

## 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 |
|  | 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          |
| 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:  |                           |  | 3          |
|  | PHIL 2050                 | Ethics and Values                                  |            |
| or   | PHIL 205G                 | Ethics and Values                                  |            |
| or   | PHIL 205H                 | Ethics and Values                                  |            |
|  | HLTH 1100                 | Personal Health and Wellness (2.0)                 |            |
| or   | PES 1097                  | Fitness for Life                                   | 2          |
| Distribution Courses:  |                           |  |            |
|  | BIOL 1610                 | College Biology I                                  | 4          |
|  | CHEM 1210                 | Principles of Chemistry I <sup>1</sup>             | 4          |
|  | CHEM 1220                 | Principles of Chemistry II <sup>2</sup>            | 4          |
|  | 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)                 |            |

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|     |                           |   |  |
|-----|---------------------------|---|--|
|     | <a href="#">BIOL 3500</a> | Genetics (3.0)                                  |  |
|     | <a href="#">BIOL 3515</a> | Advanced Genetics Laboratory (1.0)              |  |
|     | <a href="#">BIOL 3550</a> | Molecular Biology (3.0)                         |  |
|     | <a href="#">BIOL 4300</a> | Bioinformatics and Genome Analysis (4.0)        |  |
|     | <a href="#">BIOL 4450</a> | Immunology (3.0)                                |  |
|     | <a href="#">BIOL 4455</a> | Immunology Laboratory (1.0)                     |  |
|     | <a href="#">BIOL 4550</a> | Molecular Evolution and Bioinformatics WE (3.0) |  |
|     | <a href="#">MICR 3450</a> | General Microbiology (3.0)                      |  |
|     | <a href="#">MICR 3455</a> | General Microbiology Laboratory (1.0)           |  |
|     | <a href="#">ZOO 2320</a>  | Human Anatomy (3.0)                             |  |
| and | <a href="#">ZOO 2325</a>  | Human Anatomy Laboratory (1.0)                  |  |
|     | <a href="#">ZOO 2420</a>  | Human Physiology (3.0)                          |  |
| and | <a href="#">ZOO 2425</a>  | Human Physiology Laboratory (1.0)               |  |
|     | <a href="#">ZOO 4300</a>  | Histology (4.0)                                 |  |
|     | <a href="#">ZOO 4700</a>  | Advanced Anatomy (4.0)                          |  |
|     | <a href="#">ZOO 4780</a>  | 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 <a href="#">CHEM 1215</a> | Principles of Chemistry I Laboratory  |
| 2-To be taken with <a href="#">CHEM 1225</a> | Principles of Chemistry II Laboratory |
| 3-To be taken with <a href="#">CHEM 1210</a> | Principles of Chemistry I             |
| 4-To be taken with <a href="#">CHEM 1220</a> | Principles of Chemistry II            |

## Chemistry - Biochemistry Emphasis, B.S. Graduation Plan

This graduation plan is a sample plan and is intended to be a guide. Your specific plan may differ based on your Math and English placement and/or transfer credits applied. You are encouraged to meet with an advisor and set up an individualized graduation plan in [Wolverine Track](#).

Milestone courses (pre-requisites for a course in one of the subsequent semesters) are marked in red and italicized.

| Semester 1   | Course Title                                   | Credit Hours |
|--|--|--------------|
| <i>ENGL 1010</i>   | Introduction to Academic Writing               | 3            |
| <i>MATH 1210</i>   | Calculus I*                                    | 5            |
| You Choose   | American Institutions                          | 3            |
| You Choose   | Fine Arts                                      | 3            |
| You Choose   | Social/Behavioral Science                      | 3            |
|  | Semester total:                                | 17           |
| Note: *MATH 1050 and MATH 1060 are not required for the major but are often completed as necessary pre-requisites for MATH 1210.   |  |              |
| Semester 2   | Course Title                                   | Credit Hours |
| <i>BIOL 1610</i>   | College Biology I                              | 4            |
| <i>BIOL 1615</i>   | College Biology I Lab                          | 1            |
| <i>CHEM 1210</i>   | Principles of Chemistry I                      | 4            |
| <i>CHEM 1215</i>   | Principles of Chemistry I Lab                  | 1            |
| <i>MATH 1220</i>   | Calculus II                                    | 5            |
| <i>ENGL 2010</i>   | Intermediate Writing                           | 3            |
|  | Semester total:                                | 18           |
| Semester 3   | Course Title                                   | Credit Hours |
| <i>PHYS 2210</i>   | Physics for Scientists and Engineers I         | 4            |
| <i>PHYS 2215</i>   | Physics for Scientists and Engineers I Lab     | 1            |
| <i>CHEM 1220</i>   | Principles of Chemistry II                     | 4            |
| <i>CHEM 1225</i>   | Principles of Chemistry II Lab                 | 1            |
| You Choose   | Humanities                                     | 3            |
|  | Semester total:                                | 13           |
| Semester 4   | Course Title                                   | Credit Hours |
| <i>CHEM 2310</i>   | Organic Chemistry I                            | 4            |
| <i>CHEM 2315</i>   | Organic Chemistry I Lab                        | 1            |
| <i>PHYS 2220</i>   | Physics for Scientists and Engineers II        | 4            |
| <i>PHYS 2225</i>   | Physics for Scientists and Engineers II Lab    | 1            |
| You Choose   | Fitness for Life or Personal Health & Wellness | 2            |
| You Choose   | Biology Electives **                           | 4            |
|  | Semester total:                                | 16           |
| Note:**Choose from BIOL 3300, BIOL 3500, BIOL 3515, BIOL 3550, BIOL 3650, BIOL 4450, BIOL 4455, BIOL 4550, MICR 3450, MICR 3455, ZOOL 2320, ZOOL 2325, ZOOL 2420, ZOOL 2425, ZOOL 4300, ZOOL 4700, or ZOOL 4780. |  |              |
| Semester 5   | Course Title                                   | Credit Hours |

