Chemistry

Name: Chemistry
Location: PS 230
Telephone: 801-863-6295
Email: hancocke@uvu.edu
Web Address: www.uvu.edu/chemistry/
Chair: Fern Caka

Mission Statement

The Chemistry Department is dedicated to providing a high quality chemistry education for the students at Utah Valley University. The department offers a wide variety of classes to support other departments and to provide excellent training leading to a Bachelor of Science in Chemistry or a Bachelor of Science in Chemistry/Physics Education. The chemistry faculty is committed to encouraging students to learn and to do research not only in their course work, but in their lifelong careers.

Chemistry

• Department Chair: Fern Caka
• Telephone: 801-863-8581
• Email: FernC@uvu.edu

• Administrative Support: Kellie D. Hancock
• Telephone: 801-863-6295
• Email: hancocke@uvu.edu

Advisors:
• TBA
• Office: PS 201
• Telephone: 801-863-5642
• Email:

Pre-Health Professions Counseling:

• Office: LC 402
• Telephone: 801-863-6484
• Email: prehealth@uvu.edu

Staff:

Lab Manager: Craig Moore
Lab Manager/Instructor, Inorganic Chemistry: Tom Strangfeld
Lab Manager/Instructor, Organic Chemistry: Marala Uluave
Manager, Central Stock Room: Keshar Tamrakar

Career Opportunities

Graduates with a bachelor degree in Chemistry will be prepared to work in industry or pursue a graduate degree in chemistry. Current employment opportunities for graduates in Chemistry programs are good.

Graduates with a bachelor degree in Chemistry Education will be prepared to teach chemistry in junior and senior high. Current employment opportunities for graduates from Chemistry Education programs are excellent.

Programs

Students may receive:
• Bachelor of Science in Chemistry with an Emphasis in Biochemistry
• Bachelor of Science in Chemistry with an Emphasis in Forensic Chemistry
• Bachelor of Science in Chemistry with an Emphasis in Professional Chemistry
• Bachelor of Science in Chemistry Education

Admission Requirements

A student who wants to pursue a chemistry major should meet with the department chair or chemistry advisor for advisement.

DEPARTMENT CHAIR
CAKA, Fern Associate Professor

FACULTY
BOND, Calvin A. Associate Professor
CAKA, Fern Associate Professor
CHAMBERLAND, Stephen Assistant Professor
EL EZZI, Asmahan Professor
GUNAWARDENA, Gamini U. Associate Professor
HALLING, Merrill Assistant Professor
HAM, Young W. Associate Professor
HOPOATE-SITAKE, Moana Lecturer
HORN, Matthew Associate Professor
LARICHEVA, Elena Lecturer
ROCKS, Sara Assistant Professor
SHURTLEFF, James K. Assistant Professor
THULIN, Craig Professor
WATEN, Mark D. Assistant Professor
WHITE, Lilia Lecturer
WILSON, Bruce E. Associate Professor
YU, Ming Assistant Professor

Degrees & Programs

Chemistry, Minor

Requirements

Total Program Credits: 27

Matriculation Requirements:
1. Admitted to a bachelor degree program at UVU.

Discipline Core Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CHEM 1210</td>
<td>Principles of Chemistry I</td>
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<td>CHEM 3000</td>
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<td>CHEM 3005</td>
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</table>

Elective Requirements:

Any upper-division chemistry class numbered above 3000 with a minimum of 3 credit hours 3

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Chemistry

Graduation Requirements:
1. Complete all courses with a minimum grade of "C-" or better.

Chemistry, Minor

Careers

Related Careers
- Natural Sciences Managers
- Chemists
- Chemistry Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

Chemistry - Biochemistry Emphasis, B.S.

