

# Chemistry

## Chemistry

The Chemistry department is in the [College of Science](#). To find the most up-to-date information from the Chemistry department, visit their website.

[Chemistry department](#)

### DEPARTMENT CHAIR

**CAKA, Fern** Associate Professor

### FACULTY

**BOND, Calvin A.** Associate Professor

**CAKA, Fern** Associate Professor

**CHAMBERLAND, Stephen** Associate Professor

**GOLDFARB, Nathan E.** Assistant Professor

**GUNAWARDENA, Gamini U.** Associate Professor

**HALLING, Merrill** Associate Professor

**HAM, Young W.** Associate Professor

**HEIDER, Emily** Assistant Professor

**HERRON, Stevens** Lecturer

**HOPOATE-SITAKE, Moana** Lecturer - Placeholder

**HORN, Matthew** Associate Professor

**LARICHEVA, Elena** Assistant Professor

**ROCKS, Sally** Assistant Professor

**SHURTLEFF, James K.** Associate Professor

**THULIN, Craig** Professor

**VISWANATH, Lakshmi** Associate Professor

**WATHEN, Mark D.** Associate Professor

**WHITE, Lilia** Lecturer

**WILSON, Bruce E.** Associate Professor

**YU, Ming** Assistant Professor

## Degrees & Programs

### Chemistry, Minor

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#### Requirements

**Total Program Credits: 27**

Matriculation Requirements:			
1. Admitted to a bachelor degree program at UVU.			
Discipline Core Requirements:			24 Credits
	<a href="#">CHEM 1210</a>	Principles of Chemistry I	4
	<a href="#">CHEM 1220</a>	Principles of Chemistry II	4
	<a href="#">CHEM 1215</a>	Principles of Chemistry I Laboratory	1
	<a href="#">CHEM 1225</a>	Principles of Chemistry II Laboratory	1
	<a href="#">CHEM 2310</a>	Organic Chemistry I	4
	<a href="#">CHEM 2320</a>	Organic Chemistry II	4
	<a href="#">CHEM 2315</a>	Organic Chemistry I Laboratory	1
	<a href="#">CHEM 2325</a>	Organic Chemistry II Laboratory	1

	<a href="#">CHEM 3000</a>	Analytical Chemistry	2
	<a href="#">CHEM 3005</a>	Analytical Chemistry Laboratory	2
Elective Requirements:			3 Credits
	Any upper-division chemistry class numbered above 3000 with a minimum of 3 credit hours		3

#### Graduation Requirements:

- Complete all courses with a minimum grade of "C-" or better.

## Chemistry - Biochemistry Emphasis, B.S.

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#### Requirements

Biochemistry studies the chemical composition of living things. Biochemistry combines the study of biology with organic and inorganic chemistry as applied to topics such as enzymology, genetics, toxicology, pharmacology, food science, and medicine. Students with this degree may pursue graduate study or work in the field of biotechnology or in one of the many related areas or be eligible for many employment opportunities in chemistry and biology.

**Total Program Credits: 120**

Matriculation Requirements:			
To matriculate into the Chemistry degree, students must have adviser approval, and completed CHEM 1210, CHEM 1220, CHEM 1250, and CHEM 1260 all with a C- or higher.			
General Education Requirements:			40 Credits
	<a href="#">ENGL 1010</a>	Introduction to Academic Writing	3
or	<a href="#">ENGL 1005</a>	Literacies and Composition Across Context (5.0)	
	<a href="#">ENGL 2010</a>	Intermediate Writing/Academic Writing and Research	3
	<a href="#">MATH 1210</a>	Calculus I	5
Complete one of the following:			3
	<a href="#">HIST 1700</a>	American Civilization (3.0)	
	<a href="#">HIST 2700</a>	US History to 1877 (3.0)	
and	<a href="#">HIST 2710</a>	US History since 1877 (3.0)	
	<a href="#">HIST 1740</a>	US Economic History (3.0)	
	<a href="#">POLS 1000</a>	American Heritage (3.0)	
	<a href="#">POLS 1100</a>	American National Government (3.0)	
Complete the following:			3
	<a href="#">PHIL 2050</a>	Ethics and Values	
or	<a href="#">PHIL 205G</a>	Ethics and Values	
or	<a href="#">PHIL 205H</a>	Ethics and Values	
	<a href="#">HLTH 1100</a>	Personal Health and Wellness (2.0)	
or	<a href="#">PES 1097</a>	Fitness for Life	2
Distribution Courses:			
	<a href="#">BIOL 1610</a>	College Biology I	4
	<a href="#">CHEM 1210</a>	Principles of Chemistry I <sup>1</sup>	4
	<a href="#">CHEM 1220</a>	Principles of Chemistry II <sup>2</sup>	4

