

# BACHELOR OF SCIENCE IN CHEMISTRY

In pursuing a [Bachelor of Science in Chemistry](#), students first receive a strong foundation in analytical, physical, organic and inorganic chemistry before selecting one of three options leading to the degree: biochemistry and natural products, environmental chemistry, and natural and synthetic polymer chemistry.

Each option offers an advanced course of studies beyond the basic courses of the classical undergraduate chemistry curriculum. All options are excellent grounding for professional work at the B.S. level or for advanced graduate study.

## Biochemistry and Organic Chemistry of Natural Products

This option stresses a chemical approach to problems in the life and health sciences. Students take advanced courses in natural products chemistry, chemical analysis, and biochemistry. Professional electives in physiology, chemical ecology, genetics and molecular biology strengthen connections in the life and health sciences.

Research areas include the elucidation of chemical signals by which organisms communicate with each other, the role of trace metals in the growth of microorganisms, the origin and function of biologically active natural compounds, and synthetic biology and metabolic engineering for the production of value-added products and antimicrobial compounds.

## Environmental Chemistry

Environmental chemistry stresses applications of fundamental chemical principles to describe and predict behavior of chemicals in the environment. After obtaining a strong foundation in analytical, physical and organic chemistry, students pursue advanced study in air and water chemistry:

- FCH 510 Environmental Chemistry I - Aquatic Chemistry
- FCH 511 Environmental Chemistry II - Atmospheric Chemistry
- FCH 515 Methods of Environmental Chemical Analysis

Professional Elective provide students exposure to environmental topics in health, engineering, biology and sustainability. The senior year culminates in a senior research project undertaken under the supervision of one of the chemistry faculty. This give students the opportunity to experience research ranging from laboratory work to field-intensive studies.

## Natural and Synthetic Polymer Chemistry

Students take advanced courses in mechanisms of polymerization and polymer synthesis, physical properties and characterization of polymers, and laboratory techniques of polymer synthesis and characterization. Special topics courses in contemporary polymer and material science are available as electives. In addition, courses in carbohydrate chemistry provide a solid background for chemists planning careers in paper, plastic, high-tech, energy, membranes, and related areas. Biochemistry is an appropriate elective for students interested in the growth of biotechnologies while environmental chemistry complements this program for students interested in working on problems of biodegradation.

*Lower Division Required Courses*

|         |                                |       |
|---------|--------------------------------|-------|
| APM 205 | Calculus I:Science & Engr      | 4     |
| APM 206 | Calculus II:Science & Engr     | 4     |
| EFB 102 | General Biology I Laboratory   | 1     |
| EFB 103 | Gen Bio II:Cell Bio & Genetics | 3     |
| EFB 104 | General Biology II Laboratory  | 1     |
| ESF 200 | Information Literacy           | 1     |
| EWP 190 | Writing And The Envrnment      | 3     |
| EWP 290 | Research Writing & Humanities  | 3     |
| FCH 132 | Orientation Seminar:FCH        | 1     |
| FCH 150 | General Chemistry I            | 3     |
| FCH 151 | General Chemistry I Lab        | 1     |
| FCH 152 | General Chemistry II           | 3     |
| FCH 153 | General Chemistry II Lab       | 1     |
| FCH 221 | Organic Chemistry 1            | 3     |
| FCH 222 | Organic Chemistry Lab 1        | 1     |
| FCH 223 | Organic Chemistry II           | 3     |
| FCH 224 | Organic Chemistry Lab II       | 1     |
| PHY 211 | General Physics I              | 0 - 8 |
| PHY 212 | General Physics II             | 0 - 8 |
| PHY 221 | General Physics I Laboratory   | 0 - 8 |
| PHY 222 | General Physics II Laboratory  | 0 - 8 |

### Lower Division Electives

| Course                                                       | Codes* | Credits |
|--------------------------------------------------------------|--------|---------|
| Math Elective (Calculus III [APM307] OR Statistics [APM391]) |        |         |
| Free Elective                                                |        |         |

|                                                                                                                                                                            |   |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
| General Education Course in two of the following categories: US History & Civic Engagement, The Arts, Social Sciences, World History and Global Awareness, World Languages | G | 6 |
| General Education Course in Diversity, Equity, Inclusion and Social Justice                                                                                                | G | 3 |

*Upper Division Required Courses*

|         |                                 |       |
|---------|---------------------------------|-------|
| EWP 407 | Writing/Env & Sci Professionals | 3     |
| FCH 325 | Organic Chemistry III           | 4     |
| FCH 360 | Physical Chemistry I            | 3     |
| FCH 361 | Physical Chemistry II           | 3     |
| FCH 380 | Analytical Chemistry I          | 2     |
| FCH 381 | Analytical Chemistry II         | 3     |
| FCH 382 | Analytical Chemistry I Lab      | 1     |
| FCH 410 | Inorganic Chemistry             | 3     |
| FCH 495 | Intro/Professional Chem         | 1     |
| FCH 497 | Undergraduate Seminar           | 1     |
| FCH 498 | Introduction To Research        | 1 - 5 |

**Note:** 5 credits of FCH 498 are required

**Upper Division Required Courses**

| Course                                                                                                                                                                                                  | Codes* | Credits |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| Professional Electives allow students to explore interests in a wide range of areas, including biology, chemistry, ecology, forestry, environmental law, mathematics, geology, physics, biophysics, and |        |         |

|                                                                                           |  |  |
|-------------------------------------------------------------------------------------------|--|--|
| various engineering disciplines. Professional elective are typically 300-level and above. |  |  |
| Electives                                                                                 |  |  |

## Other Courses

### *Biochemistry and Natural Products Option*

|         |                         |   |
|---------|-------------------------|---|
| FCH 430 | Biochemistry I          | 3 |
| OR      |                         |   |
| FCH 530 | Biochemistry I          | 3 |
| FCH 431 | Biochemistry Laboratory | 3 |
| OR      |                         |   |
| FCH 531 | Biochemistry Laboratory | 3 |
| FCH 432 | Biochemistry II         | 3 |
| OR      |                         |   |
| FCH 532 | Biochemistry II         | 3 |

### *Environmental Chemistry Option*

|         |                           |   |
|---------|---------------------------|---|
| FCH 510 | Environmental Chemistry I | 3 |
| FCH 511 | Atmospheric Chemistry     | 3 |
| FCH 515 | Meth/Envrn Chem Analysis  | 3 |

### *Natural and Synthetic Polymer Chemistry Option*

|         |                        |   |
|---------|------------------------|---|
| FCH 550 | Polymer Sci:Synth&Mech | 3 |
| FCH 551 | Polymer Techniques     | 3 |
| FCH 552 | Polymer Sci:Prop&Tech  | 3 |

**Total Minimum Credits for Degree: 121**