health care, design and construction, pulp and paper, petrochemicals, food processing, polymers, biotechnology, environmental health and safety ... and many more fields!

Within these industries, chemical engineers rely on their knowledge of **mathematics** and science—particularly **chemistry**— to overcome technical problems safely and economically. And, of course, they draw upon and apply their engineering knowledge to solve any technical challenges they encounter.

Don't make the mistake of thinking that chemical engineers only “make things,” though. Their expertise is also applied in the areas of law, education, publishing, finance, and medicine, as well as in many other fields that require technical training.

For more information: www.aiche.org/careers, www.cems.umn.edu

Panels following adapted from AIChE material available at www.careercornerstone.org

WHAT DO CHEMICAL ENGINEERS DO and for how much?

	'01-'02	'00-'01	1999	1998
AVERAGE STARTING SALARY	\$51,300	51,200	48,500	46,900
Area within Chem Eng				
Chemical (including polymers)	30.8%	23.3%	26.7%	26.1%
Fuels	21.3%	15.7%	12.6%	10.8%
Food/Consumer Prods.	11.2%	10.6%	11.4%	14.6%
Biotech & Related Indus. (Pharma)	10.3%	9.3%	6.9%	4.6%
Engng. Svcs. - Design & Construction	8.0%	5.6%	4.8%	7.2%
Electronics (e.g., computers, software dvlp., chip mfg.)	4.2%	15.9%	15.6%	11.4%
Engng. Svcs. - Environmental Engng	3.9%	2.4%	2.6%	2.6%
Other Industry	3.5%	3.9%	4.8%	13.0%
*Business Svcs.	2.8%	5.8%	6.4%	
Materials	2.3%	3.1%	3.3%	6.0%
Pulp & Paper	1.1%	2.1%	2.4%	2.9%
* Engng. Svcs. - Research & Testing	0.6%	1.8%	2.4%	
Public Utilities				0.8%

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CHEMICAL ENGINEERING AT MINNESOTA

AMONG TOP-RANKED CHEMICAL ENGINEERING PROGRAMS

ca. 100 BACHELORS DEGREES ANNUALLY

SUPPORTED BY

WORLD RENOWNED PROFESSORS

TEACHING ASSISTANTS NATION'S TOP GRADUATES

TEAM TEACHING

VALUE ADDED TO LECTURE THROUGH RECITATION AND NON-COURSEWORK CURRICULUM

ADVISING

EXCELLENT RESEARCH, INTERN, HONORS OPPORTUNITIES

VIBRANT STUDENT ORGANIZATIONS AND ACTIVITIES

EMPHASIS THROUGH THE FOUR YEAR PROGRAM:

LOWER DIVISION (FRESHMAN AND SOPHOMORE)

BACKGROUND IN MATHEMATICS, CHEMISTRY, PHYSICS, COMPUTATION

INTRODUCTION TO CHEMICAL ENGINEERING IN SOPHOMORE SPRING

UPPER DIVISION

JUNIOR YEAR

**CHEMICAL ENGINEERING FUNDAMENTAL THEORY
PROBLEM-SOLVING SKILLS**

SENIOR YEAR

**DESIGN
TEAMWORK
WRITING, AND PRESENTATION SKILLS
TECHNICAL EMPHASIS**

CHEMICAL PROCESS INDUSTRIES

The focus of the CPI companies is the development, extraction, isolation, combination, and use of chemicals.

Chemical engineers design and operate reactors, processes, and systems to combine, transport, separate, and recycle chemicals.



Specialties include:

Agricultural chemicals
Catalysts
Specialty chemicals
Industrial gases
Paints, varnishes, lacquers,
and paper coatings
Pigments and inks
Petrochemicals

Plastics, synthetic resins,
and composites
Polymers
Pulp and paper
Rubber
Soaps, detergents, perfumes
Synthetic fibers, textiles, and
coatings

BIOTECHNOLOGY

This area uses living cells, cell material, and biological techniques to produce antibiotics, insulin, interferon, artificial organs, recombinant DNA, and techniques for environmental, nutrition, and medical improvements.



FOOD AND DRUGS

This industry includes the processing, preparation, packaging, and preserving of food, beverages, and pharmaceuticals for human consumption. Chemical engineers formulate new products to meet consumer demand, improve performance and quality, ensure consistent properties, and minimize contamination and microbial growth.



