Chemistry

Karl Konrad, Chair

AIMS OF THE CHEMISTRY PROGRAM

The aim of the chemistry program is to develop in students the ability to think critically and creatively. The chemistry curriculum is designed to provide the student with a strong background in the areas of organic, biological and physical chemistry. The major will serve as a solid foundation upon which the candidate can build a professional career or a more specialized graduate program.

PROGRAMS

Bachelor of Arts
Bachelor of Science
Teaching Areas — Secondary

BA Major requirements:

The chemistry BA major includes the following courses or their equivalents.

CHEM	111, 112	General Chemistry	8
CHEM	221	Modern Analytical Chemistry	4
CHEM	331, 332	Organic Chemistry	8
CHEM	341	Physical Chemistry	4
CHEM	451	Biochemistry	3
CHEM	462	Inorganic Chemistry	3
CHEM	491	Selected Topics	1
CHEM	471, 472	Seminar in Chemistry	2
or			
BIOL	480	Research Methods	2
Electives		CHEM 342 *or* CHEM 452	4
		TOTAL	37

Required Cognates: MATH 181; PHYS 121, 122.
Recommended Cognates: MATH 282, 283; CSIS 110.

BS Major requirements:

The chemistry BS major includes the following courses or their equivalents.

CHEM	111, 112	General Chemistry	8
CHEM	221	Modern Analytical Chemistry	4
CHEM	331, 332	Organic Chemistry	8
CHEM	341 342	Physical Chemistry	8
CHEM	451, 452	Biochemistry	7
CHEM	462	Inorganic Chemistry	3
CHEM	491	Selected Topics	1
CHEM	471, 472	Seminar in Chemistry	2
or			
BIOL	380	Research Methods	2
		TOTAL	41

Required Cognates: CSIS 110; MATH 181, 282, 283; PHYS 121, 122.
Recommended Cognates: MATH 321; an intermediate foreign language.

Chemistry minor:

18 hours including CHEM 111, 112 and 10 hours chosen from courses listed for the major. Chemistry as a supporting area must include as a minimum CHEM 111 and 112.

TEACHING CERTIFICATION PROGRAM

The following chemistry major is for teaching certification only. Requirements for certification are listed in the Education section of this bulletin.

Chemistry BS - Secondary Teaching Area
Option I

CHEM	111, 112	General Chemistry	8
CHEM	221	Modern Analytical Chemistry	4
CHEM	331, 332	Organic Chemistry	8
CHEM	341	Physical Chemistry	4
CHEM	451	Biochemistry	3
CHEM	462	Inorganic Chemistry	3
CHEM	471, 472	Seminar in Chemistry	2
Choose one of these courses:			
CHEM	342	Physical Chemistry	4
CHEM	452	Biochemistry	4
		TOTAL	36

COURSES

CHEM 101 Introductory Chemistry: General Chemistry 3 hours

Prerequisite: High school algebra or Corequisite: MATH 110.

The course is designed as an introduction to the fundamental principles of chemistry. Applications are drawn from inorganic, and biochemistry. Not applicable to major, minor or teaching sequence. 3 Lec.

CHEM 102 Introductory Chemistry Laboratory 1 hour

Prerequisite or corequisite: CHEM 101.

A laboratory course to accompany CHEM 101. Experiments cover topics from inorganic, organic, and biochemistry. 3 Lab.

CHEM 103 Introductory Chemistry: Organic and Biochemistry 3 hours

Prerequisite: CHEM 101 with grade of C or above.

Additional introductory topics in organic and basic biochemistry with particular emphasis on applications to human metabolism. Not applicable to major, minor or teaching sequence. 3 Lec.

CHEM 104 Introductory Chemistry Laboratory 1 hour

Prerequisite or corequisite: CHEM 103.

A laboratory course to accompany CHEM 103. Experiments cover basic concepts in organic and biochemistry. 3 Lab.

CHEM 111 General Chemistry 4 hours

Prerequisite: MATH 110 or equivalent; or Corequisite: MATH 121.

