

# CHEMISTRY, MINOR

## Program Requirements

Students majoring in other academic fields who wish to earn a minor in chemistry must complete the following requirements.

Code	Title	Hours
<b>Required Courses</b>		
CHEM 1411	General Chemistry I *	4
CHEM 1412	General Chemistry II	4
CHEM 3411	Organic Chemistry I	4
CHEM 3412	Organic Chemistry II	4
CHEM 3417	Quantitative Analysis	4
	or CHEM 3418 Instrumental Analysis	
	Select one advance CHEM elective	3-4
<b>Total Hours</b>		<b>23-24</b>

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Online offering

## Courses

### CHEM 1305 Introductory Chemistry

#### 3 Semester Credit Hours (3 Lecture Hours)

A one-semester principles course for students in non-science related majors covering the major concepts of chemistry (atomic structure, bonding, stoichiometry, elementary thermodynamics) and the role of chemistry in contemporary society (polymers, energy, pollution, etc.). Will not substitute for CHEM 1411.

**TCCNS:** CHEM 1305

### CHEM 1406 Introductory Physiological Chemistry

#### 4 Semester Credit Hours (3 Lecture Hours, 1 Lab Hour)

Fundamentals of chemistry with a descriptive introduction to organic and physiological chemistry. For students in nursing and other allied health programs which require only one semester of a laboratory chemistry. Safety training given during a laboratory meeting early in the semester is required for continued participation in this course.

**Co-requisite:** SMTE 0093.

### CHEM 1411 General Chemistry I

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

The foundation course in chemistry. Stoichiometry, chemical equilibria, atomic structure, chemical bonding, periodic properties, thermodynamics, chemical kinetics, and descriptive chemistry of the elements. Laboratory involves development of basic skills. This course counts toward the natural science component of the University Core Curriculum. Either CHEM 1305 - Introductory Chemistry or CHEM 1411, but not both, may be applied towards the core requirement. This course is offered in Fall, Spring and typically during both Summer sessions .

**Co-requisite:** SMTE 0093.

**TCCNS:** CHEM 1411

### CHEM 1412 General Chemistry II

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

The continuation of CHEM 1411 - General Chemistry I, the foundation course in chemistry with emphasis on quantitative aspects. Laboratory involves development of basic skills. This course counts toward the natural science component of the University Core Curriculum. CHEM 1411 - General Chemistry I and MATH 1314 - College Algebra or equivalent math competency or higher. This course is offered in Fall, Spring and typically both Summer sessions.

**Prerequisite:** CHEM 1411 and (MATH 1314, 1316, 1325, 2312, 2413, 2414, 2415 or 2305).

**Co-requisite:** SMTE 0093.

**TCCNS:** CHEM 1412

### CHEM 2490 Special Topics

#### 4 Semester Credit Hours (1-4 Lecture Hours, 3 Lab Hours)

May be repeated for credit. Subject materials variable. Offered on sufficient demand.

### CHEM 3411 Organic Chemistry I

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

The structure, nomenclature, synthesis, reactions, and reaction mechanisms of the principal classes of organic compounds. Stereochemistry and spectroscopy of organic compounds. Laboratory involves separation and synthetic techniques and development of basic skills. This course is offered in Fall, Spring and typically during the Summer I session.

**Prerequisite:** CHEM 1411.

**Co-requisite:** SMTE 0093.

### CHEM 3412 Organic Chemistry II

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

A continuation of CHEM 3411 . The course concludes with a survey of the structures of biomolecules. Laboratory involves spectroscopy and qualitative analysis techniques. This course is offered in Fall, Spring and typically during the Summer II session.

**Prerequisite:** CHEM 3411.

**Co-requisite:** SMTE 0093.

### CHEM 3417 Quantitative Analysis

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

A course in quantitative analysis, which includes chemical statistics and the use of acid-base, complexation, precipitation, and redox reactions to perform analyses and separations. Laboratory includes standard volumetric and gravimetric methods and development of basic quantitative techniques. This course is typically offered in Spring.

**Prerequisite:** CHEM 1412.

**Co-requisite:** SMTE 0093.

### CHEM 3418 Instrumental Analysis

#### 4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)

An introduction to instrumental methods of analysis: spectroscopy, chromatography, and electrochemical methods. Laboratory involves use of instrumentation in chemical analysis. This course is typically offered in Fall and Spring.

**Prerequisite:** CHEM 1412.

**Co-requisite:** SMTE 0093.

### CHEM 4085 Major Field Test in Chemistry

#### 0 Semester Credit Hours

The Major Field Test (MFT) in Chemistry is a national examination given in the Fall and Spring semesters only. It is a graduation requirement for all Chemistry students. Students enroll in this course during the semester that they plan to take the MFT. There is no cost to the student for either this course or for the MFT.

**CHEM 4292 Senior Chemistry Seminar****2 Semester Credit Hours (2 Lecture Hours)**

Presentation and discussion of selected topics in chemistry. Includes literature searches and reviews, paper presentations, survey of professional opportunities and requirements, career guidance and job searching skills.

