

BS in Biochemistry

Degree Program Description

Biochemists are the locksmiths of life science. They use their imagination, ingenuity and understanding of the basics of living processes to unlock life's mysteries. By unraveling the complexities of nature, they improve the quality of life. Biochemistry combines the tools of biology, chemistry and genetics to fight human disease, increase the production and quality of food, and protect the environment. The knowledge acquired through the program prepares students for careers in many areas, including Medicine, Biotechnology, Agriculture and Government.

Premedical Track Students interested in a medical career may choose from a variety of science-based majors. The most common choice of students is biochemistry because it is a collaborative program between CAFNR and the School of Medicine. The Biochemistry degree provides excellent preparation for the intellectual demands of the medical profession. This training includes, as part of the degree requirements, all of the science courses necessary for application to medical school or related professional fields. Many graduates of this program matriculate at medical, dental, veterinary, pharmacy or optometry schools.

In **Biotechnology**, some of the nation's largest and most respected private biotechnology companies, such as Bayer, Dow Chemical and Pfizer, employ biochemists in a wide range of specialties, including molecular biology, genetic engineering, pharmaceutical development and microbiology. Many graduates have chosen to pursue Masters or Doctoral degrees at major research institutions across the country. Some have been selected for internships at National Institute of Health and others have earned National Science Foundation Pre-Doctoral Awards.

In **Agriculture**, biochemists find employment with agricultural industry companies such as Cargill, Bayer, and Nestle Purina. They may work on projects to develop new varieties of crops that resist drought and insects, nutritionally correct animal feed, or herbicide resistant crops.

In **Government**, state and federal agencies such as the U.S. Food and Drug Administration, the State Public Health Lab and Epidemiology for Public Health Lab employ biochemists in many fields. They might perform genetic testing and biological sample testing, research epidemics in the region, or identify food-borne pathogens.

Major Program Requirements

Students earning a Bachelor of Science in Biochemistry are required to complete all University general education (<http://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>), University graduation (<http://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>), and degree requirements, including selected foundational courses, which may fulfill some University general education requirements.

Foundational Courses

| | | |
|--------------------------------|---|---|
| CHEM 1320 or CHEM 1320H | College Chemistry I College Chemistry I - Honors | 4 |
| BIO_SC 1500 or BIO_SC 1500H | Introduction to Biological Systems with Laboratory Introduction to Biological Systems with Laboratory Honors | 5 |
| MATH 1500 | Analytic Geometry and Calculus I | 5 |

| | | |
|----------------|---|---|
| or MATH 1500H | Analytic Geometry and Calculus I - Honors | |
| AGSC_COM 2220 | Verbal Communication in Agriculture, Food and Natural Resources | 3 |
| or COMMUN 1200 | Public Speaking | |

Degree and Major Courses

Major core requirements

| | | |
|---|---|-------------------|
| Biochemistry | | 25-26 |
| BIOCHM 1090 | Introduction to Biochemistry | 3 |
| BIOCHM 1094 | Introductory Biochemistry Laboratory | 3 |
| BIOCHM 2480 | Introduction to Macromolecular Structure and Function ^ | 3 |
| BIOCHM 2482 | Integrative Cellular and Molecular Biochemistry ^ | 3 |
| BIOCHM 4270 | Biochemistry (I: First semester of two semester sequence) | 3 |
| BIOCHM 4272 | Biochemistry (II: Continuation of BIOCHM 4270) | 3 |
| BIOCHM 4300 | Physical Chemistry of Biological Systems ^ | 3 |
| BIOCHM 4974W | Biochemistry Laboratory - Writing Intensive | 5 |
| BIOCHM 4972 | Post-Normal Biochemistry | 2 |
| Biological Sciences | | 3-4 |
| BIO_SC 2200 or AN_SCI 3213 or PLNT_SCI 3213 | General Genetics Genetics of Agricultural Plants and Animals Genetics of Agricultural Plants and Animals | 3-4 |
| Chemistry | | 12 |
| CHEM 1330 | College Chemistry II | 4 |
| CHEM 2100 | Organic Chemistry I | 3 |
| CHEM 2110 | Organic Chemistry II | 3 |
| CHEM 2130 | Organic Laboratory I (Concurrent with CHEM 2110) | 2 |
| Mathematics | | 5 |
| STAT 1200 or ABM 2123 or STAT 2500 | Introductory Statistical Reasoning Quantitative Applications in Agricultural and Natural Resource Sciences Introduction to Probability and Statistics I | 3 |
| Information Technology | | |
| INFOTC 1040 | Introduction to Problem Solving and Programming | 3 |
| Physics | | 8-10 |
| PHYSICS 1210 or PHYSICS 2750 | College Physics I University Physics I | 4-5 |
| PHYSICS 1220 or PHYSICS 2760 | College Physics II University Physics II | 4-5 |
| Advanced science * | | 10 or more |

5 additional BIOCHM credits; all credit hours must be 3000 level or above.

* Science courses that are not used to fulfill other major requirements. For an approved list of courses, email mubchemadvising@missouri.edu.

^ Some courses may only be offered during fall or spring semester. Please check with the department for course offerings.

Semester Plan

Below is a sample plan of study, semester by semester. A student's actual plan may vary based on course choices where options are available.

| First Year | | | |
|--|--------------|---|--------------|
| Fall | CR | Spring | CR |
| BIOCHM 1090 | | 3 CHEM 1330 | 4 |
| CHEM 1320 | | 4 ENGLSH 1000 | 3 |
| BIO_SC 1500 | | 5 MATH 1500 | 5 |
| INFOTC 1040 | | 3 BIOCHM 1094 or BIO_SC 2200 | 3-4 |
| INTDSC 1001 | | 1 | |
| | 16 | | 15-16 |
| Second Year | | | |
| Fall | CR | Spring | CR |
| BIOCHM 2480 | | 3 BIOCHM 2482 | 3 |
| BIO_SC 2200 or BIOCHM 1094 | | 3-4 CHEM 2110 | 3 |
| CHEM 2100 | | 3 CHEM 2130 | 2 |
| STAT 1200 | | 3 BIO_SC 2300 (or general elective) | 4 |
| Elective (Humanities) | | 3 Social/Behavioral Sci Elective | 3 |
| | 15-16 | | 15 |
| Third Year | | | |
| Fall | CR | Spring | CR |
| BIOCHM 4270 | | 3 BIOCHM 4272 | 3 |
| PHYSCS 1210 | | 4 PHYSCS 1220 | 4 |
| HIST 1100 or 1200 | | 3 Advanced Science Elective (3000 level or above) | 4-5 |
| AGSC_COM 2220 | | 3 Elective (Social/Behavioral Sci) | 3 |
| Elective (Humanities) | | 3 | |
| | 16 | | 14-15 |
| Fourth Year | | | |
| Fall | CR | Spring | CR |
| BIOCHM 4300 | | 3 General Electives | 6 |
| BIOCHM 4974W (OR Writing Intensive Elective) | | 5 Writing Intensive Elective OR BIOCHM 4974W | 3-5 |
| BIOCHM 4972 (or other Adv Science BIOCHM) | | 2 Adv Sci BIOCHM OR BIOCHM 4972 | 2 |
| BIOCHM 4978 | | 3 Adv Sci BIOCHM | 2 |
| General Elective | | 3 | |
| | 16 | | 13-15 |

Total Credits: 120-125