



What do Chemical Engineers Do?

Traditionally, Chemical Engineers apply engineering skills to solve the problems associated with the transformation of resources (raw materials and/or energy) to useful products. Upon graduation there are a number of specific roles that they might perform. However, because of their problem solving skills, Chemical Engineers also serve in non-traditional roles and industries.

Traditional Roles:

- **Process Engineer:** This is the most common role of a chemical engineer. A process engineer serves to optimize and troubleshoot chemical processes in a production plant.
- **Process Control Engineer:** A process control engineer focuses on the automation and controls of chemical processes. This engineer has a strong skill set in sensors, computers, and manipulation of large data sets.
- **Project Engineer:** A project engineer manages the design and startup of a new process for a manufacturing company, combining engineering skills with project management.
- **Design Engineer:** A design engineer develops the design of a new chemical production facility, including economic analysis.
- **Production Engineer:** A production engineer is similar to an industrial engineer, combining knowledge of manufacturing techniques, ergonomics, and management science to optimize workplace design.
- **Research Engineer:** A research engineer conducts research in various fields of science to advance products or processes for specific industrial problems.
- **Quality Control Engineer:** A quality control engineer ensures that production is to design specifications using advanced metrology and statistical analysis.
- **Environmental Engineer:** An environmental engineer in a chemical plant works to minimize and monitor environmental discharges (air, water, ground) within acceptable limits.
- **Health and Safety Engineer:** A health and safety engineer works to protect workers and the community from industrial hazards.
- **Plant Engineer:** A plant engineer addresses concerns regarding maintenance of the plant and its physical systems.
- **Product Engineer:** A product engineer is responsible for a product from conceptual design through production, understanding prototyping, materials, and manufacturing methods.
- **Production Manager:** A production manager is an administrative position with the goal of scheduling and coordinating activities around reaching production targets.
- **Technical Sales/Applications Engineer:** A technical sales or applications engineer has the job of becoming an expert on a particular technology to help customers find the right product for their application.



Traditional Industries

- Chemicals (specialty and commodity)
- Food Products
- Beverages
- Household and Personal Products
- Paper/Forest Products
- Petroleum Refining
- Materials
- Manufacturing
- Oilfield Services
- Energy (fossil and alternative)
- Pharmaceuticals
- Consultant/Engineering Services
- Government

Other Roles/Industries

- Physician
- Patent Lawyer
- Biomedical
- Academia
- Business Consulting
- Software Development



University of Dayton

**School of
Engineering**

Entry Level Salaries Graduating Senior
May 2019

Curriculum	Average \$ Offer
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<u>Engineering</u>	
Chemical	70,493
Electrical	69,129
Computer	66,868
Mechanical	66,248
Metallurgical	65,980
Aerospace	65,616
Civil	65,355
Industrial	65,216
Engineering Technology	64,148

<u>Sciences</u>	
Information Sciences	58,986
Computer Science	55,779
Mathematics	54,949
Chemistry	51,949
Biological Sciences	48,186
Geology and Geological Sciences	42,668

<u>Business</u>	
Management Information Systems	57,916
Economics and Finance	54,919
Business Administration	53,222
Accounting	53,687
Marketing/Management	52,511



- **Dr. Erick S. Vasquez**, assistant professor of chemical and materials engineering (and a University of Mississippi researcher), was awarded a three-year grant from the **National Science Foundation** to find ways that nanoparticles with magnetic properties can separate ethanol from water using vegetable oils in a liquid-liquid extraction process. If successful, this new process will extract ethanol more quickly, at a lower cost and in a more environmentally friendly manner than current existing industrial separations technologies. The proposed method can enhance the future of separations technologies in the chemical engineering field.
- Undergraduate students have the opportunity to take part in the **S.U.R.E. Program (Summer Undergraduate Research Experience)**. The competitive program allows students to spend 10 weeks working on a faculty-led research project – receive a \$5,000 award, and may apply for an additional \$1,000 for travel expenses to present their findings at a conference. In addition, at the end of the summer, students present their research projects to the School of Engineering community. Interested students submit an information form that includes a brief statement of their research interests, their resume and a letter of recommendation. Students who have participated in the program have indicated this experience is helpful in determining future – whether it is an area of research or industry.
- Two chemical engineering undergraduate students were selected to present their **SURE, NSF and Verhoff** sponsored research to the **University of Dayton board of trustees in August 2018**.
- Chemical engineering researcher and **associate professor, Dr. Kristen Krupa-Comfort**, was awarded a five year, \$542,000 National Science Foundation CAREER Award to fund her research to create a cellular model that behaves more like the human body. Dr. Krupa-Comfort has already completed tests on 3-D cultures, fluid flow models, and multicellular systems, and this award will allow her to tie these models together into a more realistic system for testing drug delivery mechanisms. Her research could lead to better ways to deliver medicine straight to the source of an illness – a malignant tumor or infection — without the cost and ethical concerns of animal testing. The funding she has received will also allow her to employ a graduate student and two undergraduate students to assist in conducting research.
- UD engineering students won three awards at the USA Science and Engineering Festival in Washington, D.C., for a device they hope will one day operate without electricity and provide eco-friendly refrigeration in areas lacking reliable electricity or affordable solar power. The project started in 2012 with a University of Dayton Engineers in Technical Humanitarian Opportunities of Service-Learning (ETHOS) trip to Patna, India, searching for a way to refrigerate medications and vaccines because of the high rate of vaccine spoilage. "This has been a huge collaboration among many students in ETHOS, the renewable and clean energy program, and chemical engineering," said **Dr. Amy Ciric, a senior lecturer in the chemical engineering department** and from mechanical engineering, Dr. Jun-Ki Choi. The current team — **chemical engineering students: Amnah Altaher, Claudia Labrador Rached, Jack Schlueter, and Katie Willard, and mechanical engineering students: Bjoern Winter and Matthew Worsham** — is competing for a U.S. Environmental Protection Agency People, Prosperity and the Planet Phase II grant.
- From the Flyer First Destination Survey 2018-2019: there is a 96% success rate of students having a job, attending grad school or military, or participating in a service program within six months of graduation. Some of the CME graduates have gained employment opportunities with Cargill, Procter & Gamble, Cornerstone Research, and J.M. Smucker Company, among others.