# Chemistry

	Fine Arts	3
	Humanities	3
	Social/Behavioral Science	3
Discipline Core Requirements:		41 Credits
CHEM 1215	Principles of Chemistry I Laboratory <sup>3</sup>	1
CHEM 1225	Principles of Chemistry II Laboratory <sup>4</sup>	1
CHEM 1250	Chemistry Cornerstone- Research and Careers	1
CHEM 1260	Chemistry Cornerstone- Ethics	1
CHEM 2310	Organic Chemistry I	4
CHEM 2315	Organic Chemistry I Laboratory	1
CHEM 2320	Organic Chemistry II	4
CHEM 2325	Organic Chemistry II Laboratory	1
CHEM 3000	Analytical Chemistry	2
CHEM 3005	Analytical Chemistry Laboratory	2
CHEM 3600	Biological Chemistry	3
CHEM 3605	Biological Chemistry Lab	1
CHEM 4000	Instrumental Analysis WE	2
CHEM 4005	Instrumental Analysis Laboratory	2
MATH 1220	Calculus II	5
PHYS 2210	Physics for Scientists and Engineers I	4
PHYS 2220	Physics for Scientists and Engineers II	4
PHYS 2215	Physics for Scientists and Engineers I Lab	1
PHYS 2225	Physics for Scientists and Engineers II Lab	1
Emphasis Requirements:		18 Credits
BIOL 1615	College Biology I Laboratory	1
BIOL 3400	Cell Biology	3
BIOL 3405	Cell Biology Laboratory	1
CHEM 3060	Physical Chemistry I	4
CHEM 3065	Physical Chemistry I Lab	1
CHEM 3100	Advanced Inorganic Chemistry	4
CHEM 3115	Advanced Inorganic Chemistry Lab	1
CHEM 3620	Biological Chemistry II	3
Emphasis Elective Requirements:		21 Credits
Chemistry Electives (10 credits) from the following:		10
CHEM 3020	Environmental Chemistry (3.0)	
CHEM 3025	Environmental Chemistry Laboratory (1.0)	
CHEM 3300	Biomolecular Modeling and Simulations (4.0)	
CHEM 3800	Energy Use on Earth (3.0)	
CHEM 4030	Radiochemistry (3.0)	
CHEM 4600	Structure Determination (3.0)	
CHEM 4605	Structure Determination Laboratory (1.0)	
CHEM 4800	Pharmacology (3.0)	

CHEM 482R	Chemistry Internship (1.0)	
CHEM 489R	Undergraduate Research in Chemistry (1.0)	
CHEM 495R	Advanced Topics in Organic Chemistry (3.0)	
CHEM 496R	Special Topics in Chemistry (1.0)	
CHEM 499R	Independent Study and Research (1.0)	
Biology Electives (11 credits) from the following:		11
BIOL 3300	Developmental Biology (3.0)	
BIOL 3500	Genetics (3.0)	
BIOL 3515	Advanced Genetics Laboratory (1.0)	
BIOL 3550	Molecular Biology (3.0)	
BIOL 4300	Bioinformatics and Genome Analysis (4.0)	
BIOL 4450	Immunology (3.0)	
BIOL 4455	Immunology Laboratory (1.0)	
BIOL 4550	Molecular Evolution and Bioinformatics WE (3.0)	
MICR 3450	General Microbiology (3.0)	
MICR 3455	General Microbiology Laboratory (1.0)	
ZOOL 2320	Human Anatomy (3.0)	
and ZOOL 2325	Human Anatomy Laboratory (1.0)	
ZOOL 2420	Human Physiology (3.0)	
and ZOOL 2425	Human Physiology Laboratory (1.0)	
ZOOL 4300	Histology (4.0)	
ZOOL 4700	Advanced Anatomy (4.0)	
ZOOL 4780	Neuroscience (4.0)	

## Graduation Requirements:

1. Completion of a minimum of 120 semester credits with a minimum of 40 upper-division credits.
2. Overall grade point average of 2.0 (C) or above with a minimum of 2.25 in Major.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. A minimum of 54 credit hours must be in the major with a minimum of 20 credits taken at UVU. A minimum of 28 chemistry credits must be upper-division.
6. Complete all chemistry and physics courses with a minimum grade of "C-" or better.
7. Successful completion of at least one Global/Intercultural course.

