CHEMISTRY

Degree: B.S., Chemistry
Department of Chemistry and Physics (https://cas.umw.edu/chemistry/)

Chemistry, the study of the structure, properties, and reactivity of matter, has been called the "central science" because it is central to a fundamental understanding of biology, pharmacy, medicine, agriculture, geology, engineering, and physics. The Bachelor of Science in Chemistry degree program offers a modern curriculum for the study of chemistry within the general framework of a liberal arts and sciences education. It prepares a student for graduate, medical, or dental school; for employment in the chemical industry; or for secondary school teaching. In addition, several courses provide an important foundation in chemical theory and practice for the study of biology, geology, environmental science, and the health sciences. The program has been approved by the American Chemical Society (ACS) to offer certified degrees in Chemistry. In general, chemistry is a solid major program around which one can build a career-focused set of courses from other disciplines, e.g., with mathematics and computer science for chemical engineering or industrial chemistry; with economics and business administration for industrial chemistry; with biology for the health sciences; and with geology for energy or environmental research. The Biochemistry track provides students interested in this interdisciplinary subject a path to explore the chemical and molecular fundamentals that control the structures and metabolic functions of living systems.

The department has well-equipped laboratories to support and reinforce classroom instruction and to provide opportunities for research. Instrumentation for spectroscopy includes ultraviolet-visible and infrared spectrophotometers; two nuclear magnetic resonance spectrometers; and atomic absorption and emission spectrometers with both flame and inductively coupled plasma sources. Other major equipment items include a scanning probe microscope, a gas chromatograph/mass spectrometer system; several other gas and liquid chromatographs; electrochemical analyzers; and a differential scanning calorimeter.

Majors are encouraged to fulfill the general education experiential learning requirement by completing URES 197 Undergraduate Research, CHEM 491 Individual Study, CHEM 493 Chemical Outreach, or CHEM 499 Internship. Alternatively, majors may meet this requirement by participating in an approved summer research program, either the UMW Summer Research Program (or a similar program at another college or university) or a program in an industrial laboratory. **To complete the experiential learning requirement through a summer research experience, contact the department chair for more details.**

During the senior year qualified students may pursue Honors in Chemistry by completing an independent research project and writing and defending a thesis. Students interested in post-graduate study or industrial careers in chemistry should pursue an ACS-certified degree. Students completing the Biochemistry track will be prepared for careers in medical, pharmaceutical, or biotechnological fields.

Chemistry Major Requirements

Code	Title	Credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
CHEM 211	Organic Chemistry I	4
CHEM 212	Organic Chemistry II	4
CHEM 253	Chemical Analysis I	4
CHEM 254	Chemical Analysis II	4
CHEM 383A	Physical Chemistry I	3
CHEM 384A	Physical Chemistry II	3
CHEM 387A	Physical Chemistry Laboratory I	2
CHEM 388A	Physical Chemistry Laboratory II	2
CHEM 423	Experimental Methods in Chemistry	4
CHEM 453	Seminar	2
Total Credits		**40**

[1] MATH 122 Calculus II and PHYS 105 University Physics, w/Lab and PHYS 106 University Physics w/Lab or PHYS 101 General Physics w/Lab and PHYS 102 General Physics w/Lab are prerequisites to CHEM 383A Physical Chemistry I and should be completed before the junior year.

ACS-certified Chemistry Degree Requirements

Code	Title	Credits
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
CHEM 211	Organic Chemistry I	4
CHEM 212	Organic Chemistry II	4
CHEM 253	Chemical Analysis I	4
CHEM 254	Chemical Analysis II	4
CHEM 317	Biochemistry I	3
CHEM 319	Biochemistry Laboratory I	1
CHEM 343	Inorganic Chemistry	3
CHEM 345	Inorganic Chemistry Laboratory	1
CHEM 383A	Physical Chemistry I	3
CHEM 384A	Physical Chemistry II	3
CHEM 387A	Physical Chemistry Laboratory I	2
CHEM 388A	Physical Chemistry Laboratory II	2
CHEM 423	Experimental Methods in Chemistry	4
CHEM 453	Seminar	2
Sufficient additional laboratory hours to total 500 contact hours		
Total Credits		**48**

General Education Requirements

The general education requirements for Bachelor of Arts/Bachelor of Science degrees (https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-arts-bachelor-science-degrees/) apply to all students who are seeking to earn an undergraduate B.A., B.S. or B.S.Ed. degree.

Students seeking a Bachelor of Liberal Studies degree have a separate set of BLS general education requirements (https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-liberal-studies-degrees/).

Electives

Elective courses are those that are not needed to fulfill a general education requirement or major program requirement but are chosen by the student to complete the 120 credits required for graduation with a

B.A./B.S./B.S.Ed. degree or the BLS degree. These courses may be taken graded or pass/fail (or S/U in the case of physical education and 100-level dance). No student in a regular B.A./B.S./B.S.Ed. program may count more than 60 credits in a single discipline toward the 120 credits required for graduation.

Total Credits Required for the Degree: 120 credits

Chemistry and Physics Department

Janet A. Asper, Chair
Janet A. Asper, Career Advisor
Matthew C. Fleenor, Program Coordinator (Physics)

Faculty

(The person's subject field is indicated in parentheses.)

Professors

Janet A. Asper (Chemistry)
K. Nicole Crowder (Chemistry)
Matthew C. Fleenor (Physics)
Kelli M. Slunt (Chemistry)

Associate Professors

Leanna C. Giancarlo (Chemistry)
E. Davis Oldham (Chemistry)
Randall D. Reif (Chemistry)

Assistant Professor

Desmond R. Villabla (Physics)
Sarah E. Smith (Chemistry)
Varun Suresh Makhija (Physics)