

# BS in Chemistry

69-71 units

Chemistry is the study of the properties and reactivity of all matter. An understanding of chemistry is fundamental to a variety of fields including but not limited to biology, astronomy, earth science, physics, environmental science, medicine, and pharmacology.

The Bachelor of Science in Chemistry program (<https://www.apu.edu/clas/programs/chemistry-major/>) provides a rigorous curriculum and strong foundation in the five major subfields of chemistry—analytical, organic, inorganic, physical, and biochemistry—as well as in related fields such as biology, physics, and mathematics, providing breadth to their study of chemistry.

This program provides excellent preparation for entry-level positions as a researcher or laboratory technician, in governmental or industrial technical support, in management, or in teaching at the secondary level. It is also excellent preparation for graduate studies in fields such as but not limited to chemistry, biochemistry, environmental studies, forensic science, pharmacology, and biotechnology. Students who attend graduate school and obtain a master's or doctoral degree may find employment at a university or in the private or government sectors.

BS in Chemistry students are strongly encouraged to collaborate with science faculty in a research project or participate in an off-campus internship in industry.

*Note: Entry requirements differ among graduate schools and jobs. Students are responsible for researching the requirements of graduate programs and professions in which they are interested.*

## Requirements

All of the following requirements must be met to continue as an allied health, biological sciences, biochemistry, or chemistry major. A student's failure to maintain these requirements will result in him or her being dropped from the major. Reentry to the major is by petition only.

- Must maintain a minimum cumulative GPA of 2.0 in all biology, chemistry, biochemistry, math, and physics courses required for the major.
- Must complete each course required for the major with a C- or higher for the course to meet a degree requirement in the Department of Biology and Chemistry.
- Any single course within the major can be taken only two times at APU; students must change to a major outside the department after two unsuccessful (below C-) attempts in a single required course.
- Only two courses total within the major can be repeated; students must change to a major outside the department after unsuccessful (below C-) attempts in any three required courses.

Code	Title	Units
<b>Chemistry</b>		
BIOC 270	Biomolecular Chemistry	4
BIOL 151	General Biology I <sup>1</sup>	4
BIOL 496	Writing 3: Ethics and the Sciences <sup>2</sup>	3
CHEM 151	General Chemistry I <sup>1,3</sup>	4
CHEM 152	General Chemistry II <sup>3</sup>	4
CHEM 251 & CHEM 261	Organic Chemistry: Theory I and Organic Chemistry - Lab	4
CHEM 252 & CHEM 262	Organic Chemistry: Theory II and Organic Chemistry - Lab	4
CHEM 300 & CHEM 310	Quantitative Chemical Analysis - Theory and Quantitative Chemical Analysis - Laboratory	4
CHEM 320 & CHEM 330	Instrumental Analysis: Theory and Instrumental Analysis - Lab <sup>4</sup>	4
CHEM 401 & CHEM 411	Physical Chemistry I and Physical Chemistry I Lab	4
CHEM 402 & CHEM 412	Physical Chemistry II and Physical Chemistry II Lab	4
CHEM 461	Inorganic Chemistry	3
Select at least 6 units from the following:		6
BIOC 370	Biomolecular Metabolism	
BIOC 390	Physical Biochemistry	

CHEM 311	Teaching and Learning in STEM <sup>5</sup>	
CHEM 312	STEM Education Research Seminar <sup>5</sup>	
CHEM 313	STEM Teaching Practicum <sup>5</sup>	
CHEM 394	Directed Research Internship <sup>5</sup>	
CHEM 395	Chemical Science Internship <sup>5</sup>	
CHEM 451	Advanced Organic Chemistry	
CHEM 495	Advanced Topics in Chemistry	
MATH 270	Ordinary Differential Equations	

**Mathematics**

MATH 165	Calculus I <sup>3</sup>	3
MATH 166	Calculus II <sup>3</sup>	3
MATH 268	Multivariable Calculus	3

**Physics**

Select one of the following: 8-10

PHYC 151 & PHYC 152	Physics for Life Sciences I and Physics for Life Sciences II <sup>3,6</sup>	
PHYC 161 & PHYC 162	Physics for Science and Engineering I and Physics for Science and Engineering II <sup>3,6</sup>	

**Total Units****69-71**

<sup>1</sup> Meets the General Education Natural Sciences requirement.

<sup>2</sup> Meets the General Education Writing 3 requirement.

<sup>3</sup> This course may be waived with an appropriate Advanced Placement test score.

<sup>4</sup> CHEM 320 meets the General Education Integrative and Applied Learning requirement.

<sup>5</sup> Up to 3 units combined of CHEM 311, CHEM 312, CHEM 313, CHEM 394, and CHEM 395 can be counted toward major elective units.

<sup>6</sup> PHYC 151 and PHYC 161 meet the General Education Natural Sciences requirement.

**Program Learning Outcomes****Program Learning Outcomes**

Students who successfully complete this program shall be able to:

1. Demonstrate a broad knowledge base in the field of chemistry.
2. Effectively communicate scientific ideas and research orally.
3. Effectively communicate scientific ideas and research in writing.
4. Demonstrate proficiency in problem solving and applying the scientific method to scientific questions.
5. Demonstrate laboratory skills and techniques.
6. Demonstrate knowledge of relevant laboratory instrumentation.
7. Express a Christian worldview that integrates faith with their chemistry vocation.