

BACHELOR OF SCIENCE IN BIOCHEMISTRY (PRE-HEALTH MAJORS)

Web Site: <https://twu.edu/chemistry-biochemistry/undergraduate-programs/bs-in-biochemistry-for-pre-health-majors/>

This degree prepares students for graduate work in biochemistry, for careers in the chemical/pharmaceutical industries, and is ideal for admission to medically-related professional programs. This degree offers flexibility for students in the upper-division courses so they can tailor their program to their individual professional goals. For those more interested in medically related programs, students would choose upper-division biology courses, whereas those more interested in graduate work in biochemistry would choose upper-division chemistry courses.

Marketable Skills

Defined by the Texas Higher Education Coordinating Board's 60x30 Strategic Plan (<https://reportcenter.highered.texas.gov/agency-publication/miscellaneous/the60x30-strategic-plan/>) as, "Those skills valued by employers that can be applied in a variety of work settings, including interpersonal, cognitive, and applied skills areas. These skills can be either primary or complementary to a major and are acquired by students through education, including curricular, co-curricular, and extracurricular activities."

- As a member of an undergraduate teaching lab team and research team, you will learn how to work and communicate with diverse team members.
- By writing laboratory reports, papers, senior theses coupled with presenting your work to your peers, at conferences, or to the general public, you will gain valuable verbal and written communication skills.
- With our departmental focus on civic engagement and laboratory safety as our first priority, you will understand social and personal responsibility.
- Finally, since earning a degree in any field of chemistry naturally requires excellent problem solving and critical thinking skills related to chemistry, these skills can also be used to address other issues and solve other problems.

Admissions

All applicants must meet the general undergraduate admission requirements (<http://catalog.twu.edu/undergraduate/admission-information/>).

Degree Requirements

Total Semester Credit Hours (SCH): 120

Major: 34 SCH

Program Code: BIOCHEMISTRY.BS.HLTH; **CIP Code:** 26.0202.00

Texas Core Curriculum

| Code | Title | SCHs |
|-------------|----------------|------|
| ENG 1013 | Composition I | 3 |
| ENG 1023 | Composition II | 3 |
| Mathematics | | 3 |

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|--|---|-----------|
| Life & Physical Sciences | | 6 |
| Language, Philosophy, & Culture | | 3 |
| Creative Arts | | 3 |
| HIST 1013 | History of the United States, 1492-1865 | 3 |
| HIST 1023 | History of the United States, 1865 to the Present | 3 |
| POLS 2013 | U.S. National Government | 3 |
| POLS 2023 | Texas Government | 3 |
| Social & Behavioral Sciences | | 3 |
| CAO: Women's Studies | | 3 |
| CAO: First Year Seminar, Wellness or Mathematics | | 3 |
| Total SCHs | | 42 |

Courses Required for Major

| Code | Title | SCHs |
|-----------------------|--|-----------|
| CHEM 1001 | Horizons of Chemistry and Biochemistry I: Career Possibilities | 1 |
| CHEM 1101 | Horizons of Chemistry and Biochemistry II: Current Applications | 1 |
| CHEM 1213 & CHEM 1211 | Principles of Chemistry I and Principles of Chemistry Laboratory I | 4 |
| CHEM 1223 & CHEM 1221 | Principles of Chemistry II and Principles of Chemistry Laboratory II | 4 |
| CHEM 2213 & CHEM 2211 | Organic Chemistry I and Organic Chemistry Laboratory I | 4 |
| CHEM 3223 & CHEM 3221 | Organic Chemistry II and Organic Chemistry Laboratory II | 4 |
| CHEM 3313 | Physical Chemistry for the Life Sciences | 3 |
| CHEM 3633 & CHEM 3632 | Biochemistry I and Biochemistry I Laboratory | 5 |
| CHEM 3333 & CHEM 3331 | Quantitative Chemical Analysis and Quantitative Chemical Analysis Laboratory | 4 |
| CHEM 3643 | Biochemistry II | 3 |
| CHEM 4001 | Research Presentations in Chemistry and Biochemistry | 1 |
| Total SCHs | | 34 |

Departmental Requirements

| Code | Title | SCHs |
|-----------------------------|---|------|
| MATH 2014 | Calculus I | 4 |
| MATH 2024 | Calculus II | 4 |
| BIOL 1113 & BIOL 1111 | Principles of Biology I and Principles of Biology I Laboratory | 4 |
| BIOL 1123 & BIOL 1121 | Principles of Biology II and Principles of Biology II Laboratory | 4 |
| PHYS 2153 & PHYS 2151 | General Physics I and General Physics Laboratory I (may be applied from core) | 4 |
| PHYS 2163 & PHYS 2161 | General Physics II and General Physics Laboratory II (may be applied from core) | 4 |
| Choose one of the following | | 4 |
| BIOL 4223 & BIOL 4221 | Ecology and Ecology Laboratory | |

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|--------------------------|---|-----------|
| BIOL 4823 & BIOL 4821 | Molecular and Cellular Biology: Genetics and Inheritance and Molecular and Cellular Biology: Genetics and Inheritance Laboratory | |
| BIOL 4813 & BIOL 4811 | Molecular and Cellular Biology: Gene Expression and Molecular and Cellular Biology: Gene Expression Laboratory | |
| BACT 3113 & BACT 3111 | General Microbiology and General Microbiology Laboratory | |
| ZOOL 4243 & ZOOL 4241 | Medical Physiology and Medical Physiology Laboratory | |
| Total SCHs | | 28 |