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: 121

<table>
<thead>
<tr>
<th>General Education Requirements:</th>
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<td>ENGL 1010 Introduction to Writing</td>
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<td>ENGL 2020 Intermediate Writing--Science and Technology</td>
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<td>MATH 1210 Calculus I</td>
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<td>Complete one of the following:</td>
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<td>HIST 1700 American Civilization (3.0)</td>
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<td>HIST 2700 US History to 1877 (3.0)</td>
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<tr>
<td>and HIST 2710 US History since 1877 (3.0)</td>
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<td>HIST 1740 US Economic History (3.0)</td>
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<td>POLS 1000 American Heritage (3.0)</td>
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<td>POLS 1100 American National Government (3.0)</td>
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<td>Complete the following:</td>
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<td>PHIL 2050 Ethics and Values</td>
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<td>HLTH 1100 Personal Health and Wellness (2.0)</td>
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<td>or PES 1097 Fitness for Life</td>
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<td>Distribution Courses:</td>
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<td>Biology</td>
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<tr>
<td>or BIOL 1610 College Biology I (4.0) (Required for Forensic Chemistry and Biochemistry)</td>
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<td>CHEM 1210 Principles of Chemistry I (To be taken with CHEM 1215)</td>
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<td>Humanities</td>
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<td>Social/Behavioral Science</td>
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<td>Discipline Core Requirements:</td>
<td>46 Credits</td>
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<td>CHEM 1215 Principles of Chemistry I Laboratory (To be taken with CHEM 1210)</td>
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</table>

Emphasis Requirements: 16 Credits
- BIOL 1615 College Biology I Laboratory | 1 |
- BIOL 1620 College Biology II | 3 |
- BIOL 1625 College Biology II Laboratory | 1 |
- BIOL 3400 Cell Biology | 3 |
- BIOL 3405 Cell Biology Laboratory | 1 |
- CHEM 3090 Physical Chemistry Applications in Biology | 3 |
- CHEM 3115 Physical and Inorganic Chemistry Laboratory | 1 |
- CHEM 3620 Biological Chemistry II | 3 |

Emphasis Elective Requirements: 20 Credits
- One Upper-division (3000 and above) Chemistry course except CHEM 3060 and CHEM 3070 | 3 |
- A minimum of 17 credits from the following: | 17 |
- 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) | |
- 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) | |
Course Catalog 2017-2018

ZOOL 4300  Histology (4.0)
CHEM 496R  Special Topics in Chemistry (1.0)

Graduation Requirements:
1. Completion of a minimum of 121 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 grade of "C" or better.
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.

Chemistry - Biochemistry Emphasis, B.S.

Related Careers
• Natural Sciences Managers
• Chemists
• Chemistry Teachers, Postsecondary
• Secondary School Teachers, Except Special and Career/Technical Education

Chemistry - Forensic Chemistry Emphasis, B.S.

Requirements
The Forensic Chemistry emphasis prepares a student for work in a forensic laboratory. A forensic chemist is a professional chemist who analyzes evidence that is brought in from crime scenes and reaches a conclusion based on tests run on that piece of evidence. Classes deal with fingerprint and bloodstain pattern analysis, chemical trace analysis, impression evidence, etc. as well as criminal law.

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: 125

General Education Requirements: 39 Credits
ENGL 1010  Introduction to Writing 3
ENGL 2020  Intermediate Writing--Science and Technology 3
MATH 1210  Calculus I 5
Complete one of the following: 3
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)
Complete the following:
PHIL 2050  Ethics and Values 3
HLTH 1100  Personal Health and Wellness (2.0)
or PES 1097  Fitness for Life 2

Distribution Courses:
Biology 3
or BIOL 1610  College Biology I (4.0) (Required for Forensic Chemistry and Biochemistry)
CHEM 1210  Principles of Chemistry I (To be taken with CHEM 1215) 4
CHEM 1220  Principles of Chemistry II (To be taken with CHEM 1225) 4

Fine Arts 3
COMM 1020  Public Speaking 3
CJ 1010  Introduction to Criminal Justice 3

