

# Chemistry

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(Bachelor of Science)

## Chemistry, Program Level Student Learning Outcomes

1. Demonstrate proficiency in organic, inorganic, analytical, physical, and biochemistry, through a rigorous curriculum aligned with the most recent ACS Guidelines for Chemistry Programs (<https://www.acs.org/education/policies/acs-approval-program.html>).
2. Develop and apply safe laboratory practices and effectively utilize advanced instrumentation for sample collection, analysis, and interpretation of results.
3. Cultivate essential professional skills, including leadership, scientific ethics, effective communication, proficiency in using scientific literature, responsible use of generative AI, teamwork, and adherence to the principles of green chemistry, while following the ACS Chemical Professional's Code of Conduct (<https://www.acs.org/careers/career-services/ethics/the-chemical-professionals-code-of-conduct.html>).

Chemists have made significant contributions to the improvement of the quality of our lives. They have played a vital role in the advancement of so many fields that it is hard to think of an area where the contributions of chemists have not been important. The challenges of today and tomorrow will continue to rely upon well-trained and creative chemists for their solutions.

UW-Green Bay offers five emphases in chemistry. One emphasis is approved by the American Chemical Society and is designed for students who are interested in a career as a practicing chemist at the bachelor's level or who are interested in advancing their education in graduate or professional school. The other emphases, general chemistry, environmental chemistry, biochemistry and food chemistry, are appropriate for students who are interested in working in a chemistry intensive industry or teaching chemistry at the secondary level.

The UW-Green Bay Chemistry program is an integrated progression of lecture and laboratory instruction that is designed to provide students with the skills needed by chemists today and tomorrow. These skills include a solid understanding of chemical principles, hands-on training in the use of modern instrumentation, experience in the design of experiments and the ability to analyze data and present results. The majority of UW-Green Bay Chemistry majors have opportunities to work as research assistants on faculty projects, or to conduct their own independent projects. UW-Green Bay faculty are active in research on chemical catalysis, sol-gel chemistry, natural product synthesis, alternative and renewable energy, chemistry of ultrasound, polymer synthesis and applications, mesoporous material synthesis and applications, computation chemistry, photocatalysis, sensors, environmental chemistry, biochemistry, and molecular biology. A research experience is an excellent way to develop and to showcase your professional skills and can provide a significant advantage when entering the job market and in applying to graduate and professional schools.

The University maintains an excellent collection of modern instrumentation, including: Hewlett-Packard and Agilent gas chromatography (GC) systems with a variety of detectors (e.g., MS, ECD, FID, and TCD); Shimadzu high performance liquid chromatography (HPLC) systems; a Dionex ion chromatograph (IC); a TESCAN scanning electron microscope (SEM) with an energy dispersive x-ray detector; a Nanalysis nuclear magnetic resonance (NMR) spectrometer; a Nicolet Fourier Transform Infrared (FTIR) spectrometer; a Varian inductively coupled plasma atomic emission spectrometer (ICP AES); a Perkin Elmer luminescence spectrometer (LS); Shimadzu UV/visible spectrophotometers; a three-channel Lachat QuikChem 8500 flow injection analyzer (FIA); a Shimadzu total organic carbon (TOC) analyzer; a Suprex supercritical fluid extractor (SFE); and gamma-ray and liquid scintillation counters. Students gain hands-on experience with these instruments during advanced coursework and in research projects.

A UW-Green Bay Chemistry major provides excellent training for students interested in careers in industry and for students interested in continuing their studies in graduate and professional schools. UW-Green Bay Chemistry majors are sought after by local industries for their strong chemistry skills and problem-solving abilities. Approximately half of the UW-Green Bay Chemistry majors begin their professional careers in industry. Students interested in continuing their studies have been admitted to the top graduate schools in the chemical and health sciences and into professional schools in medicine, dentistry, and veterinary science. UW-Green Bay Chemistry majors have gone on to become university professors, medical doctors and corporate directors.

## Major Area of Emphasis (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)

Students must complete requirements in one of the following areas of emphasis: (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)

- ACS Certified Chemistry (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)
- Biochemistry (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)
- Environmental Chemistry (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)
- Food Chemistry (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)
- General Chemistry (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/major/>)

## Minor

Code	Title	Credits
<b>Supporting Courses</b>		<b>11</b>
CHEM 207	Laboratory Safety	
CHEM 211 & CHEM 213	Principles of Chemistry I and Principles of Chemistry I Laboratory	
CHEM 212 & CHEM 214	Principles of Chemistry II and Principles of Chemistry II Laboratory	
<b>Upper-Level Courses</b>		<b>12</b>
CHEM 311	Analytical Chemistry	
<b>Complete one of the following course groups:</b>		
CHEM 300 & CHEM 301	Bio-Organic Chemistry and Bio-Organic Chemistry Laboratory	
CHEM 302 & CHEM 304	Organic Chemistry I and Organic Chemistry Laboratory I	
<b>Choose 4 credits from the following elective courses:</b>		
CHEM 303 & CHEM 305	Organic Chemistry II and Organic Chemistry Laboratory II	
CHEM 320 & CHEM 322	Thermodynamics and Kinetics and Thermodynamics and Kinetics Laboratory	
CHEM 324 & CHEM 325	Biophysical Chemistry and Biophysical Chemistry Laboratory	
CHEM 330 & CHEM 331	Biochemistry and Biochemistry Laboratory	
CHEM 410 & CHEM 411	Inorganic Chemistry and Inorganic Chemistry Laboratory	
CHEM 413	Instrumental Analysis	
CHEM 420 & CHEM 423	Polymer Chemistry and Polymer Chemistry Laboratory	
NUT SCI 327	Nutritional Biochemistry	
<b>Total Credits</b>		<b>23</b>

## Curriculum Guides (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/cg/>)

The following are curriculum guides for a four-year Chemistry degree program and is subject to change without notice. Students should consult a Chemistry program advisor to ensure that they have the most accurate and up-to-date information available about a particular four-year degree option. (<http://catalog.uwgb.edu/undergraduate/programs/chemistry/cg/>)

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