## Footnote:

1-To be taken with CHEM 1215 Principles of Chemistry I Laboratory
2-To be taken with CHEM 1225 Principles of Chemistry II Laboratory
3-To be taken with CHEM 1210 Principles of Chemistry I
4-To be taken with CHEM 1220 Principles of Chemistry II

## Chemistry - Professional Chemistry Emphasis, B.S.

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information, they may contact the Assistive Technology Center at ACCESSIBLETECH@uvu.edu or 801-863-6788.

### Requirements

This bachelor's degree in professional chemistry prepares a student for employment as a chemist. It also prepares a student for further study in a graduate degree or professional program. This degree is designed to meet American Chemical standards for a bachelor degree. Job opportunities for students with this degree are very good. Students with this degree can have careers in test laboratories, government laboratories, hospital laboratories, research and development, quality control, manufacturing, and many other areas.

In obtaining this degree, students will learn how to:

- Use modern scientific instruments and interpret results
- Apply principles used in chemistry to solve everyday problems
- Think analytically
- Use problem solving skills
- Categorize information
- Apply learned math skills
- Develop laboratory skills

### Total Program Credits: 120

<b>Matriculation Requirements:</b>			
To matriculate into the Chemistry degree, students must have adviser approval, and completed CHEM 1210, CHEM 1220, CHEM 1250, and CHEM 1260 all with a C- or higher.			
General Education Requirements:			40 Credits
	<a href="#">ENGL 1010</a>	Introduction to Academic Writing	3
or	<a href="#">ENGL 1005</a>	Literacies and Composition Across Context (5.0)	
	<a href="#">ENGL 2010</a>	Intermediate Writing/Academic Writing and Research	3
	<a href="#">MATH 1210</a>	Calculus I	5
Complete one of the following:			3
	<a href="#">HIST 1700</a>	American Civilization (3.0)	
	<a href="#">HIST 2700</a>	US History to 1877 (3.0)	
and	<a href="#">HIST 2710</a>	US History since 1877 (3.0)	
	<a href="#">HIST 1740</a>	US Economic History (3.0)	
	<a href="#">POLS 1000</a>	American Heritage (3.0)	
	<a href="#">POLS 1100</a>	American National Government (3.0)	
Complete the following:			
	<a href="#">PHIL 2050</a>	Ethics and Values	3
or	<a href="#">PHIL 205G</a>	Ethics and Values	
or	<a href="#">PHIL 205H</a>	Ethics and Values	
	<a href="#">HLTH 1100</a>	Personal Health and Wellness (2.0)	
or	<a href="#">PES 1097</a>	Fitness for Life	2
<b>Distribution Courses:</b>			
	<a href="#">BIOL 1610</a>	College Biology I	4
	<a href="#">CHEM 1210</a>	Principles of Chemistry I <sup>1</sup>	4
	<a href="#">CHEM 1220</a>	Principles of Chemistry II <sup>2</sup>	4
	Fine Arts		3
	Humanities		3
	Social/Behavioral Science		3
<b>Discipline Core Requirements:</b>			41 Credits

