# BACHELOR OF SCIENCE IN BIOCHEMISTRY BACCMED TRACK

The Bachelor of Science degree in Biochemistry, BaccMed track, is specifically designed for students interested in seeking careers as physicians. The cross-disciplinary nature of the degree provides a student with a good foundation in the sciences, psychology, sociology, and public health. The student will not only be well prepared for the rigors of medical school, but he or she will also be aware of the issues facing health care professionals as well as be better able to deal with a diverse population.

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

## Learning Outcomes

The learning objectives for the major in Biochemistry, BaccMed Track 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.

| COURSE | TITLE | S.H. |
|---|---|---|
| **FIRST YEAR REQUIREMENT -STUDENT SUCCESS** | | |
| HONR 1500 | Intro to Honors | 1 |
| HONR 2601P | Honor Seminar Campus Community Partnerships | 1 |
| **General Education Requirements** | | |
| ENGL 1550 | Writing 1 | 3 |
| ENGL 1551 | Writing 2 | 3 |
| Mathematics requirement included in the major. | | |
| Some courses are categorized in more than one knowledge domain. Courses can only be used once within the General Education model. | | |
| Arts & Humanities (2 courses) | | 6 |
| Natural Sciences - NS requirement included in the major. | | |
| (courses below are required for the BS Biochemistry major and fulfill the Natural Sciences General Education requirement) | | |
| CHEM 1515 & 1515L | General Chemistry 1 and General Chemistry 1 Laboratory | |
| CHEM 1516 & 1516L | General Chemistry 2 and General Chemistry 2 Laboratory | |
| Social Science: 2 courses, both required | | 6 |
| PSYC 1560 | General Psychology | |
| PHLT 1531 | Fundamentals of Public Health | |
| **General Education Electives (9 s.h.)** | | |
| CMST 1545 | Communication Foundations | 3 |
| Any 2 Gen Ed Courses (6 s.h.) | | 6 |
| **The following CHEM core courses are required (38 s.h.):** | | |
| CHEM 1515 | General Chemistry 1 | 3 |
| CHEM 1515L | General Chemistry 1 Laboratory | 1 |
| CHEM 1515R | Recitation for General Chemistry 1 | 1 |
| CHEM 1516 | General Chemistry 2 | 3 |
| CHEM 1516L | General Chemistry 2 Laboratory | 1 |
| CHEM 1516R | Recitation for General Chemistry 2 | 1 |
| CHEM 2604 & 2604L | Quantitative Analysis and Quantitative Analysis Laboratory | 5 |
| CHEM 3719 | Organic Chemistry 1 | 3 |
| CHEM 3719L | Organic Chemistry 1 Laboratory | 1 |
| CHEM 3719R | Organic Chemistry Recitation 1 | 1 |
| CHEM 3720 | Organic Chemistry 2 | 3 |
| CHEM 3720L | Organic Chemistry 2 Laboratory | 1 |
| CHEM 3720R | Organic Chemistry Recitation 2 | 1 |
| CHEM 3739 | Physical Chemistry 1 | 3 |
| CHEM 3739L | Physical Chemistry 1 Laboratory | 1 |
| CHEM 3785 | Biochemistry 1 | 3 |
| CHEM 3785L | Biochemistry Laboratory | 1 |
| CHEM 3786 | Biochemistry 2 | 3 |
| CHEM 5876 | Enzyme Analysis | 2 |
| **The following capstone is required (3 s.h.):** | | |
| CHEM 4850 | Chemistry Research | 1 |
| CHEM 4851 | Chemistry Research Project | 2 |
| **The following BIOL core courses are required (14 s.h.):** | | |
| BIOL 2603 | Integrated Biology for BaccMed | 4 |
| BIOL 3702 | Microbiology | 3 |
| BIOL 3702L | Microbiology Laboratory | 1 |
| BIOL 3711 | Cell Biology: Fine Structure | 3 |
| BIOL 3721 | Genetics | 3 |
| **The following Mathematics and Statistics courses are required (12 s.h.):** | | |
| MATH 1581H or MATH 1571 | Honors Calculus for the Health Sciences 1 Calculus 1 | 4 |
| MATH 1572 | Calculus 2 | 4 |
| STAT 3743 or STAT 3717 | Probability and Statistics Statistical Methods | 4 |
| **The following Physics Courses are required - choose Option 1 or Option 2 (9-10 s.h.):** | | **9-10** |
| Option 1: | | |
| PHYS 2610 | General Physics 1 | |
| PHYS 2610L | General Physics Laboratory 1 | |
| PHYS 2611 | General Physics 2 | |
| PHYS 2611L | General Physics laboratory 2 | |
| Option 2: | | |
| PHYS 1501 | Fundamentals of Physics 1 | |
| PHYS 1501L | Fundamentals of Physics Laboratory 1 | |
| PHYS 1502 | Fundamentals of Physics 2 | |
| PHYS 1502L | Fundamentals of Physics Laboratory 2 | |
| **Select 7 s.h. in upper level CHEM electives (3000 or higher) from the list below. It is recommended that one elective course includes a laboratory.** | | **7** |
| CHEM 3729 | Inorganic Chemistry | |
| CHEM 3764 | Chemical Toxicology | |
| CHEM 4851 | Chemistry Research Project | |
| CHEM 4891 | Special Topics | |
| CHEM 5804 & 5804L | Chemical Instrumentation and Chemical Instrumentation Laboratory | |
| CHEM 5821 | Intermediate Organic Chemistry | |
| CHEM 5822 & 5822L | Advanced Organic Laboratory and Advanced Organic Laboratory | |
| CHEM 5832 & 5832L | Solid State Structural Methods and Solid State Structural Methods Laboratory | |