Electives

| Code | Title | SCHs |
|--|---|--------------|
| Choose 16-17 SCH not already taken | | 16-17 |
| Global Perspectives Course (see advisor for selection) | | |
| CHEM 3413 & CHEM 3411 | Physical Chemistry I and Physical Chemistry Laboratory I | |
| CHEM 3423 & CHEM 3421 | Physical Chemistry II and Physical Chemistry Laboratory II | |
| CHEM 4983 | Undergraduate Research | |
| CHEM 4313 & CHEM 4311 | Instrumental Analysis and Instrumental Analysis Laboratory | |
| CHEM 4513 & CHEM 4511 | Inorganic Chemistry and Inorganic Chemistry Laboratory | |
| CHEM 4913 | Independent Study | |
| BIOL 4223 & BIOL 4221 | Ecology and Ecology Laboratory | |
| BIOL 4823 & BIOL 4821 | Molecular and Cellular Biology: Genetics and Inheritance and Molecular and Cellular Biology: Genetics and Inheritance Laboratory | |
| BIOL 4813 & BIOL 4811 | Molecular and Cellular Biology: Gene Expression and Molecular and Cellular Biology: Gene Expression Laboratory | |
| BACT 3113 & BACT 3111 | General Microbiology and General Microbiology Laboratory | |
| ZOOL 4243 & ZOOL 4241 | Medical Physiology and Medical Physiology Laboratory | |
| CHEM 3713 & CHEM 3711 | Environmental Chemistry I and Environmental Chemistry Laboratory I | |
| Total SCHs | | 16-17 |

Recommended Plan of Study

First Year

| Fall | TCCN | SCHs |
|--------------------------|---|------|
| CHEM 1001 | Horizons of Chemistry and Biochemistry I: Career Possibilities | 1 |
| CHEM 1213 & CHEM 1211 | Principles of Chemistry I and Principles of Chemistry Laboratory I | 4 |
| MATH 2014 | Calculus I | 4 |

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|--------------------------|---|---------------------------------------|---|
| BIOL 1113 & BIOL 1111 | Principles of Biology I and Principles of Biology I Laboratory | BIOL 1406 & BIOL 1106 | 4 |
| UNIV 1231 | Learning Frameworks: The First Year Experience | EDUC 1100, EDUC 1200, EDUC 1300 | 1 |
| Wellness/Math CAO Core | | | 2 |

SCHs 16

| Spring | | TCCN | |
|--|--|-----------------------|---|
| CHEM 1101 | Horizons of Chemistry and Biochemistry II: Current Applications | | 1 |
| CHEM 1223 & CHEM 1221 | Principles of Chemistry II and Principles of Chemistry Laboratory II | | 4 |
| MATH 2024 or 4013 | Calculus II or Probability and Statistics | MATH 2414 | 4 |
| BIOL 1123 & BIOL 1121 | Principles of Biology II and Principles of Biology II Laboratory | BIOL 1407 & BIOL 1107 | 4 |
| Multicultural Women's Studies CAO Core | | | 3 |

SCHs 16

| Second Year | | | |
|--|---|-------------|---|
| Fall | | TCCN | |
| CHEM 2213 | Organic Chemistry I | CHEM 2323 | 4 |
| & CHEM 2211 and Organic Chemistry Laboratory I | | & CHEM 2123 | |
| PHYS 2153 | General Physics I | PHYS 2325 | 4 |
| & PHYS 2151 and General Physics Laboratory I | | & PHYS 2125 | |
| HIST 1013 | History of the United States, 1492-1865 | HIST 1301 | 3 |
| ENG 1013 | Composition I | ENGL 1301 | 3 |

SCHs 14

| Spring | | TCCN | |
|---|--------------------------------|-------------|---|
| CHEM 3223 | Organic Chemistry II | | 4 |
| & CHEM 3221 and Organic Chemistry Laboratory II | | | |
| PHYS 2163 | General Physics II | PHYS 2326 | 4 |
| & PHYS 2161 and General Physics Laboratory II | | & PHYS 2126 | |
| ENG 1023 | Composition II | ENGL 1302 | 3 |
| CHEM 3333 | Quantitative Chemical Analysis | | 4 |
| & CHEM 3331 and Quantitative Chemical Analysis Laboratory | | | |

SCHs 15

| Third Year | | |
|---|-----------|------|
| Fall | | TCCN |
| CHEM 3633 Biochemistry I & CHEM 3632 and Biochemistry I Laboratory | | 5 |
| BIOL 3XXX or 4XXX | | 4 |
| POLS 2013 U.S. National Government | GOVT 2305 | 3 |
| Elective | | 4 |

SCHs 16

| Spring | | TCCN |
|-----------|--|------|
| CHEM 3313 | Physical Chemistry for the Life Sciences | 3 |
| CHEM 3643 | Biochemistry II | 3 |
| CHEM 4983 | Undergraduate Research | 3 |

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| Elective (Global Perspectives course) | | | 3 |
| POLS 2023 | Texas Government | GOVT 2306 | 3 |
| SCHs | | | 15 |
| Fourth Year | | | |
| Fall | | TCCN | |
| Elective | | | 3 |
| CHEM 4983 | Undergraduate Research | | 3 |
| Creative Arts Core | | | 3 |
| Language, Philosophy, and Culture Core | | | 3 |
| Elective | | | 2 |
| SCHs | | | 14 |
| Spring | | TCCN | |
| CHEM 4001 | Research Presentations in Chemistry and Biochemistry | | 1 |
| HIST 1023 | History of the United States, 1865 to the Present | HIST 1302 | 3 |
| Elective - Upper Level | | | 4 |
| Elective | | | 3 |
| Social & Behavioral Science Core | | | 3 |
| SCHs | | | 14 |
| Total SCHs: | | | 120 |