CHEMISTRY AND BIOCHEMISTRY

GENERAL REQUIREMENTS
All students seeking bachelor’s degrees at Kent State complete a series of Kent Core requirements. In addition to the coursework specific to their major (outlined below), students pursuing B.S. or B.A. chemistry degree programs take courses in English composition, foreign language, humanities, fine arts and social sciences.

BACHELOR OF SCIENCE PROGRAM
There are three B.S. chemistry degree concentrations at Kent State:

CHEMISTRY CONCENTRATION
This traditional B.S. chemistry program is certified by the American Chemical Society and is recommended for students interested in pursuing graduate study in chemistry, as well as those planning careers as practicing chemists in industrial research and development, government research laboratories or in academia. In addition to the Kent Core requirements cited above, students take courses in the following areas:

YEAR I:
general chemistry (lecture/lab), analytical geometry and calculus I and II;

YEAR II:
organic chemistry (lecture/lab), inorganic chemistry (lecture), physics I and II, analytical geometry and calculus III;

YEAR III:
analytical chemistry (lecture/lab), physical chemistry (lecture/lab), organic chemistry (lecture/lab);

YEAR IV:
inorganic chemistry (lecture/lab), biological chemistry (lecture), physical chemistry (lab), chemistry electives.

BIOCHEMISTRY CONCENTRATION
This program includes a broad range of chemistry, biology and biochemistry courses. It is ideal for students interested in premedicine and prepharmacy, as well as those planning to pursue graduate study in biological chemistry. The program meets all premedicine requirements and provides one of the strongest possible preparations for medical school. This concentration also provides an ideal preparation for students intending to pursue a Doctor of Pharmacy degree. It closely fits the requirements of the Northeast Ohio Medical University (NEOMED); with advanced planning, students pursuing the Biological Chemistry concentration can move to NEOMED after three years at Kent State and transfer back 16 credit hours of courses from NEOMED to Kent State through an articulation agreement to complete their B.S. chemistry degree requirements.

In addition to the Kent Core requirements cited above, students take courses in the following areas:

YEAR I:
general chemistry (lecture/lab), biological foundations, calculus for life sciences, probability and statistics for life sciences;

YEAR II:
organic chemistry (lecture/lab), inorganic chemistry (lecture), genetics (lecture), cell biology (lecture/lab), college physics (lecture/lab);

YEAR III:
biochemistry (lecture), analytical chemistry (lecture/lab), physical chemistry (lecture/lab), microbiology (lecture/lab);

YEAR IV:
advanced biological chemistry (lecture/lab), physical biochemistry (lecture), chemistry/biology electives.

MATERIALS CHEMISTRY CONCENTRATION
This program is recommended for students interested in pursuing graduate study or industrial careers in materials science, including nanotechnology. It has similar requirements to the traditional chemistry concentration but provides an opportunity for more in-depth study in the synthesis and characterization of inorganic and organic materials, including polymers. In addition to the Kent Core requirements cited above, students take courses in the following areas:

YEAR I:
general chemistry (lecture/lab), analytical geometry and calculus I and II;

YEAR II:
organic chemistry (lecture/lab), inorganic chemistry (lecture), introduction to materials chemistry (lecture), analytical geometry and calculus III, physics I and II;

YEAR III:
analytical chemistry (lecture), physical chemistry (lecture), inorganic chemistry (lecture/lab);

YEAR IV:
physical chemistry (lab), biological chemistry (lecture), organic materials chemistry (lecture), inorganic materials chemistry (lecture), materials chemistry (lab), chemistry electives.

Career Opportunities
Many chemistry graduates find employment in government research and analysis, industrial research and development and manufacturing in fields such as pharmaceuticals, biotechnology, cosmetics, materials (plastics, liquid crystals, paints and coatings, composites, ceramics, metals, paper, cement, nanotechnology), energy (petrochemicals, energy storage), agriculture, the food industry, environmental science (pollution monitoring, soil science, water resource management), forensic science and instrument design.

A chemistry degree is also excellent preparation for a career in the various health professions (medicine, osteopathy, pharmacy and dentistry).
UNDERGRADUATE RESEARCH

A research experience is an important component of all our Bachelor of Science degree programs. Students have numerous opportunities to pursue research projects and gain experience working with state-of-the-art instrumentation under the guidance of members of the chemistry faculty. This experience is invaluable in students' intellectual development and in their subsequent search for positions in industry, graduate school, pharmacy school or medical school. Students who are members of the Honors College perform undergraduate research and prepare and defend an honors thesis.