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| **At least 3 s.h. in upper-level BIOL courses required from the list below.** | | **3** |
| BIOL 3703 | Clinical Immunology | |
| BIOL 3705 & 3705L | Introduction to Human Gross Anatomy and Introduction to Human Gross Anatomy Laboratory | |
| BIOL 3730 | Human Physiology | |
| BIOL 4829 | Microbial Physiology | |
| BIOL 4890 | Molecular Genetics | |
| BIOL 4890L | Molecular Genetics Laboratory | |
| BIOL 5840 | Advanced Microbiology | |
| **Other Required Courses:** | | |
| PHLT 3709 | Elements of Urban Environmental Health Practices | 3 |
| SOC 3745 | Sociology of Health, Illness, and Healthcare | 3 |
| HONR 4890C | Senior Honors Thesis: Capstone | 1 |
| **Total Semester Hours** | | **122-123** |

**Year 1**

| **Fall** | | **S.H.** |
|---|---|---|
| HONR 1500 | Intro to Honors | 1 |
| CHEM 1515 | General Chemistry 1 | 3 |
| CHEM 1515L | General Chemistry 1 Laboratory | 1 |
| CHEM 1515R | Recitation for General Chemistry 1 | 1 |
| MATH 1571 | Calculus 1 | 4 |
| ENGL 1550 | Writing 1 | 3 |
| | **Semester Hours** | **13** |
| **Spring** | | |
| HONR 2601P | Honor Seminar Campus Community Partnerships | 1 |
| CHEM 1516 | General Chemistry 2 | 3 |
| CHEM 1516L | General Chemistry 2 Laboratory | 1 |
| CHEM 1516R | Recitation for General Chemistry 2 | 1 |
| MATH 1572 | Calculus 2 | 4 |
| ENGL 1551 | Writing 2 | 3 |
| BIOL 3711 | Cell Biology: Fine Structure | 3 |
| | **Semester Hours** | **16** |
| **Summer** | | |
| Second Summer Session | | |
| BIOL 2603 | Integrated Biology for BaccMed | 4 |
| PSYC 1560 | General Psychology | 3 |
| | **Semester Hours** | **7** |

**Year 2**

| **Fall** | | |
|---|---|---|
| CHEM 3785 | Biochemistry 1 | 3 |
| CHEM 3785L | Biochemistry Laboratory | 1 |
| PHYS 2610 or PHYS 1501 | General Physics 1 or Fundamentals of Physics 1 | 4 |
| PHYS 2610L or PHYS 1501L | General Physics Laboratory 1 or Fundamentals of Physics Laboratory 1 | 1 |
| BIOL 3721 | Genetics | 3 |
| BIOL 3702 | Microbiology | 3 |
| BIOL 3702L | Microbiology Laboratory | 1 |
| | **Semester Hours** | **16** |
| **Spring** | | |
| CHEM 3786 | Biochemistry 2 | 3 |
| CHEM 5876 | Enzyme Analysis | 2 |
| PHYS 2611 or PHYS 1502 | General Physics 2 or Fundamentals of Physics 2 | 3-4 |
| PHYS 2611L or PHYS 1502L | General Physics laboratory 2 or Fundamentals of Physics Laboratory 2 | 1 |
| STAT 3743 or STAT 3717 | Probability and Statistics or Statistical Methods | 4 |
| PHLT 3725 | Topics in Public Health | 3 |
| | **Semester Hours** | **16-17** |
| **Summer** | | |
| First Summer Session | | |
| CHEM 3719 | Organic Chemistry 1 | 3 |
| CHEM 3719L | Organic Chemistry 1 Laboratory | 1 |
| CHEM 3719R | Organic Chemistry Recitation 1 | 1 |
| PHLT 1531 | Fundamentals of Public Health | 3 |
| Second Summer Session | | |
| CHEM 3720 | Organic Chemistry 2 | 3 |
| CHEM 3720L | Organic Chemistry 2 Laboratory | 1 |
| CHEM 3720R | Organic Chemistry Recitation 2 | 1 |
| SOC 3745 | Sociology of Health, Illness, and Healthcare | 3 |
| | **Semester Hours** | **16** |

**Year 3**

| **Fall** | | |
|---|---|---|
| CHEM 3739 | Physical Chemistry 1 | 3 |
| CHEM 3739L | Physical Chemistry 1 Laboratory | 1 |
| CHEM 4850 | Chemistry Research | 1 |
| CHEM Upper-level Elective | | 4 |
| GER Arts & Humanities | | 3 |
| PHLT 3709 | Elements of Urban Environmental Health Practices | 3 |
| | **Semester Hours** | **15** |
| **Spring** | | |
| HONR 4890C | Senior Honors Thesis: Capstone | 1 |
| CHEM 4851 | Chemistry Research Project | 2 |
| CHEM Upper-level Elective | | 3 |
| BIOL Upper-level Elective | | 6 |
| | **Semester Hours** | **12** |
| **Summer** | | |
| First Summer Session | | |
| CHEM 2604 & 2604L | Quantitative Analysis and Quantitative Analysis Laboratory | 5 |
| Second Summer Session | | |
| CMST 1545 | Communication Foundations | 3 |
| GER Arts & Humanities | | 3 |
| | **Semester Hours** | **11** |
| | **Total Semester Hours** | **122-123** |