B.S. Biochemistry

(This degree appears in the Biomedical Sciences and Chemistry sections of the catalog.)

Two departments - Biomedicall Sciences and Chemistry - jointly offer the B.S. degree in Biochemistry. The curriculum is designed to prepare the student for graduate work in biochemistry and related fields, as well as for admission to medical, dental, or other health professional schools. The graduate is also prepared to go directly into research or industrial positions which require preparation only at the B.S. level.

The purpose of the B.S. in Biochemistry is to serve students who seek to develop a strong background in biochemistry and the supporting sciences of biology, chemistry, and physics. Majors also gain experience in the broad areas of biochemistry, molecular biology, biotechnology, and medical and/or ecological applications of each. Majors gain experience that will prepare them to participate in research development, planning and implementation, and to be competent to carry out standard biochemical and molecular biology techniques in the laboratory. The B.S. in Biochemistry prepares students to be competitive for positions in research, graduate schools, health profession schools, and in the biotechnology industry.

Core Requirements

Students pursuing a Bachelor of Science must satisfy all of the General Education Objectives (a minimum of 24 credits; Objectives 3 and 5 are satisfied in the core--see the General Education Requirements (https://coursecat.isu.edu/undergraduate/academicinformation/generaleducation/) described in the Academic Information section of this catalog). Students must also satisfy the core requirements listed below and at least **20** credits of elective courses selected from Biological Sciences, Chemistry, Mathematics, and Biomedical and Pharmaceutical Sciences. In order to make timely progress toward the degree, it is imperative that the student work closely with a major advisor. All graduates of this program will earn a B.S. in Biochemistry.

General Education

The listing below includes program requirements that also fulfill General Education requirements.

Code	Title	Credits
Objective 1 - ENGL 1101, ENGL 1102 [1]		6
Objective 2		3
Objective 3 - MATH 1170		4
Objective 4		6
Objective 5 - BIOL 1101/BIOL 1101L & CHEM 1111/CHEM 1111L [1]		9
Objective 6		6
Students must fulfill Objective 7 or Objective 8		**3**
Objective 7		
Objective 8		
Objective 9		3
Total Credits		**40**

[1] "P" courses are equivalent to the original course.

Core Requirements [1]

Code	Title	Credits
BIOL 1101 & 1101L	Biology I and Biology I Lab (Partially satisfies General Education Objective 5)	4
BIOL 1102 & 1102L	Biology II and Biology II Lab	4
BIOL 2233 & 2233L	Principles of Microbiology and Principles of Microbiology Lab [2]	4
BIOL 3358	Genetics	3
BIOL 4437/CHEM 4438	Experimental Biochemistry	1
BIOL 4444 & 4444L	Molecular Biology and Molecular Biology Lab	4
BIOL/CHEM 4445	Biochemistry I	3
BIOL/CHEM 4447	Biochemistry II	3
BIOL/CHEM 4498	Seminar in Biochemistry, Microbiology, and Molecular Biology	1
CHEM 1111 & 1111L	General Chemistry I and General Chemistry I Lab (Partially satisfies General Education Objective 5)	5
CHEM 1112 & 1112L	General Chemistry II and General Chemistry II Lab (Partially satisfies General Education Objective 5)	4
CHEM 2232 & CHEM 2234	Quantitative Analysis and Quantitative Analysis Laboratory	4
CHEM 3301 & CHEM 3303	Organic Chemistry I and Organic Chemistry Laboratory I	4
CHEM 3302 & CHEM 3304	Organic Chemistry II and Organic Chemistry Laboratory II	4
CHEM 3341	Topics in Physical Chemistry I [3]	3
CHEM 3342	Topics in Physical Chemistry II [3]	3
MATH 1170	Calculus I (Satisfies General Education Objective 3)	4
MATH 1175	Calculus II	4
PHYS 1111 & PHYS 1113	General Physics I and General Physics I Laboratory (Partially satisfies General Education Objective 5) [4]	4
PHYS 1112 & PHYS 1114	General Physics II and General Physics II Laboratory [4]	4
ENGL 1101	Writing and Rhetoric I (Partially satisfies General Education Objective 1)	3
ENGL 1102	Writing and Rhetoric II (Partially satisfies General Education Objective 1)	3
Total Credits		**76**

[1] Students must pass core classes with a grade of C- or better.

[2] May elect to take BIOL 2206 (https://coursecat.isu.edu/search/?P=BIOL%202206) and BIOL 2207 (https://coursecat.isu.edu/search/?P=BIOL%202207) instead of BIOL 2233 (https://coursecat.isu.edu/search/?P=BIOL%202235) and BIOL 2233L (https://coursecat.isu.edu/search/?P=BIOL%202235L).

[3] May elect to take CHEM 3351 (https://coursecat.isu.edu/search/?P=CHEM%203351) and CHEM 3352 (https://coursecat.isu.edu/search/?P=CHEM%203352) instead of CHEM 3341 (https://coursecat.isu.edu/search/?P=CHEM%203341) and CHEM 3342 (https://coursecat.isu.edu/search/?P=CHEM%203342).