This course develops basic topics such as atomic structure, periodicity, chemical equations, chemical bonding, and structure and states of matter. 3 Lec 3 Lab.

Chemistry

CHEM 112 General Chemistry **4 hours**

Prerequisite: CHEM 111 with a grade of C or above.

A continuation of CHEM 111. Included are discussions of solutions, acids and bases, equilibrium, and electrochemistry. 3 Lec 3 Lab.

CHEM 221 Modern Analytical Chemistry **4 hours**

Prerequisite: CHEM 112 with a grade of C or above.

A course in which quantitative and instrumental techniques of chemical analysis are combined. Emphasis will be on developing analytical skills. 3 Lec 3 Lab.

CHEM 291 Selected Topics **1 hour**

Prerequisite: Permission of the department chair.

This course offers the lower division student opportunity for independent study under the direction of a staff member. This study may involve research, laboratory, or library work. Content and methods of study must be arranged prior to registration. May be repeated once for credit.

CHEM 331 Organic Chemistry **4 hours**

Prerequisite: CHEM 112 with grade of C or above, and/or permission of instructor.

The course deals with the theory and applications of basic organic chemistry. Included is the study of alkanes, alkenes, alkynes, simple aromatics, alkyl halides, alcohols, ethers and spectroscopic methods. 3 Lec 3 Lab.

CHEM 332 Organic Chemistry **4 hours**

Prerequisite: CHEM 331 with a grade of C or above.

A continuation of the study of basic organic chemistry. Includes carboxylic acids, aldehydes, ketones, amines, heterocyclics, unsaturated carbonyl compounds, carbohydrates, phenols, glycols and epoxides. 3 Lec 3 Lab.

CHEM 341 Physical Chemistry **4 hours**

Prerequisite: CHEM 112 or equivalent with a grade of C or above; Calculus I.

Concepts chosen from classical and molecular thermodynamics. 3 Lec 3 Lab.

CHEM 342 Physical Chemistry **4 hours**

Prerequisite: CHEM 341 and calculus or concurrent registration in Calculus II or Calcullus III.

Continuation of CHEM 341 with emphasis on rates and mechanisms of reactions, and application of elementary quantum mechanics to chemistry. 3 Lec 3 Lab.

CHEM 451 Biochemistry **3 hours**

Prerequisite: CHEM 332 with a grade of C or above, and/or permission of instructor.

The course is designed to expose the students to the fundamental aspects of biochemistry, Recombinant DNA technology, protein chemistry and structural biology. All of these will be discussed in a common framework or network that will tie them together to reveal the molecular mechanisms of some of the best known biological processes. 3 Lec.

CHEM 452 Biochemistry **4 hours**

Prerequisite: CHEM 451 with a grade of C or above, and/or permission of instructor.

A continuation of CHEM 451. The course will include body fluids (renal functions and composition of urine), acid-base balance, the chemistry of respiration, blood chemistry, biochemistry of specialized tissues (muscles, connective, and bone), and general study of hormones. 3 Lec 3 Lab.

CHEM 462 Inorganic Chemistry **3 hours**

Prerequisite: CHEM 341 or permission of instructor.

A survey course including a study of the elements and their periodic relationships, acid-base theories, current bonding theories, coordination compounds, and other selected topics. 3 Lec.

CHEM 471 Seminar in Chemistry **1 hour**

An introduction to the use of the chemical literature as a source of information. While focusing on the reading and study of selected scientific papers, the course can include oral and written reports, attendance at local scientific meetings and guest lecturers. Can be started in junior year.

CHEM 472 Seminar in Chemistry **1 hour**

A continuation of CHEM 471. Includes a thorough literature search and bibliography with a comprehensive report on an agreed-upon topic.

CHEM 491 Selected Topics **1-3 hours**

Prerequisite: Permission of chemistry faculty.

The subject of study is selected by conference between the student and the chemistry faculty, and will consist mainly of independent study and/or laboratory work summarized by a comprehensive report. Content and method of study must be arranged prior to registration. May be repeated once for credit.