BACHELOR OF SCIENCE IN BIOCHEMISTRY

The Bachelor of Science degree in Biochemistry is recommended for those students interested in integrating the subjects of biology and chemistry. The cross-disciplinary nature of the degree provides students with a good foundation for careers in research and development in the private sector and in academia. Many will continue their education in graduate schools or in health related fields such as medicine, dentistry, or pharmacy.

For further information, please see the Chemical Sciences (http://catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-chemistry/#text) overview page.

### COURSE TITLE S.H.

**FIRST YEAR REQUIREMENT - STUDENT SUCCESS**

YSU 1500 Success Seminar 1-2

or SS 1500 Strong Start Success Seminar 1-2

or HONR 1500 Intro to Honors 1-2

**General Education Requirements**

ENGL 1550 Writing 1 3-4

or ENGL 1549 Writing 1 with Support 3-4

ENGL 1551 Writing 2 3

CMST 1545 Communication Foundations 3

Mathematics requirement (met with MATH in major) 3

Some courses are categorized in more than one Knowledge Domain. Courses can only be used once within the GE model.

### Arts and Humanities (6 s.h.)

6

### Natural Sciences (2 courses, 1 with lab)

This requirement is met through courses in the major

Social Science (6 s.h.) 6

Social and Personal Awareness (6 s.h.) 6

**The following CHEM core courses are required:**

CHEM 1515 & 1515L General Chemistry 1 and General Chemistry 1 Laboratory 4

CHEM 1515R Recitation for General Chemistry 1 1

CHEM 1516 & 1516L General Chemistry 2 and General Chemistry 2 Laboratory 4

CHEM 1516R Recitation for General Chemistry 2 1

CHEM 2604 & 2604L Quantitative Analysis and Quantitative Analysis Laboratory 5

CHEM 3719 & 3719L Organic Chemistry 1 and Organic Chemistry 1 Laboratory 4

CHEM 3719R Organic Chemistry Recitation 1 1

CHEM 3720 & 3720L Organic Chemistry 2 and Organic Chemistry 2 Laboratory 4

CHEM 3720R Organic Chemistry Recitation 2 1

CHEM 3739 & 3739L Physical Chemistry 1 and Physical Chemistry 1 Laboratory 4

CHEM 3785 Biochemistry 1 3

CHEM 3785L Biochemistry Laboratory 1

CHEM 3786 Biochemistry 2 3

CHEM 4850 Chemistry Research 1

CHEM 4850L Chemistry Research Laboratory 2

CHEM 5876 Enzyme Analysis 2

Select 10 s.h. in upper-level CHEM electives from the list below. At least one elective must be a laboratory course or include a laboratory component:

CHEM 3729 Inorganic Chemistry

CHEM 3764 Chemical Toxicology

CHEM 4850L Chemistry Research Laboratory

CHEM 4891 Special Topics

CHEM 5804 Chemical Instrumentation & 5804L and Chemical Instrumentation Laboratory

CHEM 5821 Intermediate Organic Chemistry & 5821L

CHEM 5822 Advanced Organic Laboratory & 5822L and Advanced Organic Laboratory


**The following BIOL core courses are required (14 s.h.):**

BIOL 2601 General Biology: Molecules and Cells 4

& 2601L and General Biology: Molecules and Cells Laboratory 4

BIOL 3702 Microbiology 4

& 3702L and Microbiology Laboratory 4

BIOL 3711 Cell Biology: Fine Structure 3

BIOL 3721 Genetics 3

At least 3 s.h. in upper-level BIOL courses required from the list below; 5 s.h. recommended if needed to attain 120 s.h. required for graduation.

BIOL 4800 Bioinformatics & 4800L and Bioinformatics Laboratory

BIOL 4801 Environmental Microbiology & 4801L and Environmental Microbiology Laboratory

BIOL 4829 Microbial Physiology

BIOL 4836 Cell Biology: Molecular Mechanisms & 4836L and Cell Biology: Molecular Mechanisms Laboratory

BIOL 4837 Cell Biology: Protein Biology Laboratory

BIOL 4890 Molecular Genetics

BIOL 4890L Molecular Genetics Laboratory

BIOL 5840 Advanced Microbiology

**The following support courses are required (22 s.h.):**

MATH 1571 Calculus 1 4

MATH 1572 Calculus 2 4

STAT 3717 Statistical Methods 4

or STAT 3743 Probability and Statistics 4

PHYS 2610 General Physics 1 4

PHYS 2610L General Physics Laboratory 1 4

PHYS 2611 General Physics 2 4

PHYS 2611L General Physics laboratory 2 1

Total Semester Hours 120-122

**Year 1**

**Fall** S.H.

YSU 1500 Success Seminar 1

CHEM 1515 & 1515L General Chemistry 1 and General Chemistry 1 Laboratory 4

CHEM 1515R Recitation for General Chemistry 1 1

MATH 1571 Calculus 1 4

ENGL 1550 Writing 1 or ENGL 1549 Writing 1 with Support 3-4

Semester Hours 13-14

**Spring**

CHEM 1516 & 1516L General Chemistry 2 and General Chemistry 2 Laboratory 4

CHEM 1516R Recitation for General Chemistry 2 1

MATH 1572 Calculus 2 4
Learning Outcomes

The undergraduate student learning outcomes for the major in biochemistry are as follows:

• Undergraduate students will demonstrate an understanding of the fundamentals of chemistry and biochemistry.
• Undergraduate students will demonstrate independent and critical thinking.
• Undergraduate students will demonstrate an understanding of the fundamentals of modern chemical instrumentation.
• Undergraduate students will be able to interpret experimental data.
• Undergraduate students will effectively communicate their ideas both orally and in writing.