Department of Chemistry and Biochemistry

Professional accreditation by American Chemical Society

FACULTY  Professors Field (chair), Taylor, Cummings (emeritus), Glover (emeritus) K. Kolb (emeritus); Associate Professor Andersh, Bosma, Campbell, Flint, Gayhart, Helenek; Assistant Professors Fry, McQuade; Adjunct Professor D. Kolb; Lab Coordinators Meier, Moroz.

The objectives of the chemistry department are: to develop a scientific attitude toward problem solving; to graduate well-qualified chemistry and biochemistry majors for immediate professional employment or entrance to graduate study in chemistry, biochemistry or allied fields; to graduate chemistry majors with background for entrance to professional schools, e.g. medicine or dentistry; to graduate students with a good knowledge of both chemistry and business or chemistry and computer.

To achieve these professional objectives, the Department of Chemistry offers six curricular programs leading to a bachelor's degree. The programs are:

1. Chemistry-Professional for students wishing to make a career in chemistry or allied fields.
2. Chemistry-Biochemistry for students wishing to prepare for a career in biochemistry or related areas.
3. Chemistry-Premedical for students who wish to make a career in chemistry with the ultimate goal of entering medical, dental, or veterinary school.
4. Chemistry-Teaching for students wishing to teach science in secondary schools.
5. Chemistry-Business for students wishing to combine chemistry with a basic knowledge of business.
6. Chemistry-Computer for students who wish to major in chemistry but also include courses in computer science.

For all students majoring in any chemistry program the general departmental requirements are: A minimum of 32 semester hours of chemistry, one year of college-level physics, and a year of calculus. A third semester of calculus is highly recommended. A grade of C or higher must be earned in CHM 110, 111, 116, 117, 250, and 351 before continuing on to the next course in this sequence.

Advanced placement students earning a 5 on the AP exam will receive credit for CHM 110, 111, and 112. Those who earn a 4 on the AP exam will receive credit for CHM 110 and 111. Those who earn a score of 3 will receive credit for CHM 100.

Chemistry-Professional

For those who elect this program the specific chemistry courses required are: CHM 110, 111, 116, 117, 191, 250, 320, 351, 360, 380, 392, 461, 462, 463, 480, 509, and 530. For those who desire certification, CHM 464, 510, 551, and 356 are required.
Chemistry-Biochemistry

The required chemistry courses for the Biochemistry program are: CHM 110, 111, 116, 117, 191, 250, 320, 351, 362, 363, 366, 380, 392, 461, 463, 480, and 530. The required biology courses for this program are: BIO 123, 124, 224, and 365. Either BIO 224 or BIO 365 must be taken with laboratory (for 4 credit hours). One year of college-level physics is required. Two semesters of calculus are required. Four hours of electives, chosen from the following list, are also required: CHM 319, 367, 460, 462, 464, 491, 568, BIO 396, or PHY 345. The total number of required credit hours is 76.

Chemistry-Premedical

This program is for the student who wishes to major in chemistry and prepare for entrance to medical, dental, or veterinary school. The required chemistry courses are: CHM 110, 111, 116, 117, 191, 250, 320, 351, 362, 363, 366, 380, 392, 461, and 480 plus 4 hours of chemistry electives, chosen from the following: CHM 319, 356, 367, 460, 463, 509, 530, and 551. The required biology courses for this program are BIO 123 and 124 plus seven hours of biology electives, chosen from the following: BIO 224, 323, 365, 381, 395, and 396.

Professional Chemistry - Secondary Teaching

The required chemistry courses for this program are identical to those of professional chemistry. The appropriate certification courses as specified by the College of Education and Health Sciences are required.

Chemistry-Business

This program is for the student who wishes to combine a background in both chemistry and business for the goal of immediate employment in technical or developmental chemistry or entrance to an MBA program. The required chemistry courses are: CHM 110, 111, 116, 117, 191, 250, 315, 320, 345, 351, 360, 380, 392, 461, 463, 480, 530, and 550. The required business administration courses are: ATG 157, BMA 352, ECO 221 or ECO 100, FIN 322, MTG 315, and QM 262 plus 3 additional hours from the following list: ATG 158, BMA 342, ECO 222, or QM 263.

Chemistry-Computer

This is a program designed for students who wish to combine a basic knowledge of chemistry and other sciences with courses in computer technology. The required chemistry courses are: CHM 110, 111, 116, 117, 191, 250, 320, 351, 392, 461, and 463 plus 9 additional hours of chemistry electives. Approved computer-related courses are required.