<a href="#">CHEM 1215</a>	Principles of Chemistry I Laboratory <sup>3</sup>	1
<a href="#">CHEM 1225</a>	Principles of Chemistry II Laboratory <sup>4</sup>	1
<a href="#">CHEM 1250</a>	Chemistry Cornerstone- Research and Careers	1
<a href="#">CHEM 1260</a>	Chemistry Cornerstone- Ethics	1
<a href="#">CHEM 2310</a>	Organic Chemistry I	4
<a href="#">CHEM 2315</a>	Organic Chemistry I Laboratory	1
<a href="#">CHEM 2320</a>	Organic Chemistry II	4
<a href="#">CHEM 2325</a>	Organic Chemistry II Laboratory	1
<a href="#">CHEM 3000</a>	Analytical Chemistry	2
<a href="#">CHEM 3005</a>	Analytical Chemistry Laboratory	2
<a href="#">CHEM 3600</a>	Biological Chemistry	3
<a href="#">CHEM 3605</a>	Biological Chemistry Lab	1
<a href="#">CHEM 4000</a>	Instrumental Analysis WE	2
<a href="#">CHEM 4005</a>	Instrumental Analysis Laboratory	2
<a href="#">MATH 1220</a>	Calculus II	5
<a href="#">PHYS 2210</a>	Physics for Scientists and Engineers I	4
<a href="#">PHYS 2220</a>	Physics for Scientists and Engineers II	4
<a href="#">PHYS 2215</a>	Physics for Scientists and Engineers I Lab	1
<a href="#">PHYS 2225</a>	Physics for Scientists and Engineers II Lab	1
<b>Emphasis Requirements:</b>		39 Credits
<a href="#">CHEM 3060</a>	Physical Chemistry I	4
<a href="#">CHEM 3065</a>	Physical Chemistry I Lab	1
<a href="#">CHEM 3070</a>	Physical Chemistry II	4
<a href="#">CHEM 3075</a>	Physical Chemistry II Lab	1
<a href="#">CHEM 3100</a>	Advanced Inorganic Chemistry	4
<a href="#">CHEM 3115</a>	Advanced Inorganic Chemistry Lab	1
<a href="#">MATH 2210</a>	Calculus III	3
<a href="#">MATH 2280</a>	Ordinary Differential Equations	3
<a href="#">PHYS 3300</a>	Mathematical Physics	3
<b>Chemistry Electives (15 credits) from the following:</b>		15
<a href="#">CHEM 3020</a>	Environmental Chemistry (3.0)	
<a href="#">CHEM 3025</a>	Environmental Chemistry Laboratory (1.0)	
<a href="#">CHEM 3080</a>	Physical Chemistry III (3.0)	
<a href="#">CHEM 3300</a>	Biomolecular Modeling and Simulations (4.0)	
<a href="#">CHEM 3620</a>	Biological Chemistry II (3.0)	
<a href="#">CHEM 3800</a>	Energy Use on Earth (3.0)	
<a href="#">CHEM 4030</a>	Radiochemistry (3.0)	
<a href="#">CHEM 4600</a>	Structure Determination (3.0)	
<a href="#">CHEM 4605</a>	Structure Determination Laboratory (1.0)	
<a href="#">CHEM 4800</a>	Pharmacology (3.0)	
<a href="#">CHEM 482R</a>	Chemistry Internship (1.0)	

# Chemistry

CHEM 489R	Undergraduate Research in Chemistry (1.0)	
CHEM 491R	Advanced Topics in Inorganic Chemistry (3.0)	
CHEM 495R	Advanced Topics in Organic Chemistry (3.0)	
CHEM 496R	Special Topics in Chemistry (3.0)	
CHEM 499R	Independent Study and Research (1.0)	
PHYS 2800	Introduction to Materials Physics (3.0)	
PHYS 3500	Thermodynamics (3.0)	
PHYS 4250	Nuclear Physics (3.0)	
PHYS 4510	Quantum Mechanics I (3.0)	
PHYS 4520	Quantum Mechanics II (3.0)	
PHYS 4800	Solid State Physics (3.0)	

## Graduation Requirements:

1. Completion of a minimum of 120 semester credits with a minimum of 40 upper-division credits.
2. Overall grade point average of 2.0 (C) or above with a minimum of 2.25 in Major.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. A minimum of 54 credit hours must be in the major with a minimum of 20 credits taken at UVU. A minimum of 28 chemistry credits must be upper-division.
6. Complete all chemistry and physics courses with a minimum grade of "C-" or better.
7. Successful completion of at least one Global/Intercultural course.

### Footnote:

1 To be taken with CHEM 1215 Principles of Chemistry I Laboratory	
2 To be taken with CHEM 1225 Principles of Chemistry II Laboratory	
3 To be taken with CHEM 1210 Principles of Chemistry I	
4 To be taken with CHEM 1220 Principles of Chemistry II	

## Chemistry Education, B.S.

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### Requirements

The degree in chemistry education prepares a student to teach chemistry in secondary education. Students that complete this degree receive endorsements to teach chemistry. Completion of this program is dependent upon being accepted into the Secondary Education program through the School of Education. There is a great demand for teachers in chemistry and employment opportunities are excellent.

In obtaining this degree, students will learn how to:  
 Use modern scientific instruments and interpret results  
 Apply principles used in chemistry to solve everyday problems  
 Think analytically  
 Use problem solving skills

