

Chemical Science

University of Michigan - Department of Chemistry

Effective Fall 2020

The B.S. Major in Chemical Science degree exposes students to all sub-disciplines in Chemistry, but provides more flexibility in course selection than the BS Chemistry degree. Undergraduate research is a strongly encouraged option, particularly for students who plan to pursue graduate studies in chemistry or a related field, but is not a requirement for this degree. This degree is similar to chemistry majors at many other institutions, and provides good preparation for those who intend to pursue graduate degrees in chemistry. The degree also provides a solid foundation for those planning to attend graduate school in an interdisciplinary field where chemical knowledge will be beneficial, and for students interested in chemistry but planning to pursue post-graduate degrees in the Health Sciences.

Prerequisites:

| Course # | Course Description | Term Completed | Term Typically Offered | Credits |
|---|--|----------------|------------------------|---------|
| CHEM 210 | Structure and Reactivity I | | <i>F, W, Sp</i> | 4 |
| CHEM 211 | Investigations in Chemistry | | <i>F, W, Sp</i> | 1 |
| CHEM 215 | Structure and Reactivity II | | <i>F, W, Sp</i> | 3 |
| CHEM 216 | Structure and Reactivity II: Laboratory | | <i>F, W, Sp</i> | 2 |
| CHEM 241 | Introduction to Chemical Analysis | | <i>F, W</i> | 2 |
| CHEM 242 | Introduction to Chemical Analysis Laboratory | | <i>F, W</i> | 2 |
| CHEM 260 | Chemical Principles | | <i>F, W, Sp</i> | 3 |
| MATH 115 | Calculus I | | <i>F, W, Sp, Su</i> | 4 |
| MATH 116 | Calculus II | | <i>F, W, Sp, Su</i> | 4 |
| One of the following; CHEM 262 or [MATH 215 and 216 or 217]: | | | | |
| CHEM 262 | Mathematical Methods for Chemists | | <i>F, W</i> | 4 |
| MATH 215 and MATH 216 | Calculus III and Introduction to Differential Equations | | <i>F, W, Sp, Su</i> | 4 |
| | | | <i>F, W, Sp, Su</i> | 4 |
| MATH 215 and MATH 217 | Calculus III and Linear Algebra | | <i>F, W, Sp, Su</i> | 4 |
| | | | <i>F, W, Sp</i> | 4 |
| One of the following groups; PHYS 135/136 or 140/141: | | | | |
| PHYS 135/136 OR PHYS 140/141 | Physics for the Life Sciences I/Laboratory I | | <i>F, W, Sp</i> | 4/1 |
| | General Physics I/Elementary Laboratory I | | <i>F, W, Sp</i> | 4/1 |
| One of the following groups; PHYS 235/236 or 240/241: | | | | |
| PHYS 235/236 OR PHYS 240/241 | Physics for the Life Sciences II/ Laboratory II | | <i>F, W, Sp</i> | 4/1 |
| | General Physics II/ Elementary Laboratory II | | <i>F, W, Sp</i> | 4/1 |

Core courses

| Course # | Course Description | Term Completed | Term Typically Offered | Credits |
|---|---|----------------|------------------------|---------|
| One of the following; CHEM 302 or 303: | | | | |
| CHEM 302 OR CHEM 303 | Inorganic Chemistry | | W | 3 |
| | Introductory Bioinorganic Chemistry: the Role of Metals in Life | | F, W | 3 |
| Two of the following; CHEM 351, 402, 419, 420 | | | | |
| CHEM 351 | Fundamentals of Biochemistry | | F, W | 4 |
| CHEM 402 | Intermediate Inorganic Chemistry | | F | 3 |
| CHEM 419 | Intermediate Physical Organic Chemistry | | F | 3 |
| CHEM 420 | Intermediate Organic Chemistry | | F, W | 3 |
| Two of the following; CHEM 447, 461 + 462, [453 + 462 or 463 + 462] ‡ | | | | |
| CHEM 447 | Physical Methods of Analysis | | F, W | 3 |
| CHEM 461 and CHEM 462 | Physical Chemistry I and Computational Chemistry Laboratory | | F | 3 |
| | | | F | 1 |
| CHEM 453 and CHEM 462 OR CHEM 463 and CHEM 462 | Biophysical Chemistry I: Thermodynamics and Kinetics, and Computational Chemistry Laboratory | | F | 3 |
| | | | F | 1 |
| | Physical Chemistry II, and Computational Chemistry Laboratory | | W | 3 |
| | | | F | 1 |
| Two different courses from the list below to total at least 5 credit hours:* | | | | |
| CHEM 399 | Undergraduate Research- taken over 2 semesters | | F, W | 2-3 |
| CHEM 352 | Introduction to Biochemical Research Techniques | | F, W | 2 |
| CHEM 436 | Polymer Synthesis and Characterization | | W | 3 |
| CHEM 482 | Synthesis and Characterization | | F | 3 |
| CHEM 483 | Advanced Methods in Physical Analysis | | W | 3 |
| Additional 3-credit upper-level elective- to be selected with advisor | | | | |
| | | | | 3 |

‡ A student will only take 462 once if both 461 and 463 or 453 are elected.

* If a student chooses Chem 399 to fulfill this requirement, the second course must be in a different field of chemistry than the research area for the Chem 399 project.

Exclusions: Students who elect a major in Chemical Science may not elect the following major: Interdisciplinary Chemical Sciences. They may also not elect any of the Chemistry minors.

Chemistry GPA requirement:

A student must earn a cumulative grade point average (GPA) of at least 2.0 in all courses required for the Chemistry major including prerequisites. Transfer courses are not calculated into the GPA.