Chemistry Minor

The minor in chemistry consists of CHM 110, 111, 116, 117, 250, 320, 351, 392, 461, and 463. One year of college-level physics and one semester of calculus are also required.

Medical Technology

In cooperation with the Department of Biology, a degree program is offered in medical technology. See the listing under Medical Technology in this catalog for information.

Course Descriptions

CHM 100 Fundamentals of General Chemistry 3 hrs. (Gen. Ed. FS)
Basic chemical concepts

CHM 101 Fundamentals of General Chemistry Lab 1 hr. Laboratory for CHM 100. Corequisite: CHM 100.

CHM 110 General Chemistry I 3 hrs. (Gen. Ed. FS)
Chemical principles and applications; For majors in chemistry, engineering, biological sciences, and other physical sciences. Prerequisites: high school chemistry or CHM 100.

CHM 111 General Chemistry I Laboratory 1 hr. Laboratory for CHM 110. Prerequisites: CHM 110 or concurrent enrollment.

CHM 112 Engineering Chemistry 3 hrs. (Gen. Ed. FS)
For students of engineering and related disciplines. Prerequisite: CHM 110 or equivalent.

CHM 116 General Chemistry II 4 hrs. Continuation of CHM 110. Required for students who are preparing for further study in chemistry. Prerequisite: CHM 110.

CHM 117 General Chemistry II Laboratory 1 hr. Laboratory for CHM 116. Prerequisites: CHM 110, 111; Corequisite: CHM 116.

CHM 141 Introduction to Medical Technology 1 hr. Profession and function of a medical technologist: job opportunities, current issues, tour of a large hospital laboratory. Cross listed as BIO 141.

CHM 150 Fundamentals of Organic-Biochemistry 3 hrs. (Gen. Ed. FS)
Various organic compounds: synthesis, reactions, and uses; emphasis on those occurring in living organisms. Prerequisite: one semester of college chemistry or consent of department. Not open to students with credit in CHM 151 or 152.

Synthesis, reactions, and uses of organic compounds utilized by man. Prerequisite: one semester of college chemistry or departmental approval. Not open to students with credit in CHM 150.

CHM 152 Fundamentals of Biochemistry 2 hrs. (Gen. Ed. FS)
Clinical chemistry and its health related applications. Prerequisite: CHM 151 or one semester of organic chemistry. Not open to students with credit in CHM 150.

CHM 153 Organic - Biochemistry Laboratory 1 hr. Introduction to techniques of isolation, purification, synthesis, and identification of organic compounds with emphasis on biologically important compounds. Prerequisites: CHM 151 and 152 or concurrent enrollment.
CHM 191  Computer Applications in Chemistry  1 hr.
Introduction to computer software relevant to the
discipline of chemistry. Prerequisites: CHM 100 or 161 or concurrent enrollment.

CHM 250  Organic Chemistry  4 hrs.
Aliphatic and aromatic compounds; emphasis on class
reactions. Prerequisite: one year of college chemistry.

CHM 299  Directed Studies in Chemistry  1-4 hrs.
Studies undertaken by freshman or sophomore students under the guidance of staff members. Prerequisites: consent of instructor and Department Chair.

CHM 300  Chemistry and Civilization  3 hrs.
(Gener. Ed. TS)
For non-science majors: broad survey of the science
of chemistry and its overall effect on civilization.
Prerequisites: junior standing; major other than science or engineering.

CHM 306  Intermediate Analysis  3 hrs.
Qualitative analytical procedures; basic instrumental
techniques. Prerequisites: CHM 116, 117, 250.

CHM 315  Environmental Chemistry  3 hrs.
Chemical principles applied to environmental systems;
water, air, soils, conventional and hazardous wastes,
thermodynamic principles, acid/base and redox
chemical, interfacial chemistry, analytical techniques.
Prerequisite: CHM 162 or 116, 117 or consent of instructor.

CHM 319  Inorganic Chemistry  3 hrs.
Preparation, properties, reactions, and uses of the
elements and their compounds. Prerequisites: CHM 110, 111, 116, 250.

CHM 320  Analytical Chemistry  4 hrs.
Introduction to modern analytical chemistry involving
classical gravimetric and volumetric procedures
combined with modern instrumental techniques. Lecture and laboratory. Prerequisites: CHM 116, 117, 250.