Discipline Core Requirements: 46 Credits
CHEM 1215  Principles of Chemistry I Laboratory (To be taken with CHEM 1210) 1
CHEM 1225  Principles of Chemistry II Laboratory (To be taken with CHEM 1220) 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 3100  Advanced Inorganic Chemistry 4
CHEM 3600  Biological Chemistry 3
CHEM 3605  Biochemistry Laboratory 1
CHEM 4000  Instrumental Analysis 2
CHEM 4005  Instrumental Analysis Laboratory 2
CHEM 4920  Chemistry Capstone I 1
CHEM 4930  Chemistry Capstone II 1
CHEM 4940  Chemistry Capstone III 1
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: 31 Credits
Biol 1615  College Biology I Laboratory 1
CHEM 3090  Physical Chemistry Applications in Biology 3
CHEM 3700  Forensic Analytical Chemistry 3
STAT 2040  Principles of Statistics 4

Forensic Requirements:
CHEM 482R Chemistry Internship 3

CJ 1330 Criminal Law 3
CJ 1340 Criminal Investigations 3
CJ 1350 Introduction to Forensic Science 3
CJ 2350 Laws of Evidence 3
FSCI 3880 Expert Witness Professional Practices 3

Complete one of the following: 2

- BIOL 2500 Environmental Biology (3.0)
- BIOL 3650 Biotechnology (2.0)
- MICR 2060 Microbiology for Health Professions (3.0)
and
- MICR 2065 Microbiology for Health Professions Laboratory (1.0)

and

- 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)

Emphasis Elective Requirements: 9 Credits

Complete 9 credits from the following recommended courses: 9

- BIOL 3400 Cell Biology (3.0)
- BIOL 3500 Genetics (3.0)
- BIOL 3550 Molecular Biology (3.0)
- BIOL 4450 Immunology (3.0)
- MICR 3450 General Microbiology (3.0)
and
- MICR 3455 General Microbiology Laboratory (1.0)
- GEO 3400 Forensic Geology (4.0)
- FSCI 3400 Criminalistics (3.0)
- FSCI 3500 Footwear Impression Evidence (3.0)
- FSCI 3520 Tire Imprint Evidence (3.0)
- FSCI 3540 Forensic Trace Analysis I (3.0)
- FSCI 3550 Forensic Trace Analysis II (3.0)
- FSCI 3700 Fingerprint Examination I (3.0)
- FSCI 3720 Fingerprint Examination II (3.0)
- FSCI 3740 Fingerprint Examination III (3.0)
- FSCI 3780 Bloodstain Pattern Analysis (3.0)
- FSCI 3800 Computer Forensics and Cyber Crime (3.0)
- FSCI 3820 Crime Scene Investigation Techniques I (3.0)
- FSCI 382L Crime Scene Investigation Techniques Laboratory I (1.0)
- FSCI 3850 Marijuana Identification Certificate (3.0)
- FSCI 3860 Forensic Microscopy (3.0)
- FSCI 4400 Forensic Chemistry (3.0)
- CHEM 496R Special Topics in Chemistry (1.0)

Or other Courses in consultation with the Department Academic Advisor

Graduation Requirements:

1. Completion of a minimum of 125 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.

Chemistry - Forensic Chemistry Emphasis, B.S.

Related Careers

- Natural Sciences Managers
- Chemists
- Chemistry Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

Chemistry - Professional Chemistry Emphasis, B.S.

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: 121

General Education Requirements: 39 Credits

- ENGL 1010 Introduction to Writing 3
- ENGL 2020 Intermediate Writing--Science and Technology 3
- MATH 1210 Calculus I 5

Complete one of the following: 3

- 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)

Complete the following:

- PHIL 2050 Ethics and Values 3
- HLTH 1100 Personal Health and Wellness (2.0)
Chemistry

Emphasis Requirements:

Distribution Courses:

- Biology
- or BIOL 1610 College Biology I (4.0) (Required for Forensic Chemistry and Biochemistry)
- CHEM 1210 Principles of Chemistry I (To be taken with CHEM 1215)
- CHEM 1220 Principles of Chemistry II (To be taken with CHEM 1225)
- Fine Arts
- Humanities
- Social/Behavioral Science

