**CHEMISTRY**

Chemistry is an experimental science that seeks to understand the structure and function of molecules. Chemists synthesize new materials, and study their properties and how they interact with other compounds. The B.S. degrees offered by the department prepare students for independent laboratory work and research. The B.A. degree is less strongly focused on research and prepares students for professional degrees like medicine, dentistry and pharmacy.

**Admission, Retention and Graduation**

- The student must maintain a minimum 2.00 grade point average
- The student must obtain a grade of C- or better in all required chemistry courses

Introduction

In Northeast Ohio, there is a growing demand for professionals trained in polymer chemistry. The polymer industry is one of the major industrial sectors of the economy of Ohio. The BS/MS Polymer Chemistry degree was instituted to prepare students for jobs in this area. The program provides a quality undergraduate science degree coupled with a graduate degree from one of the premier polymer programs in the country.

Students who are admitted to this program can complete the undergraduate phase of the course of study in three years and then immediately begin graduate studies in polymer science. Under rare circumstances, a student can complete the undergraduate phase in four years after approval of the advisers. A student not proceeding to the graduate program in Polymer Science may complete the degree requirements for the BS Natural Sciences - Polymer Chemistry Concentration.

Students earn a Bachelors degree in Natural Science from the Buchtel College of Arts and Sciences (https://www.uakron.edu/bcas) that is heavily weighted toward chemistry. They will be assigned an adviser in the Department of Chemistry (https://www.uakron.edu/chemistry) and a co-adviser in the Department of Polymer Science (https://www.uakron.edu/cpspe) who will advise them throughout their undergraduate program. Once the undergraduate degree is completed students begin studies to earn a Masters of Science from the College of Polymer Science and Polymer Engineering (https://www.uakron.edu/cpspe) that will require two years of courses and research.

**Admission, Retention, and Graduation**

- Honors Students who express interest will be admitted into the 3+2 program after an interview
- Students must have a 3.70 grade point average in all undergraduate science and math classes at the end of the first semester in the third year
- Students who earn a grade less than a C- in any required science or math class will have to repeat the course and earn a grade of C- or better

**Cooperative Education Program in Chemistry**

**Qualifications**

Arrangements for entry into the program are on an individual basis and are initiated by the student during the second year of undergraduate study. Full-time B.S. chemistry majors at The University of Akron must meet the following requirements:

- Satisfactory completion of 60 credits with a quality point average of at least 2.3 in chemistry courses and on schedule in their curriculum.
- Acceptance by a cooperative education coordinator or director following a series of interviews
- Part-time students must have completed 60 credits with a 2.3 average and be on schedule in their curriculum
- Transfer students must have preparation equivalent to the minimum requirements for The University of Akron students and must have completed at least one semester of full-time study at The University of Akron

Placement in an industrial or other position is not guaranteed, and foreign students should recognize that many companies require U.S. citizenship or possession of a permanent visa. In any case, final acceptance of a student for any position is the decision of the employer.

**Schedule**

The work-study schedule for students in the co-op program is as follows:

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>School</td>
<td>Vacation/School</td>
</tr>
<tr>
<td>School</td>
<td>School</td>
<td>Vacation/School/Work</td>
</tr>
<tr>
<td>Work</td>
<td>School</td>
<td>School</td>
</tr>
<tr>
<td>School</td>
<td>School</td>
<td>Work</td>
</tr>
</tbody>
</table>

**Admission to Program**

Interested students should attend a Cooperative Education orientation session. Students will be expected to remain with their employer for all co-op work periods in order to provide a progression of experience and responsibility. Employment must have approval of the department and the Cooperative Education director, but the University does not guarantee employment.

**Registration**

Students register for Cooperative Work Periods in the same manner that a student registers for any other University courses. The course is: 3000:301 Cooperative Education.

A registration fee for each work period is charged to offset the expenses of administering the Co-op Program. Upon completion of a work period, a statement will appear on the student’s official transcript listing the course number and title. In place of a grade, “credit” or “no credit” will be given, depending upon the student’s satisfactory or unsatisfactory completion of the following:

- Work performance as evaluated by the employer
- Submission of a written Work Report and its approval by the Cooperative Education staff
- Submission of a Cooperative Work Period Summary Form

- Biochemistry, BS (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/chemistry/biochemistry-bs)
- Chemistry, BA (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/chemistry/chemistry-ba)
- Chemistry, BS (https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/chemistry/chemistry-bs)
Chemistry (3150)

3150:100 Chemistry & Society (3 Credits)
Qualitative introduction to chemistry using current world problems and commercial products, such as the ozone layer, nuclear fission, polymers and drugs, to introduce chemical principles.

