

Chemistry and Biochemistry

Note: MSU's programs in the biological sciences are distributed across multiple departments. MSU does not have a single Department of Biology. For additional options see Biological Sciences at MSU.

Department of Chemistry and Biochemistry

The Department of Chemistry and Biochemistry offers programs that are certified by the American Chemical Society and American Society for Biochemistry and Molecular Biology, the major professional societies in the field. These emphasize modern areas in chemistry and biochemistry at both the undergraduate and graduate levels. The curriculum for the Bachelor of Science degree in chemistry provides foundational education in chemistry with sufficient breadth and flexibility to allow students to enter a variety of chemistry-related careers. Several curricular options are available, each of which is career- and employment-directed. Employment opportunities are extensive. At least 36 percent of the research and development workforce in the United States have degrees in chemistry, more than any other discipline. Each of the degree options (chemistry, biochemistry, and teaching) allows students to tailor the degree toward their personal choices in course selection. A pre-professional track for future medical, dental, or veterinary students offers focused guidance to students planning to pursue these professional degrees.

Particular attention is given to mastery of state of the art instrumentation, modern concepts and methods, and use of computational and informatics approaches to help solve chemical and biochemical problems. Participation in undergraduate research within an active research group in the department is an important and rewarding part of the overall program. A wide range of research programs are available, spanning all major areas of chemistry: analytical, biochemistry, inorganic, organic and physical.

The Department of Chemistry and Biochemistry participates in several instructional and research programs of an interdisciplinary nature. These include nanomaterials, optical technology, thermal biology, biofilm engineering, computer modeling of proteins and nucleic acids, and the WWAMI medical education program. The department has active graduate programs leading to the degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). These degrees may be obtained in either chemistry or biochemistry.

Per Montana Board of Regents policy 301.5.2, the Department of Chemistry and Biochemistry will evaluate any post-secondary coursework taken within the last fifteen (15) years of being admitted or readmitted for the purposes of satisfying prerequisites for any CHMY or BCH course. If a course was taken more than 15 years ago, it will not be evaluated or counted as satisfying a prerequisite.

The department encourages majors in allied fields to consider either a chemistry or a biochemistry minor.

Chemistry (Professional) Option

This option includes a central core of chemistry courses that, together with technical electives, allows the students to prepare for careers in chemistry or related fields such as medicine, patent law, chemical industry, or science writing. Students interested in the more quantitative and physical aspects of chemistry may wish to include additional mathematics and/or physics courses. This option is certified by the American Chemical Society. Students electing this option will be well prepared both for graduate study and for immediate employment in industry, government, or business.

Biochemistry Option

This option includes a core of chemistry, biochemistry, and biology courses for students interested in the molecular nature of biological materials and life processes. A broad choice of biological science electives allow the students to prepare for careers in human, animal, plant, or microbial biochemistry. Trained biochemical scientists are in demand for research and teaching in universities and for research and development work in chemical, pharmaceutical, and bio-technical industries, in medical laboratories, and in state and federal governments. Students who complete the curriculum satisfactorily will be prepared to assume responsible professional positions or undertake graduate level work in the life sciences. The curriculum also provides an excellent preparation for medical, dental, or veterinary school.

Biochemistry Option Pre-Med Track

This track within the Biochemistry option offers biological and science electives specifically tailored to those looking to prepare for medical, dental, or veterinary school.

Teaching Option

This option is designed to prepare prospective teachers of chemistry at the secondary level. It provides a thorough background in all of the basic fields of chemistry and an acquaintance with aspects of chemistry in society that are essential to the practicing teacher of chemistry. The chemistry teaching option qualifies graduates to teach secondary school chemistry. Employment opportunities will be enhanced by obtaining a second area of certification, usually a teaching minor. Obtaining a teaching major, a teaching minor, and certification will require more than 120 credits.

Chemistry/Biochemistry Minors (Non-teaching)

A minor in either chemistry or biochemistry is offered for students with other majors who wish to receive formal acknowledgement for taking a core of intermediate-level chemistry and/or biochemistry courses. The minor is designed to strengthen the students' opportunities for admission to graduate school or medical, dental, veterinary, or pharmacy school, or for industrial employment.

Undergraduate Programs

- Chemistry (Professional) Option (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry/chemistry-professional-option/>)
- Biochemistry Option (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry/biochemistry-option/>)
- Teaching Option (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry/teaching-option/>)
- Biochemistry (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry-premed/>) Option: Pre-Med Track (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry-premed/>)

Undergraduate Minors

- Biochemistry Minor (Non-Teaching) (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry/biochemistry-minor-nonteaching/>)
- Chemistry Minor (Non-Teaching) (<http://catalog.montana.edu/undergraduate/letters-science/chemistry-biochemistry/chemistry-minor-non-teaching/>)

The Department of Chemistry and Biochemistry offers research-oriented programs culminating in the Doctor of Philosophy degree. The faculty in the department have expertise in a broad range of specialty areas including synthesis, structure, spectroscopy, and mechanism. In each of these fields, the strength of MSU Chemistry and Biochemistry Department has been recognized at the international level. MSU is a growing and dynamic

university of 16,000 students. MSU is rapidly increasing in research prominence and is now ranked among the nation's 100 leading research universities by the Carnegie Foundation. The Department of Chemistry and Biochemistry has the largest and best-funded doctoral program on campus. Our doctoral students receive world-class mentoring in a spectacular northern Rocky Mountain setting and graduate to superb career opportunities.

Graduate programs in chemistry and biochemistry are designed to provide students with a solid and broad foundation on which to base their careers. An appropriate combination of coursework and independent investigation is planned with individual faculty advisors. In consultation with their graduate advisor, graduate students can tailor their program to their own needs and interests. We believe that at the conclusion of their graduate education at Montana State University, students should have a professional command of the fundamentals of their disciplines. We cultivate the ability to think independently and to critically analyze scientific problems that span disciplinary boundaries. A high level of creativity and originality in research is expected of candidates for the Ph.D.

Degrees Offered

- M.S. in Chemistry (<http://catalog.montana.edu/graduate/letters-science/chemistry-biochemistry/ms-chemistry/>)
- M.S. in Biochemistry (<http://catalog.montana.edu/graduate/letters-science/chemistry-biochemistry/ms-biochemistry/>)
- Ph.D. in Chemistry (<http://catalog.montana.edu/graduate/letters-science/chemistry-biochemistry/phd-chemistry/>)
- Ph.D. in Biochemistry (<http://catalog.montana.edu/graduate/letters-science/chemistry-biochemistry/phd-biochemistry/>)