

# Chemistry

View Chemistry Department website

The general educational objective of the chemistry major is the development by the student of a fundamental understanding of basic principles, concepts, models, and practices employed by chemists in characterizing the structure and behavior of matter.

The chemistry major is structured to ensure that this fundamental knowledge is based on experiences that include the four major divisions of chemistry (analytical, inorganic, organic, and physical). The chemistry program is designed to foster development of an understanding of (1) the nature of the underlying scientific processes employed in the acquisition of chemical knowledge, (2) the application of current principles and modern practices used in solving chemical problems, (3) the current state of chemical knowledge, and (4) the applications of the concepts of chemistry in addressing societal needs. The program is particularly well-suited to prepare students for careers in chemistry or related areas and for admission to graduate, medical, or other professional schools.

## Learning Outcomes

- Correctly use the fundamental concepts of chemistry.
- Execute research using scientific approaches, and safely perform experiments using appropriate techniques and equipment
- Express scientific information through written and oral communication at a level appropriate to the audience
- Demonstrate the ability to identify, locate and evaluate chemistry related primary literature
- Integrate professional ethics while conducting experiments, performing data analysis, and communicating results
- Work collaboratively with other students and faculty members on classwork and in the laboratory
- Use problem solving and critical thinking skills
- Employ chemical waste management and minimization and describe the role of chemistry in

modern issues of sustainability

## Degree Requirements for the Major

### General College Requirements

General College Requirements (see Curriculum section), including the following requirements to satisfy the major

### Required Chemistry Core Courses (28 credit hours)

- CHEM 106: General Chemistry II
- CHEM 305: Quantitative Analysis
- CHEM 311: Organic Chemistry I
- CHEM 312: Organic Chemistry II
- CHEM 405: Inorganic Chemistry
- CHEM 451: Physical Chemistry I
- CHEM 452: Physical Chemistry II

### Required Cognate Courses

- MATH 151: Calculus I
- MATH 152: Calculus II
- PHYS 141: General Physics I (recommended) or PHYS151 Fundamentals of Physics
- PHYS 142: General Physics II (recommended) or PHYS152 Fundamentals of Physics

### Elective Courses

#### Option 1: ACS-Certified Major

- CHEM 325: Chem Literature (Required)
- CHEM 420: Biochemistry I (Required)
- Elective (Required) one of the 4 options:
  - CHEM 306: Instrumental Analysis
  - CHEM 425: Biochemistry II
  - CHEM 480: Topics in Chemistry
  - PHYS 462: Quantum Mechanics

#### Option 2: non-ACS-Certified Major

Four credits hours selected from the following list of options:

- MTSC 301: Materials Sciences

- CHEM 306: Instrumental Analysis
- CHEM 325: Introduction to Chemical Literature
- CHEM 420: Biochemistry
- CHEM 480: Topics in Chemistry
- CHEM 397, CHEM 399, CHEM 497, CHEM 499: Directed research/Independent study (as approved by the chemistry faculty)
- PHYS 462: Quantum Mechanics

### **St. Mary's Project**

Every chemistry major must complete a St. Mary's Project. This project may be in chemistry or in another major discipline or study area. The guidelines established in the selected area apply. The project must be proposed to a mentor and to the chair of the Department of Chemistry and Biochemistry at least three weeks before the last day of classes of the second semester of the student's junior year, and it must be approved by the mentor and the department chair.

### **Minimum Grade and GPA Requirements**

Students must earn a grade of C- or better in all courses listed above, and maintain an overall GPA of 2.0 or better in these required courses.

### **ACS Certification**

Students wishing to have their degrees certified by the American Chemical Society (ACS) must take Biochemistry I (CHEM 420), Introduction to Chemical Literature (CHEM 325), and one 4 credit elective from the following list: CHEM306, CHEM425, CHEM480, or PHYS462. The ACS certification is not a requirement for graduation.

### **Sequence of Study**

- First Year:  
Core Curriculum requirements, CHEM 103 (or earned a 4 or 5 on the Chemistry AP exam)  
CHEM 106, MATH 151, and MATH 152
- Sophomore Year:  
Core Curriculum requirements, CHEM 311, CHEM 312, PHYS 141, and PHYS 142
- Junior Year:  
Core Curriculum requirements, CHEM 305, CHEM 405, CHEM 451, CHEM 452, and elective courses
- Senior Year:

Mary's Project, Core Curriculum requirements, and elective courses

## Faculty

Geoffrey M. Bowers, Ruth Bowers, Daniel T. Chase, Andrew S. Koch, Randolph K. Larsen, Pamela S. Mertz (Department Chair), Kelly Neiles, Shanen Sherrer, Troy Townsend