CHM 345  Materials Chemistry  1 hr.
Survey of topics in materials chemistry. Prerequisite:
CHM 319 or consent of instructor.

CHM 351  Organic Chemistry  4 or 5 hrs.
Emphasis on theoretical and instrumental aspects.
Prerequisite: CHM 250.

CHM 356  Organic Spectroscopy  3 hrs.
Characterization/identification of compounds using
spectrometric methods.

CHM 360  Biological Chemistry  3 hrs.
Introduction to biological macromolecules, enzymatic
processes, bioenergetics, and metabolism. Prerequisites:
CHM 351, CHM 320. Not open to students with credit in
CHM 362 and CHM 366.

CHM 362  Biochemistry I: Macromolecular Structure
and Function  3 hrs.
Structure and function of biological macromolecules.
Prerequisite: CHM 351, BIO 123, BIO 124.

CHM 363  Biochemistry I Laboratory  1 hr.
Structure and function of biological macromolecules.
Prerequisite: CHM 362 or concurrent enrollment.

CHM 366  Biochemistry II: Metabolism  3 hrs.
Energetics, regulation, and integration of metabolic
processes. Prerequisite: CHM 351, CHM 362 or consent of instructor.

CHM 367  Biochemistry II Laboratory  1 hr.
Investigation of enzymes and metabolism. Prerequisite:
CHM 363; CHM 366 or concurrent enrollment.

CHM 380  Junior Seminar in Chemistry  0 hrs.
Weekly seminars presented by a variety of speakers
pertaining to all aspects of Chemistry. Course may
be repeated a maximum of three times. Pass/Fail.
Prerequisites: Junior standing or consent of instructor.

CHM 391  Medical Terminology  1 hr.
Terminology used in all areas of medical and paramedical
specialties. Emphasis on word building, technique, and
understanding of typical medical reports. Cross listed as
NUR 391. Prerequisites: one year each of college biology
and chemistry.

CHM 392  Chemical Literature  1 hr.
Use of chemical literature. Prerequisite: CHM 250; CHM
351 or concurrent enrollment.

CHM 460  Advanced Biochemistry  3 hrs.
Applications of organic, inorganic, and physical
chemistry to biological systems. Prerequisite: CHM 366.

CHM 461, 462  Physical Chemistry  3 hrs. each
Mathematical treatment of laws governing chemical and
physical changes. Prerequisites: CHM 250, 320; one year
each of college physics and calculus.

CHM 463, 464  Physical Chemistry Laboratory  1 hr. ea.
Corequisite: CHM 461 or 462.

CHM 480  Senior Seminar in Chemistry  1 hr.
Weekly seminars presented by a variety of speakers
pertaining to all aspects of Chemistry. Each student will
present a seminar under the supervision of a faculty
member. Prerequisites: Two semesters of CHM 380

CHM 491  Independent Studies in Chemistry  1-3 hrs.
Studies undertaken by well qualified advanced students
under the guidance of staff members, with approval of
the Department Chair. May be repeated for a maximum
of 6 hrs. credit.

CHM 500  Chemical Topics  1-3 hrs.
Topics of special interest which may vary each time
course is offered. Topic stated in current Schedule of
Classes. Prerequisites: CHM 351 and 461.

CHM 509  Advanced Inorganic Chemistry  3 hrs.
Theoretical-descriptive approach to inorganic chemistry.
Emphasis on dependence of selected chemical and
physical characteristics of elements and compounds on
extranuclear structure. Prerequisites: CHM 320, 461.

CHM 510  Advanced Inorganic Chemistry
Laboratory  1 hr.
Laboratory work in inorganic chemistry. Prerequisite:
CHM 509 or concurrent enrollment.

CHM 530  Advanced Analytical Chemistry  4 hrs.
Theory and applications of modern qualitative,
quantitative, and instrumental methods. Prerequisites:
CHM 320, 462.

CHM 550  Industrial Organic Chemistry  1 hr.
Survey of modern industrial organic chemistry; emphasis
on petroleum derivatives. Prerequisite: one year of
organic chemistry.

CHM 551  Advanced Organic Chemistry  3 hrs.
Organic reactions and reaction mechanisms. Prerequisite:
CHM 351.
CHM 568  Selected Topics in Biochemistry  1-3 hrs.
Content and credit will vary as indicated in current schedule of classes. May be repeated for up to eight credits, with no more than two credits counting towards the major. Prerequisite: CHM 366.