Chemistry Major Track 2 (Biology)
(from the 2007-2008 College Catalog)

Chemistry (CH) Bachelor of Science
Science and Mathematics

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Career opportunities in chemistry include health care, teaching, and government and industrial research. Students who expect to work in the field of chemistry or attend graduate school in chemistry should take the courses listed under track 1. Students can receive an American Chemical Society certified degree by completing the requirements for track 1 and also taking CH 408. Track 2 is available for students pursuing health care careers such as medicine or dentistry or graduate school in biochemistry. Students wishing to prepare for teaching chemistry in secondary schools should complete a chemistry major and confer with the education department concerning additional requirements in education.

Courses required for the chemistry major may be used to meet minor requirements in mathematics and physics.

Major Requirements

Track 2 [Biology Track] (16-20 units):
CH 121 and 122 (or CH 149)
CH 211 and 212
CH 304
CH 311 and 312
CH 401 and 402
CH 408
two units from CH 404, CH 406, CH 410, BI 301, BI 304, BI 402, or BI 405, at least one of which must be a CH course (see note below)
CH 499
BI 115 and 125
MA 232 (see note below)
PH 121 and 122

Certain courses have their own prerequisites that add units to those required for the major: BI 301 requires BI 225; BI 405 requires BI 225 and BI 301; depending on placement, MA 232 may require MA 231.

Courses in Chemistry

CH 101 Introductory Chemistry (1)
An introduction to the fundamental principles of chemistry and the importance of chemistry in modern life. This course may be counted toward the laboratory science requirement but cannot be used as a prerequisite for CH 122. Three lectures and one three-hour laboratory per week.

CH 121 General Chemistry I (1)
A study of the laws and theories of chemistry, stoichiometry atomic and molecular structure of matter, chemical bonding, properties of solutions, and periodicity of the elements. Three lectures and one three-hour laboratory per week. Two tutorial sessions are offered each week. Prerequisite: placement. Fall, Summer.

CH 122 General Chemistry II (1)
A continuation of CH 121, covering equilibria, thermodynamics, kinetics, and oxidation-reduction. Laboratory work includes semi-micro qualitative analysis. Three lectures and one three-hour laboratory per week. Prerequisite: CH 121. Spring.

**CH 149 Chemical Principles (1)**
A one-semester course covering advanced topics in atomic theory, equilibria, thermodynamics, and kinetics, as well as an introduction to organic and biochemistry. This course is designed for students with excellent high school preparation in chemistry and replaces the CH 121/122 sequence. Three lectures and one three-hour laboratory per week. Prerequisite: placement (AP score of 4). Fall.

**CH 150 Introduction to Research (1)**
An introduction to the method of scientific research. Lecture work focuses on literature search techniques, data analysis, and theory of scientific instrumentation. Laboratory work focuses on the methodology of chemical research, uses and limitations of chemical analysis, and application of different measurement techniques to the same chemical problem. Students are required to work on an independent research project. Prerequisite: CH 122 or 149. Spring.

**CH 211 Organic Chemistry I (1)**
An introduction to structure and modern theory of organic compounds. Laboratory work includes preparation, purification, and structure determination of these compounds. Three lectures and one three-hour laboratory per week. Prerequisite: CH 122 or 149. Fall, Summer.

**CH 212 Organic Chemistry II (1)**
A continuation of CH 211 with emphasis on aromatic organic compounds, spectroscopy, and carbonyl chemistry. Three lectures and one three-hour laboratory per week. Prerequisite: CH 211. Spring.

**CH 304 Quantitative Analysis (1)**
Theory and practice of volumetric, gravimetric, and certain instrumental chemical analyses. Two lectures and two three-hour laboratories per week. Prerequisite: CH 122 or 149. Spring.

**CH 311 Physical Chemistry I (1)**
Basic principles of physical chemistry, stressing thermodynamics. Three lecture periods, one three-hour laboratory, and one DHAR laboratory per week. Students are strongly encouraged to take MA 310 or equivalent prior to taking CH 311. Prerequisites: CH 212, MA 232, and PH 122. Fall.

**CH 312 Physical Chemistry II (1)**
Continuation of CH 311, stressing chemical kinetics, elementary quantum theory, and spectroscopy. Three lectures, one three-hour laboratory, and one DHAR laboratory per week. Prerequisite: CH 311. Spring.

**CH 401 Senior Seminar in Chemistry (½)**
A weekly, hour-long seminar on current topics in chemistry and related areas, involving faculty, students, and guest speakers. Each student presents one seminar on a topic approved by the faculty. Fall.

**CH 402 Senior Seminar in Chemistry (½)**
A weekly, hour-long seminar on current topics in chemistry and related areas, involving faculty, students, and guest speakers. Each student presents one seminar on a topic approved by the faculty. Spring.

**CH 404 Advanced Analytical Chemistry (1)**
Theory and practice of such physico-chemical methods of analysis as infrared, visible, and ultraviolet spectrophotometry; gas chromatography; atomic absorption; voltammetry; and
mass spectroscopy. Three lectures and two three-hour laboratories per week. Prerequisites: CH 304 and PH 122. Fall.

**CH 406 Inorganic Chemistry (1)**
A course containing both theoretical and descriptive inorganic chemistry. Topics include group theory and symmetry, crystal field theory, coordination chemistry, reaction mechanisms, organometallic chemistry, and bioinorganic chemistry. Three lectures and one three-hour laboratory per week. Prerequisite: CH 311. Spring.

**CH 408 Biochemistry (1)**
An introduction to the structure, chemistry, and metabolism of carbohydrates, proteins, nucleic acids, and lipids. Topics in application of biochemistry to medicine, dentistry, and nutrition are also considered. Three lectures and one three-hour laboratory per week. (Also listed as BI 408, this course may be counted for credit in either biology or chemistry.) Prerequisites: CH 212, BI 115 and 125, and consent. Fall.

**CH 410 Senior Research in Chemistry (1)**
A research experience in chemistry during the senior year. Requirements include a paper written in the style of a scientific journal article and an oral presentation to students and faculty. Prerequisites: CH 212 and consent. Fall, Spring.

**CH 293, 393, 493 Independent Study (1)**

**CH 298, 398, 498 Teaching Experience in Chemistry (1)**

**CH 499 Senior Project in Chemistry (1)**
A research project, pursued independently or corporately, that brings to bear the student's accumulated knowledge and skills in chemistry. A paper and oral presentation are required. Students may be required to lead discussion or direct the activities of other members of the project. Prerequisite: senior standing or consent. Interim.