4200: CHEMICAL ENGINEERING

The Chemical Engineering program helps students develop intellectual capacity and the ability to apply the principles of transport phenomena, thermodynamics, and chemical reaction kinetics to the creative resolution of technological problems.

All engineers are trained in the application of mechanics, materials, economics, systems, and controls. Chemical engineers, however, apply chemical principles to design, evaluate, build, and operate systems capable of converting inexpensive raw materials into marketable products via chemical reactions, biological processes, and physical separations.

Graduates of the Chemical Engineering program find career opportunities in the chemical process industries, usually involving polymer production, petroleum refining, environmental remediation, materials research and development, process design and development, and process operations and control. In addition, chemical engineers are increasingly in demand in such areas of current interest as process simulations, biotechnology, supercritical fluid processes, and solids processing. Critical thinking skills developed throughout the curriculum enable chemical engineers to succeed in other fields including medicine, patent law, and international business.

The Chemical Engineering program maintains a balance between theory and practice to prepare students for careers in a highly technical global society. The curriculum stresses the integration of mathematics, science, and chemical engineering fundamentals throughout the program. At each level of the program, from freshman through seniors, students have the opportunity to gain experience in a wide range of emerging technologies through laboratory courses and design or research electives. Exciting work is performed in biocompatible polymeric materials, biological cellular and enzymatic processes, nanocomposite materials, chemical vapor deposition, computational molecular science, microscale separations, green chemistry, and novel catalytic reactions. Students are also encouraged to gain important practical experience through the optional cooperative education program.

Mission: The goal of the Chemical and Biomolecular Engineering Department is to prepare baccalaureate graduates with the necessary skills so that they can contribute to a highly technical global society through their professional careers. The philosophy of the Chemical and Biomolecular Engineering faculty is to provide a strong theoretical foundation supported by practical applications of that knowledge, which is consistent with the mission of The University of Akron.

The specific educational objectives of the chemical engineering program are that:

1. Our graduates will apply their technical proficiency to make positive contributions as chemical engineers or any other career path they choose.
2. Our graduates will continue life-long learning through professional activities and training, the pursuit of higher educational degrees, and individual professional improvement.
3. Our graduates will contribute to the professional practice of their chosen field through effective communication, leadership, teamwork and service, while exhibiting high ethical and professional standards.

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The following student outcomes describe what students are expected to know and be able to do by the time of graduation with a B.S. degree in Chemical Engineering from The University of Akron:

- Have a good grounding in chemistry and working knowledge of advanced chemistry
- Can relate chemical structure to material properties
- Able to apply first principles to analyze and solve chemical engineering problems, including comprehensive open-ended design problems
- Develop experiments from proposed hypotheses and interpret data
- Pose and develop practical solutions to chemical engineering problems which include the limitations of environmental, safety, ethical, and economic issues
- Design and select optimal processes for chemical production
- Select and use computational tools to design, analyze and solve chemical engineering problems
- Work effectively in teams
- Write and speak effectively in a technical setting
- Independently assimilate new concepts to facilitate life-long learning
- A knowledge of contemporary issues

The chemical engineering program also meets the curriculum requirements specified by the American Institute of Chemical Engineers. Graduates must demonstrate:

- A thorough grounding in chemistry including organic and physical and a working knowledge of advanced chemistry such as inorganic, analytical, materials, polymers or biochemistry
- A working knowledge of material and energy balances, thermodynamics, heat, mass, and momentum transfer, chemical reaction engineering, separation processes, process dynamics and control, and process economics and design

The Chemical and Biomolecular Engineering Department provides a unique opportunity to master teamwork and design project management skills. Teams of freshmen through senior Chemical and Corrosion Engineering undergraduates work on a realistic engineering design project. Besides experience with a range of current engineering topics, the projects allow students to develop teamwork, communication, presentation, project management and information technology skills.