3150:101 Chemistry for Everyone (4 Credits)
Integrated, hands-on, laboratory instruction in the fundamental concepts of chemistry for general education and middle-level licensure for preservice and in-service teachers.

Gen Ed: Tier 2 - Natural Science w/LAB

3150:110 Introduction to General, Organic & Biochemistry I (Lecture) (3 Credits)
Sequential. Introduction to principles of chemistry, fundamentals of inorganic, organic and biochemistry. Structure and chemistry of carbohydrates, lipids, proteins; biochemistry of enzymes, metabolism, radiation.

Gen Ed: Tier 2 - Natural Science

3150:111 Introduction to General, Organic & Biochemistry I (Laboratory) (1 Credit)
Prerequisite/Corequisite: 3150:110. Sequential. Laboratory course applying principles of chemistry and fundamentals of inorganic, organic and biochemistry.

Gen Ed: Tier 2 - Natural Science w/LAB

3150:112 Introduction to General, Organic & Biochemistry II (Lecture) (3 Credits)
Prerequisite: 3150:110. Sequential. Introduction to principles of chemistry, fundamentals of inorganic, organic and biochemistry. Structure and chemistry of carbohydrates, lipids, proteins; biochemistry of enzymes, metabolism, radiation.

Gen Ed: Tier 2 - Natural Science

3150:113 Introduction to General, Organic & Biochemistry II (Laboratory) (1 Credit)
Prerequisite/Corequisite: 3150:112. Sequential. Laboratory course applying principles of chemistry and fundamentals of inorganic, organic and biochemistry.

Gen Ed: Tier 2 - Natural Science w/LAB

3150:151 Principles of Chemistry I (3 Credits)
Prerequisite: placement in 3450:149 or higher or permission. Introduction to basic facts and principles of chemistry including atomic and molecular structure, states of matter and thermodynamics. For chemistry majors, pre-medical students and most other science majors. Discussion (day sections).

Gen Ed: Tier 2 - Natural Science

3150:152 Principles of Chemistry I Laboratory (1 Credit)
Pre/Corequisite: 3150:151. Laboratory course applying principles of thermodynamics, chemical analysis and laboratory practice.

Gen Ed: Tier 2 - Natural Science w/LAB

3150:153 Principles of Chemistry II (3 Credits)
Prerequisite: Pre/Corequisite: 3150:151. Continuation of 151, 152, including aqueous solution theory, chemical kinetics, equilibrium, electrochemistry and nuclear chemistry. For chemistry majors, premedical students and most other science majors. Discussion (day sections).

Gen Ed: Tier 2 - Natural Science

3150:154 Qualitative Analysis (2 Credits)
Prerequisite: 3150:152; pre/corequisite: 3150:153. Laboratory course applying principles of chemical equilibrium to inorganic qualitative analysis.

3150:199 Introductory Seminar in Chemistry (1 Credit)
Basic concepts in chemistry practice including written and oral communication skills, computer skills, professional ethics, environmental issues, chemical literature, degree options, and career considerations.

3150:263 Organic Chemistry Lecture I (3 Credits)
Sequential. Prerequisite: 3150:153 or permission. Structure and reactions of organic compounds, mechanism of reactions.

3150:264 Organic Chemistry Lecture II (3 Credits)
Sequential. Prerequisite: 3150:263 or permission. Structure and reactions of organic compounds, mechanism of reactions.

3150:265 Organic Chemistry Laboratory I (2 Credits)
Sequential. Prerequisite: 3150:154; pre/corequisite: 3150:263. Laboratory experiments to develop techniques in organic chemistry and illustrate principles. Discussion.

3150:266 Organic Chemistry Laboratory II (2 Credits)
Sequential. Prerequisite: 3150:265. Laboratory experiments to develop techniques in organic chemistry and illustrate principles. Discussion.

3150:305 Physical Chemistry for the Biological Sciences (4 Credits)
Prerequisites: 3150:264, 3450:222, and [3650:262 or 3650:292]. Chemical thermodynamics, kinetics, molecular structure and spectra. Accepted for the BS degree in Biochemistry.