ADVANCED MATERIALS

The aerospace, automotive, electronics, mineral, and imaging industries employ chemical engineers to design and control the production of advanced polymer, ceramic, and hybrid materials that allow improved performance. Chemical engineers work with materials and other engineers to analyze and help control the effect of the chemical processes on materials properties and performance.



ENVIRONMENTAL, SAFETY, AND HEALTH

Every process involving the use and manipulation of chemicals produces some by-products and can impact environment, safety, and health. Chemical engineers maintain control over these variables through process monitoring and control, efficient and safe process design, waste treatment, and environmental impact studies.



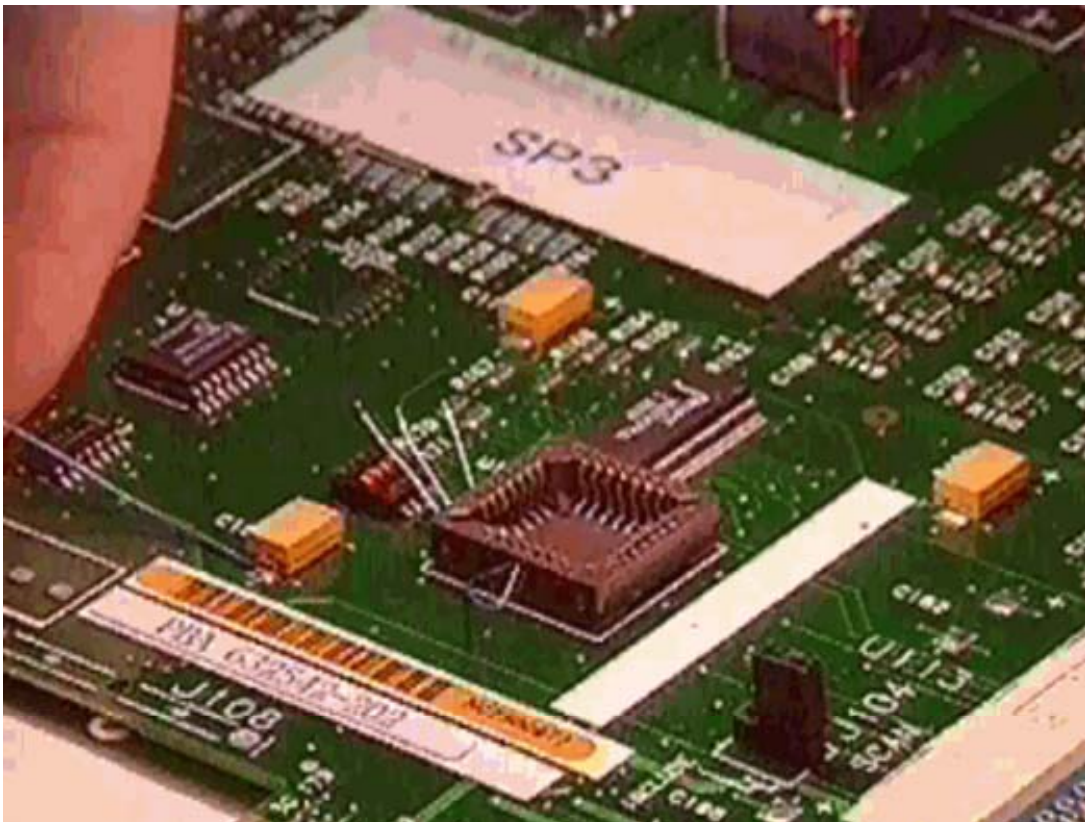
FUEL AND ENERGY

This industry comprises petroleum and petrochemical production and refining as well as nuclear and synthetic fuels. Chemical engineers are instrumental in state-of-the-art energy facilities, and they are developing alternative energy sources to meet environmental challenges of the future.



ELECTRONICS

Chemical engineers in the electronics industry are involved with materials development and production, process control equipment and algorithm design, and the manufacturing of microchips and integrated circuits. Chemical engineers have also contributed to the industry by producing components that efficiently dissipate heat and electromagnetic signals.



PROCESS DESIGN AND CONSTRUCTION

This field works with other industry sectors to design and build facilities and specialty operations, and to design and troubleshoot processes to ensure safe and efficient chemical operations. Chemical process designers and managers work closely with other engineering disciplines.



GOVERNMENT, BUSINESS, LAW....

The technical training received by chemical engineers makes them well-suited for career paths in government agencies, business, patent law, insurance, industrial finance, publishing, and education. US. government employers include the Department of Energy, the Environmental Protection Agency, the U. S. Navy, NASA, the Department of Agriculture, and the Patent and Trademark Office.