[4] PHYS 2211 (https://coursecat.isu.edu/search/?P=PHYS%202211), PHYS 2212 (https://coursecat.isu.edu/search/?P=PHYS%202212), PHYS 2213 (https://coursecat.isu.edu/search/?P=PHYS%202213), and PHYS 2214 (https://coursecat.isu.edu/search/?P=PHYS%202214) may be taken to fulfill the Physics requirement in the core curriculum.

Electives

Students must take a minimum of **20** elective credits from the list below, with at least **8** credits in Biological Sciences (BIOL), **8** credits in Chemistry (CHEM), and **4** additional credits in either Biological Sciences (BIOL), Chemistry (CHEM), Mathematics (MATH), or Biomedical and Pharmaceutical Sciences (PSCI).

Courses in Biological Sciences:

Code	Title	Credits
BIOL 3301 & 3301L	Advanced Human Anatomy and Physiology 1 and Advanced Human Anatomy and Physiology 1 Lab	4
BIOL 3302 & 3302L	Advanced Human Anatomy and Physiology 2 and Advanced Human Anatomy and Physiology 2 Lab	4
BIOL 3303 & 3303L	Principles of Animal Physiology and Principles of Animal Physiology Lab	4
BIOL 3314 & 3314L	Comparative Vertebrate Anatomy and Comparative Vertebrate Anatomy Lab	4
BIOL 3324 & 3324L	Developmental Biology and Developmental Biology Lab	4
BIOL 4404 & 4404L	Plant Physiology and Plant Physiology Lab	4
BIOL 4417	Organic Evolution	3
BIOL 4433 & 4433L	Microbial Physiology and Microbial Physiology Laboratory	4
BIOL 4434 & 4434L	Microbial Diversity and Microbial Diversity Lab	4
BIOL 4436	Food Microbiology	3
BIOL 4443	Endocrinology	3
BIOL 4449	Human Physiology I	4
BIOL 4451 & 4451L	Immunology and Immunology Laboratory	4
BIOL 4453	Foundations in Neuroscience	3
BIOL 4455 & 4455L	Pathogenic Microbiology and Pathogenic Microbiology Laboratory	4
BIOL 4456	Human Physiology II	4
BIOL 4461	Microbial Genetics	3
BIOL 4473 & 4473L	Applied and Environmental Microbiology and Applied Environmental Microbiology Lab	4
BIOL 4475	General Virology	3
BIOL 4481 & BIOL 4482	Independent Problems and Independent Problems	max 2
BIOL 4489	Field Ecology	4

Courses in Chemistry:

Code	Title	Credits
CHEM 2211	Inorganic Chemistry I	3
CHEM 2213	Inorganic Chemistry I Laboratory	1
CHEM 3311 & CHEM 3312	Introduction to Research and Introduction to Research	max 2
CHEM 3331 & CHEM 3334	Instrumental Analysis and Instrumental Analysis Laboratory	4
CHEM 4465 & CHEM 4466	Synthetic Methods and Synthetic Methods Laboratory	4
CHEM 4407	Inorganic Chemistry II	2
CHEM 4433 & CHEM 4437	Environmental Chemistry and Environmental Chemistry Laboratory	3
CHEM 4451	Physical Chemistry Laboratory I	1
CHEM 4452	Physical Chemistry Laboratory II	1
CHEM 4481 & CHEM 4482	Independent Problems in Chemistry and Independent Problems in Chemistry	max 2
CHEM 4485	Senior Research	max 1
CHEM 4491	Seminar	1

Courses in Mathematics:

Code	Title	Credits
MATH 2240	Linear Algebra	3
MATH 2275	Calculus III	4
MATH 3360	Differential Equations	3

Courses in Biomedical and Pharmaceutical Sciences:

Code	Title	Credits
PSCI 2205	Drugs in Society	2
PSCI 3301	Introduction to Pharmacology	3
PSCI 3308	Drug Discovery	2
PSCI 3353	Introduction to Methods in Pharmaceutical Sciences	2
PSCI 4407	Pharmacogenomics	2
PSCI 4408	Medicinal Chemistry	3
PSCI 4440	Fundamentals of Nanoscience	3

[1] Prerequisites include CHEM 2211 (https://coursecat.isu.edu/search/?P=CHEM%202211), CHEM 2213 (https://coursecat.isu.edu/search/?P=CHEM%202213), and CHEM 3351 (https://coursecat.isu.edu/search/?P=CHEM%203351).

[2] Corequisite is CHEM 3351 (https://coursecat.isu.edu/search/?P=CHEM%203351).

[3] Corequisite is CHEM 3352 (https://coursecat.isu.edu/search/?P=CHEM%203352).

Degree Totals

Code	Title	Credits
Program Admission Requirements		0
General Education		40
Major Requirements (Required General Education credits removed.)		67
Upper Division Free Electives		0
Free Electives		13
Total Credits		**120**

ISU Degree Requirements (http://coursecat.isu.edu/undergraduate/degreerequirements/)

ISU General Education (http://coursecat.isu.edu/undergraduate/academicinformation/generaleducation/)

Major Academic Plan (MAP) (https://www.isu.edu/advising/maps/)