3150:313 Physical Chemistry Lecture I (3 Credits)
Prerequisites: 3150:264, 3450:223, and 3650:291. Gases, thermodynamics, thermochemistry, solutions, dilute solutions, chemical equilibrium, phase rule, chemical kinetics, electrochemistry, electrolytic equilibria.

3150:314 Physical Chemistry Lecture II (3 Credits)
Prerequisites: 3150:264, and 3450:335, and 3650:292. Atomic and molecular structure and spectroscopy.

3150:370 Biochemistry Laboratory (2 Credits)
Prerequisite: 3150:266. An integrated laboratory experience covering the isolation, characterization and analysis of enzymes and DNA, protein synthesis and purification, enzyme kinetics, biochemical databases and statistical treatment of data.

3150:380 Advanced Chemistry Laboratory I (2 Credits)
Prerequisite: 3150:266. A laboratory experience that focuses on the synthetic and spectroscopic techniques of modern inorganic chemistry, including bio-inorganic and organometallic compounds.

3150:381 Advanced Chemistry Laboratory II (2 Credits)
Prerequisite 3150:266; corequisite: 3150:314 or 3150:305 or permission. Integrated laboratory experience covering the areas of quantitative analysis, physical chemistry, and instrumental techniques.

3150:399 Internship in Chemistry (1-3 Credits)
Prerequisites: minimum GPA of 2.5; permission of the Department. Work experience focused on career applications of the discipline of Chemistry. (May repeat for a maximum of six credits.)
3150:401 Biochemistry Lecture I (3 Credits)

3150:402 Biochemistry Lecture II (3 Credits)
Prerequisite: 3150:401. Overview of metabolism; thermodynamics; carbohydrate, fatty acid, amino acid, and nucleoside anabolism and catabolism; hormonal control of metabolism. Photosynthesis.

3150:406 Biochemistry of Gene Expression (3 Credits)
Prerequisites: 3100:311 and 3150:401. DNA, RNA, and protein synthesis, translation and transcription. Gene function and expression, cell cycle and cancer, genetic engineering, gene silencing, gain of function studies.

3150:410 Special Readings in Analytical Chemistry (1-3 Credits)
Prerequisite: Junior standing or higher. Selected topics in advanced analytical chemistry for which no course exists. (May be repeated)

3150:411 Special Readings in Inorganic Chemistry (1-3 Credits)
Prerequisite: Junior standing or higher. Selected topics in advanced inorganic chemistry for which no course exists. (May be repeated)

3150:412 Special Readings in Organic Chemistry (1-3 Credits)
Prerequisite: Junior standing or higher. Selected topics in advanced organic chemistry for which no course exists. (May be repeated)

3150:413 Special Readings in Physical Chemistry (1-3 Credits)
Prerequisite: Junior standing or higher. Selected topics in advanced physical chemistry for which no course exists. (May be repeated)

3150:415 Special Readings in Biochemistry (1-3 Credits)
Prerequisite: Junior standing or higher. Selected topics in advanced biochemistry for which no course exists. (May be repeated)

3150:423 Analytical Chemistry I (3 Credits)
Prerequisite: 3150:154 and 3150:263. Theoretical principles of quantitative and instrumental analysis.

3150:424 Analytical Chemistry II (3 Credits)
Prerequisite: 3150:154 and 3150:263. Instrumental analysis with emphasis on newer analytical tools and methods.

3150:463 Advanced Organic Chemistry (3 Credits)
Prerequisite: 3150:264. Introduction to study of mechanisms of organic reactions.

3150:472 Advanced Inorganic Chemistry (3 Credits)

3150:480 Advanced Chemistry Laboratory III (2 Credits)
Prerequisite: 3150:381; or Corequisite: 3150:305; or permission. Integrated laboratory experience covering the areas of quantitative analysis, physical chemistry, instrumental techniques, and inorganic chemistry.

3150:490 Workshop in Chemistry (1-3 Credits)
(May be repeated) Group studies of special topics in chemistry. May not be used to meet undergraduate or graduate major requirements in chemistry.

3150:497 Honors Project in Chemistry (2 Credits)
(May be repeated for a total of eight credits) Prerequisites: Junior or senior standing in Honors College and permission of department honors preceptor. Independent research leading to completion of honors thesis under guidance of honors project adviser.

3150:498 Special Topics in Chemistry (1-3 Credits)
Special Topics in Chemistry.

3150:499 Research Problems in Chemistry (1-2 Credits)
(May be repeated for a total of eight credits) Prerequisite: Permission. Assignment of special problems to student, designed as an introduction to research problems.