Examples of the types of research projects available to undergraduates include: the synthesis and characterization of both organic and inorganic compounds with useful materials properties (e.g., liquid crystalline, electro-optical, microporous), studies of biologically/medically important molecules (e.g., proteins, nucleic acids, phosphoinositides, vitamin B12, polycyclic aromatic hydrocarbons, anticancer drugs) and biological processes (e.g., protein synthesis, cholesterol metabolism), fundamental surface chemistry and various projects centered around the state-of-the-art spectroscopic methods (e.g., NMR, mass, IR, microwave) in addressing important chemical and biochemical problems.

BACHELOR OF ARTS PROGRAM

The Bachelor of Arts degree program has fewer required courses than the Bachelor of Science program and thus allows greater flexibility in curriculum design. Students may, therefore, combine chemistry coursework with courses in other fields (e.g., business, technical writing, computer science) to prepare themselves for a broad range of career opportunities (e.g., management, technical sales and service, technical writing, science education, information science). The Bachelor of Arts degree meets all the requirements for the dual premedicine/chemistry major when appropriate courses from biological sciences are used to fulfill elective hours.

THE FACULTY

The department has 18 full-time faculty and is especially proud of its excellence in teaching and research. Several faculty members have been honored with teaching awards, including the Alumni Association’s Distinguished Teaching Award and the College of Arts and Sciences Student Advisory Council Award for Outstanding Teaching. The department maintains active research programs on many frontiers of analytical, biological, inorganic, organic and physical chemistry but has particular strengths in materials chemistry, spectroscopy and imaging, and in biological chemistry and its applications in medicine. Members of the department’s faculty are internationally recognized leaders in their fields.

FACILITIES AND INSTRUMENTATION

The Department of Chemistry is housed in Williams Hall and part of the connecting Science Research Laboratory. Williams Hall houses two large lecture halls, classrooms, teaching and research laboratories, the Analytical Instrumentation Facility, the chemistry-physics library, chemical stockrooms and glass and electronics shops. A machine shop, which is jointly operated with the Department of Physics, is located in nearby Smith Hall.

The department has excellent laboratory facilities equipped with a wide range of instrumentation that is available for use by undergraduate students. Instrumentation available includes: three high field NMR spectrometers, X-ray powder and single crystal diffractometers, FTIR, UV/visible, microwave and fluorescence spectrometers, four mass spectrometers, titration and differential scanning calorimeters, numerous chromatographs, centrifuges, electrophoresis equipment and facilities for proteomics, DNA sequencing, PCR and protein purification and analysis. Molecular modeling software is available for the display and analysis of proteins, nucleic acids and small inorganic and organic compounds. The department also houses a state-of-the-art 3-D classroom where various chemical concepts can be effectively illustrated using large three-dimensional images which appear to “come to life” for the student audience. In addition, one of our newly renovated large lecture halls includes a 3-D visualization system.

SCHOLARSHIPS

The department offers several renewable scholarships to qualified incoming freshmen who major in chemistry. Interested students should contact the Department of Chemistry and Biochemistry for an application form. The deadline for receipt of applications is February 15 for the following fall semester.

CAREER OPPORTUNITIES

Despite the recent economic downturn, employment prospects for graduating chemistry majors remain good. Recent Kent State graduates have joined companies within Ohio (e.g., GOJO Industries) and beyond (e.g., L’Oreal Industries and Eli Lilly).

In addition, recent graduates have received fellowships to pursue doctoral degrees at some highly prestigious universities, including MIT, Stanford University, University of Illinois, Michigan State University, Indiana University and The Ohio State University.

Our graduates have gone on to medical and dental schools at top-ranked institutions such as Columbia and Case Western Reserve University. A significant number of our graduates also gain admission to pharmacy schools across Ohio.

Many less technical career paths are also available including: technical management, sales and service, technical writing, science education and information science.

Department of Chemistry and Biochemistry

208 Williams Hall
330-672-2032
www.kent.edu/chemistry

Admissions Office
Kent State University
P.O. Box 5190
Kent, OH 44242-0001
330-672-2444
1-800-988-KENT
www.kent.edu/admissions

For information on all of Kent State’s degrees and majors, go online to www.kent.edu/gps.