**CHEM 4309 Advanced Instrumental Analysis****3 Semester Credit Hours (3 Lecture Hours)**

An advanced course in analytical chemistry covering the underlying theories of instrumental methods. This course is typically offered on an irregular basis.

**Prerequisite:** (CHEM 3411, 3412 and 3418).

**CHEM 4320 Drugs, Toxins and Natural Products Chemistry****3 Semester Credit Hours (3 Lecture Hours)**

The chemistry and biological activity of pharmaceuticals, toxins and selected natural products. Examines how chemical structure relates to biological activity. Also examines action of antibiotics, chemotherapy agents, analgesics, steroids, and compounds targeting the central and peripheral nervous system. This course is typically offered in Fall and Spring.

**Prerequisite:** CHEM 4401.

**CHEM 4341 Organic Synthesis****3 Semester Credit Hours (3 Lecture Hours)**

This three-credit hour course will entail detailed description of structure, synthesis, and reactions and mechanisms in organic chemistry including important named reactions. This course will also introduce them to the art of writing reaction mechanisms and retrosynthetic analysis. Moreover, they will be learning about separation, purification and characterization of organic compounds followed by scientific abstract writing. Designed only for science major. There is NO laboratory associated with the course.

**Prerequisite:** CHEM 3412.

**CHEM 4344 Chemical Oceanography****3 Semester Credit Hours (3 Lecture Hours)**

The study of the oceans and seas as a chemical system, including interactions with both the biota and the solid earth. This course is typically offered in Spring.

**Prerequisite:** CHEM 1412.

**CHEM 4350 Polymer Chemistry****3 Semester Credit Hours (3 Lecture Hours)**

An advanced lecture course in organic chemistry. Characterization of polymers. Polymerization mechanisms. Current research directions such as biomedical applications and electroactive polymers. This course is offered on an irregular basis.

**Prerequisite:** CHEM 3412.

**CHEM 4360 Molecular Spectroscopy****3 Semester Credit Hours (3 Lecture Hours)**

Spectroscopy and Structure of Organic Compounds is a three-credit that introduce you to concepts used in the identification of organic compounds with methods based on NMR, mass spectrometry, UV and IR.

**Prerequisite:** CHEM 3412.

**CHEM 4401 Biochemistry I****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

The structure and function of carbohydrates, lipids, proteins, and nucleic acids. An introduction to enzyme kinetics, cell membrane structure and biochemical signaling. Laboratory exercises demonstrate the basic principles and techniques used in Biochemistry. This course is typically offered in Fall, Spring and Summer.

**Prerequisite:** CHEM 3412 and (BIOL 1406 and 1407).

**Co-requisite:** SMTE 0093.

**CHEM 4402 Biochemistry II****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A continuation of CHEM 4401. Biochemical energetics, including glycolysis, fatty acid oxidation, amino acid oxidation, citric acid cycle, oxidative phosphorylation, photophosphorylation and photosynthesis. Carbohydrate, fatty acid and amino acid biosynthesis. Laboratory is a continuation of biochemical techniques. This course is typically offered in Fall and Spring.

**Prerequisite:** CHEM 4401.

**Co-requisite:** SMTE 0093.

**CHEM 4407 Inorganic Chemistry****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A survey of inorganic chemistry. Theories of atomic structure, covalent bonding, ionic solids, metallic solids, and coordination compounds. Modern acid-base concepts. Laboratory involves the synthesis of inorganic compounds.

**Prerequisite:** CHEM 3412.

**Co-requisite:** SMTE 0093.

**CHEM 4420 Physical Biochemistry****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A fundamental approach to the study of physical and chemical phenomena, including the study of thermodynamics, gases and phase equilibria. This course is typically offered on an irregular basis.

**Prerequisite:** CHEM 1412 and (PHYS 1402 or 2426) and MATH 2414.

**Co-requisite:** SMTE 0093.

**CHEM 4423 Physical Chemistry I****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A fundamental approach to the study of physical and chemical phenomena, including the study of thermodynamics, gases and phase equilibria. This course is typically offered in Fall.

**Prerequisite:** CHEM 1412 and (PHYS 1402 or 2426) and MATH 2414.

**Co-requisite:** SMTE 0093.

**CHEM 4424 Physical Chemistry II****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A continuation of CHEM 4423, including the study of chemical kinetics, electrochemistry, molecular structure, and quantum mechanics. This course is typically offered in Spring.

**Prerequisite:** CHEM 4423.

**Co-requisite:** SMTE 0093.

**CHEM 4443 Environmental Chemistry****4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)**

A study of the impact of chemistry on the environment, including topics of air pollution, water pollution, and beneficial chemical modifications of the environment. Laboratory devoted to field techniques of sampling, sample preservation, and analytical techniques applied to the environment. This course is typically offered in Spring.

**Prerequisite:** CHEM 1412.

**Co-requisite:** SMTE 0093.

**CHEM 4490 Special Topics****4 Semester Credit Hours (1 Lecture Hour, 1 Lab Hour)**

May be repeated for credit. Subject materials variable.

**CHEM 4696 Directed Independent Study****1-6 Semester Credit Hours**

Requires a formal proposal of study to be completed in advance of registration, to be approved by the supervising faculty, the chairperson and the dean of the College.