Discipline Core Requirements: 46 Credits

- CHEM 1215 Principles of Chemistry I Laboratory (To be taken with CHEM 1210)
- CHEM 1225 Principles of Chemistry II Laboratory (To be taken with CHEM 1225)
- CHEM 2310 Organic Chemistry I
- CHEM 2315 Organic Chemistry I Laboratory
- CHEM 2320 Organic Chemistry II
- CHEM 2325 Organic Chemistry II Laboratory
- CHEM 3000 Analytical Chemistry
- CHEM 3005 Analytical Chemistry Laboratory
- CHEM 3100 Advanced Inorganic Chemistry
- CHEM 3600 Biological Chemistry
- CHEM 3605 Biochemistry Laboratory
- CHEM 4000 Instrumental Analysis
- CHEM 4005 Instrumental Analysis Laboratory
- CHEM 4920 Chemistry Capstone I
- CHEM 4930 Chemistry Capstone II
- CHEM 4940 Chemistry Capstone III
- MATH 1220 Calculus II
- PHYS 2210 Physics for Scientists and Engineers I
- PHYS 2220 Physics for Scientists and Engineers II
- PHYS 2215 Physics for Scientists and Engineers I Lab
- PHYS 2225 Physics for Scientists and Engineers II Lab

Emphasis Requirements: 36 Credits

- CHEM 3060 Physical Chemistry I
- CHEM 3070 Physical Chemistry II
- CHEM 3115 Physical and Inorganic Chemistry Laboratory
- MATH 2210 Calculus III
- MATH 2280 Ordinary Differential Equations
- PHYS 3300 Mathematical Physics

Complete 18 credits of upper-division CHEM courses not previously taken, with the exception of CHEM 3090. With departmental approval, up to 6 credits of upper-division courses in BIOL, GEO, MATH, or PHYS may be substituted.

Graduation Requirements:

1. Completion of a minimum of 121 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.

Chemistry - Professional Chemistry Emphasis, B.S.

Related Careers

- Natural Sciences Managers
- Chemists
- Chemistry Teachers, Postsecondary
- Secondary School Teachers, Except Special and Career/Technical Education

Chemistry Education, B.S.

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
- Develop laboratory skills

Total Program Credits: 124

Matriculation Requirements:

1. Students are admitted directly to the Baccalaureate degree program in Chemistry Education upon acceptance to the Secondary Education Program.
2. Students must obtain the departmental Advisor's signature on an approved program plan prior to enrollment in their second semester of study.

Secondary Education Requirements:

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.
2. GPA of 3.0 or higher with no grade lower than a C in content area courses.
3. Completion of all General Education requirements and the majority of content area courses.
4. Pass group interview directed by the Secondary Teacher Education Department.
5. Pass LiveScan Criminal Background Check.

General Education Requirements: 39 Credits
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 1010</td>
<td>Introduction to Writing</td>
<td>3</td>
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<td>ENGL 2020</td>
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<td>HIST 1700</td>
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<td>Secondary Curriculum Instruction and Assessment</td>
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</tr>
<tr>
<td>EDSC 4850</td>
<td>Student Teaching--Secondary</td>
<td>10</td>
</tr>
<tr>
<td>EDSP 3400</td>
<td>Exceptional Students</td>
<td>2</td>
</tr>
<tr>
<td>Graduation Requirements:</td>
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<tr>
<td>1. Completion of a minimum of 124 semester credits with a minimum of 40 upper-division credits.</td>
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<tr>
<td>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.</td>
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<tr>
<td>3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.</td>
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<td>4. Completion of GE and specified departmental requirements.</td>
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<tr>
<td>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.</td>
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<tr>
<td>6. Successful completion of at least one Global/Intercultural course.</td>
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</tbody>
</table>

**Chemistry Education, B.S.**

**Careers**

- Chemistry Teachers, Postsecondary
- Education Teachers, Postsecondary
- Middle School Teachers, Except Special and Career/Technical Education
- Secondary School Teachers, Except Special and Career/Technical Education