| <i>CHEM 2320</i>   | Organic Chemistry II                        | 4            |
|--|---|--------------|
| <i>CHEM 2325</i>   | Organic Chemistry II Lab                    | 1            |
| <i>CHEM 1250</i>   | Chemistry Cornerstone- Research and Careers | 1            |
| <i>PHIL 205G</i>   | Ethics and Values                           | 3            |
| You Choose   | Biology Electives **                        | 4            |
|  | Semester total:                             | 13           |
| Note:**Choose from BIOL 3300, BIOL 3500, BIOL 3515, BIOL 3550, BIOL 3650, BIOL 4450, BIOL 4455, BIOL 4550, MICR 3450, MICR 3455, ZOOL 2320, ZOOL 2325, ZOOL 2420, ZOOL 2425, ZOOL 4300, ZOOL 4700, or ZOOL 4780. |   |              |
| Note:** Choose from CHEM 3020, 3025, 3300, 3800, 4030, 4600, 4605, 4800, 482R, 489R, 495R, 496R or 499R.   |   |              |
| Semester 6   | Course Title                                | Credit Hours |
| <i>BIOL 3400</i>   | Cell Biology                                | 3            |
| <i>BIOL 3405</i>   | Cell Biology Lab                            | 1            |
| <i>CHEM 1260</i>   | Chemistry Cornerstone- Ethics               | 1            |
| <i>CHEM 3000</i>   | Analytical Chemistry                        | 2            |
| <i>CHEM 3005</i>   | Analytical Chemistry Lab                    | 2            |
| <i>CHEM 3600</i>   | Biological Chemistry                        | 3            |
| <i>CHEM 3605</i>   | Biological Chemistry Lab                    | 1            |
| You Choose   | Biology Electives **                        | 3            |
|  | Semester total:                             | 16           |
| Note:**Choose from BIOL 3300, BIOL 3500, BIOL 3515, BIOL 3550, BIOL 3650, BIOL 4450, BIOL 4455, BIOL 4550, MICR 3450, MICR 3455, ZOOL 2320, ZOOL 2325, ZOOL 2420, ZOOL 2425, ZOOL 4300, ZOOL 4700, or ZOOL 4780. |   |              |
| Note:** Choose from CHEM 3020, 3025, 3300, 3800, 4030, 4600, 4605, 4800, 482R, 489R, 495R, 496R or 499R.   |   |              |
| Semester 7   | Course Title                                | Credit Hours |
| <i>CHEM 3060</i>   | Physical Chemistry I                        | 4            |
| <i>CHEM 3065</i>   | Biological Chemistry Lab                    | 1            |
| <i>CHEM 3100</i>   | Advanced Inorganic Chemistry                | 4            |
| <i>CHEM 3115</i>   | Advanced Inorganic Chemistry Lab            | 1            |
| You Choose   | Upper-Division Chemistry Electives ***      | 4            |
|  | Semester total:                             | 14           |
| Note: ** Choose from CHEM 3020, 3025, 3300, 3800, 4030, 4600, 4605, 4800, 482R, 489R, 495R, 496R or 499R.  |   |              |
| Semester 8   | Course Title                                | Credit Hours |
| <i>CHEM 3620</i>   | Biological Chemistry II                     | 3            |
| <i>CHEM 4000</i>   | Instrumental Analysis WE                    | 2            |
| <i>CHEM 4005</i>   | Instrumental Analysis Lab                   | 2            |
| You Choose   | Upper-Division Chemistry Electives ***      | 6            |
|  | Semester total:                             | 13           |
|  | Degree total:                               | 120          |