Categorize information  
 Apply learned math skills  
 Develop laboratory skills

## Total Program Credits: 122

<b>Matriculation Requirements:</b>			
<ol style="list-style-type: none"> <li>1. Students are admitted directly to the Baccalaureate degree program in Chemistry Education upon acceptance to the Secondary Education Program.</li> <li>2. Students must obtain the departmental Advisor's signature on an approved program plan prior to enrollment in their second semester of study.</li> </ol>			
<b>Secondary Education Requirements:</b>			
<ol style="list-style-type: none"> <li>1. ACT exam minimums: Composite 21, English 20, Math 19; or SAT exam minimums: Critical Read /Math 1000, with Math and Reading scores of 450; or If student has a bachelor degree or higher, he/she does not need to meet this testing requirement.</li> <li>2. GPA of 3.0 or higher with no grade lower than a C in content area courses.</li> <li>3. Completion of all General Education requirements and the majority of content area courses.</li> <li>4. Pass LiveScan Criminal Background Check.</li> </ol>			
<b>General Education Requirements:</b>			<b>39 Credits</b>
	ENGL 1010	Introduction to Academic Writing	3
or	ENGL 1005	Literacies and Composition Across Context (5.0)	
	ENGL 2010	Intermediate Writing Academic Writing and Research	3
	MATH 1210	Calculus I	5
<b>Complete one of the following:</b>			<b>3</b>
	HIST 1700	American Civilization (3.0)	
	HIST 2700	US History to 1877 (3.0)	
and	HIST 2710	US History since 1877 (3.0)	
	HIST 1740	US Economic History (3.0)	
	POLS 1000	American Heritage (3.0)	
	POLS 1100	American National Government (3.0)	
<b>Complete the following:</b>			
	PHIL 2050	Ethics and Values	3
	HLTH 1100	Personal Health and Wellness (2.0)	
or	PES 1097	Fitness for Life	2
<b>Distribution Courses:</b>			
	Biology		3
	CHEM 1210	Principles of Chemistry I <sup>1</sup>	4
	CHEM 1220	Principles of Chemistry II <sup>2</sup>	4
	Humanities		3
	Fine Arts		3
	Social/Behavioral Science		3
<b>Discipline Core Requirements:</b>			<b>83 Credits</b>
<b>Chemistry Discipline Core Courses:</b>			
	CHEM 1215	Principles of Chemistry I Laboratory <sup>3</sup>	1
	CHEM 1225	Principles of Chemistry II Laboratory <sup>4</sup>	1
	CHEM 1250	Chemistry Cornerstone- Research and Careers	1

CHEM 2310	Organic Chemistry I	4
CHEM 2320	Organic Chemistry II	4
CHEM 2315	Organic Chemistry I Laboratory	1
CHEM 2325	Organic Chemistry II Laboratory	1
CHEM 3000	Analytical Chemistry	2
CHEM 3005	Analytical Chemistry Laboratory	2
CHEM 3060	Physical Chemistry I	4
CHEM 3065	Physical Chemistry I Laboratory	1
CHEM 3100	Advanced Inorganic Chemistry	4
CHEM 4200	Teaching Methods in Science	3
MATH 1220	Calculus II	5
PHYS 2210	Physics for Scientists and Engineers I	4
PHYS 2215	Physics for Scientists and Engineers I Lab	1
PHYS 2220	Physics for Scientists and Engineers II	4
PHYS 2225	Physics for Scientists and Engineers II Lab	1
CHEM 3600	Biological Chemistry	3
CHEM 4000	Instrumental Analysis WE	2
CHEM 4005	Instrumental Analysis Laboratory	2
Education Discipline Core Courses: Must be completed with a B- or higher		
EDEL 1010	Introduction to Education	2
EDSC 3000	Educational Psychology	3
EDSC 3250	Instructional Media	2
EDSC 4200	Classroom Management I	2
EDSC 4250	Classroom Management II	2
EDSC 4440	Content Area Literacies	3
EDSC 445G	Multicultural Instruction ESL	3
EDSC 455G	Secondary Curriculum Instruction and Assessment	3
EDSC 4850	Student Teaching--Secondary	8
EDSC 4990	Teacher Performance Assessment Project WE	2
EDSP 340G	Exceptional Students	2

1-To be taken with CHEM 1215 Principles of Chemistry I Laboratory

2-To be taken with CHEM 1225 Principles of Chemistry II Laboratory

3-To be taken with CHEM 1210 Principles of Chemistry I

4-To be taken with CHEM 1220 Principles of Chemistry II

#### **Graduation Requirements:**

1. Completion of a minimum of 122 semester credits with a minimum of 40 upper-division credits.
2. Overall Grade of 3.0 (B) or above with no grade lower than a C or better in major required content courses and no grade lower than a B- in Licensure and Methods courses.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. A minimum of 52 credit hours must be in the major with a minimum of 20 credits taken at UVU. A minimum of 24 chemistry and physics credits must be upper-division.
6. Complete all chemistry courses with a minimum grade of "C-" or better.
7. Successful completion of at least one Global/Intercultural course.

Footnote: