

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:

Fall	Spring	Summer
School	School	Vacation/School
School	School	Vacation/School/Work
School	Work	School
Work	School	Work
School	School	

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: BCAS 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, Minor (<https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/chemistry/chemistry-minor/>)
- Chemistry, Polymer Option, BS (<https://bulletin.uakron.edu/undergraduate/colleges-programs/arts-sciences/chemistry/chemistry-polymer-option-bs/>)

Chemistry (CHEM)

CHEM 100 Chemistry & Society (3 Units)

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. (Formerly 3150:100)

CHEM 101 Chemistry for Everyone (4 Units)

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

Ohio Transfer 36: Yes

Gen Ed: Natural Science with Lab

CHEM 110 Introduction to General, Organic & Biochemistry I (Lecture) (3 Units)

Sequential. Introduction to principles of chemistry, fundamentals of inorganic, organic and biochemistry. Structure and chemistry of carbohydrates, lipids, proteins; biochemistry of enzymes, metabolism, radiation. (Formerly 3150:110)

Ohio Transfer 36: Yes

CHEM 111 Introduction to General, Organic & Biochemistry I (Laboratory) (1 Unit)

Prerequisite/Corequisite: CHEM 110. Sequential. Laboratory course applying principles of chemistry and fundamentals of inorganic, organic and biochemistry. (Formerly 3150:111)

Ohio Transfer 36: Yes

CHEM 112 Introduction to General, Organic & Biochemistry II (Lecture) (3 Units)

Prerequisite: CHEM 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. (Formerly 3150:112)

Ohio Transfer 36: Yes

CHEM 113 Introduction to General, Organic & Biochemistry II (Laboratory) (1 Unit)

Prerequisite/Corequisite: CHEM 112. Sequential. Laboratory course applying principles of chemistry and fundamentals of inorganic, organic and biochemistry. (Formerly 3150:113)

Ohio Transfer 36: Yes

Gen Ed: Natural Science with Lab

CHEM 114 Introduction to General, Organic & Biochemistry (Lecture) (4 Units)

Prerequisite: If a student has no high school chemistry, CHEM:101 is recommended to be taken prior to enrollment in CHEM:114. Introduction to principles of chemistry, fundamentals of inorganic, organic and biochemistry. Structure and chemistry of carbohydrates, lipids, proteins; biochemistry of enzymes, metabolism, radiation. (Formerly 3150:114)

CHEM 115 Introduction to General, Organic & Biochemistry (Laboratory) (1 Unit)

Pre/Corequisite: CHEM 114. Laboratory course applying principles of chemistry and fundamentals of inorganic, organic and biochemistry. (Formerly 3150:115)

CHEM 151 Principles of Chemistry I (3 Units)

Prerequisite: placement in MATH 149 or MATH 154 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). (Formerly 3150:151)

Ohio Transfer 36: Yes

Gen Ed: Natural Science

CHEM 152 Principles of Chemistry I Laboratory (1 Unit)

Pre/Corequisite: CHEM 151. Laboratory course applying principles of thermodynamics, chemical analysis and laboratory practice. (Formerly 3150:152)

Ohio Transfer 36: Yes

Gen Ed: Natural Science with Lab

CHEM 153 Principles of Chemistry II (3 Units)

Pre/Corequisite: CHEM 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). (Formerly 3150:153)

Ohio Transfer 36: Yes

Gen Ed: Natural Science

CHEM 154 Qualitative Analysis (2 Units)

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

CHEM 199 Introductory Seminar in Chemistry (1 Unit)

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

CHEM 263 Organic Chemistry Lecture I (3 Units)

Sequential. Prerequisite: CHEM 153 or permission. Structure and reactions of organic compounds, mechanism of reactions. (Formerly 3150:263)

CHEM 264 Organic Chemistry Lecture II (3 Units)

Sequential. Prerequisite: CHEM 263 or permission. Structure and reactions of organic compounds, mechanism of reactions. (Formerly 3150:264)

CHEM 265 Organic Chemistry Laboratory I (2 Units)

Sequential. Prerequisite: CHEM 154; pre/corequisite: CHEM 263. Laboratory experiments to develop techniques in organic chemistry and illustrate principles. Discussion. (Formerly 3150:265)

CHEM 266 Organic Chemistry Laboratory II (2 Units)

Prerequisite: CHEM 265. Pre/Corequisite: CHEM 264. Sequential. Laboratory experiments to develop techniques in organic chemistry and illustrate principles. Discussion. (Formerly 3150:266)

CHEM 305 Physical Chemistry for the Biological Sciences (4 Units)

Prerequisites: CHEM 264, MATH 222, and [PHYS 262 or PHYS 292]. Chemical thermodynamics, kinetics, molecular structure and spectra. Accepted for the BS degree in Biochemistry. (Formerly 3150:305)

CHEM 313 Physical Chemistry Lecture I (3 Units)

Prerequisites: CHEM 264, MATH 223, and PHYS 291. Gases, thermodynamics, thermochemistry, solutions, dilute solutions, chemical equilibrium, phase rule, chemical kinetics, electrochemistry, electrolytic equilibria. (Formerly 3150:313)

CHEM 314 Physical Chemistry Lecture II (3 Units)

Prerequisites: CHEM 264, and MATH 335, and PHYS 292. Atomic and molecular structure and spectroscopy. (Formerly 3150:314)

CHEM 370 Biochemistry Laboratory (2 Units)

Prerequisite: CHEM 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. (Formerly 3150:370)

CHEM 380 Advanced Chemistry Laboratory I (2 Units)

Prerequisite: CHEM 266. A laboratory experience that focuses on the synthetic and spectroscopic techniques of modern inorganic chemistry, including bio-inorganic and organometallic compounds. (Formerly 3150:380)

CHEM 381 Advanced Chemistry Laboratory II (2 Units)

Prerequisite CHEM 266. Corequisite: CHEM 314 or CHEM 305 or permission. Integrated laboratory experience covering the areas of quantitative analysis, physical chemistry, and instrumental techniques. (Formerly 3150:381)

CHEM 399 Internship in Chemistry (1-3 Units)

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.) (Formerly 3150:399)

CHEM 401 Biochemistry Lecture I (3 Units)

Prerequisite: CHEM 264. Biochemistry of amino acids, carbohydrates, lipids, and nucleic acids: structure/function relations. Enzymes as catalysts: kinetics and regulation. Cofactors. (Formerly 3150:401)

CHEM 402 Biochemistry Lecture II (3 Units)

Prerequisite: CHEM 401. Overview of metabolism; thermodynamics; carbohydrate, fatty acid, amino acid, and nucleoside anabolism and catabolism; hormonal control of metabolism. Photosynthesis. (Formerly 3150:402)

CHEM 406 Biochemistry of Gene Expression (3 Units)

Prerequisites: BIOL 311 and CHEM 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. (Formerly 3150:406)

CHEM 410 Special Readings in Analytical Chemistry (1-3 Units)

Prerequisite: Junior standing or higher. Selected topics in advanced analytical chemistry for which no course exists. (May be repeated) (Formerly 3150:410)

CHEM 411 Special Readings in Inorganic Chemistry (1-3 Units)

Prerequisite: Junior standing or higher. Selected topics in advanced inorganic chemistry for which no course exists. (May be repeated) (Formerly 3150:411)

CHEM 412 Special Readings in Organic Chemistry (1-3 Units)

Prerequisite: Junior or greater standing. Selected topics in advanced organic chemistry for which no course exists. (May be repeated) (Formerly 3150:412)

CHEM 413 Special Readings in Physical Chemistry (1-3 Units)

Prerequisite: Junior or greater standing. Selected topics in advanced physical chemistry for which no course exists. (May be repeated) (Formerly 3150:413)

CHEM 415 Special Readings in Biochemistry (1-3 Units)

Prerequisite: Junior or greater standing. Selected topics in advanced biochemistry for which no course exists. (May be repeated) (Formerly 3150:415)

CHEM 423 Analytical Chemistry I (3 Units)

Prerequisite: CHEM 154 and CHEM 263. Theoretical principles of quantitative and instrumental analysis. (Formerly 3150:423)

CHEM 424 Analytical Chemistry II (3 Units)

Prerequisite: CHEM 154 and CHEM 263. Instrumental analysis with emphasis on newer analytical tools and methods. (Formerly 3150:424)

CHEM 463 Advanced Organic Chemistry (3 Units)

Prerequisite: CHEM 264. Introduction to study of mechanisms of organic reactions. (Formerly 3150:463)

CHEM 472 Advanced Inorganic Chemistry (3 Units)

Prerequisites: CHEM 314 or CHEM 305. Concepts of atomic structure integrated in systematic classification of elements. Periodic table. Chemistry of the representative elements. Transition elements including coordination compounds, organometallics and metal carbonyls. (Formerly 3150:472)

CHEM 480 Advanced Chemistry Laboratory III (2 Units)

Prerequisite: CHEM 381; or Corequisite: CHEM 305; or permission. Integrated laboratory experience covering the areas of quantitative analysis, physical chemistry, instrumental techniques, and inorganic chemistry. (Formerly 3150:480)

CHEM 490 Workshop in Chemistry (1-3 Units)

(May be repeated) Group studies of special topics in chemistry. May not be used to meet undergraduate or graduate major requirements in chemistry. (Formerly 3150:490)

CHEM 497 Honors Project in Chemistry (2 Units)

(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. (Formerly 3150:497)

CHEM 498 Special Topics in Chemistry (1-3 Units)

Special Topics in Chemistry. (Formerly 3150:498)

CHEM 499 Research Problems in Chemistry (1-2 Units)

(May be repeated for a total of eight credits) Prerequisite: Permission. Assignment of special problems to student, designed as an introduction to research problems. (Formerly 3150:499)