B.S. Microbiology

The purpose of the BS in Microbiology is to serve students who seek to develop a strong background in microbiology and molecular biology, with applications for biotechnology, medical, and environmental biology. Majors gain experiences that prepare them to participate in the development of research plans and their implementation, and to be competent to carry out standard microbiological and molecular biology techniques in the laboratory. The BS in Microbiology prepares students to be competitive for positions in research, graduate schools, health professional schools, and in the biotechnology industry.

Core Requirements

Students pursuing a Bachelor of Science degree must satisfy the General Education Objectives (https://coursecat.isu.edu/undergraduate/academicinformation/generaleducation/) (a minimum of 37 credits). Students must also satisfy the core requirements listed below and at least **13** credits of elective courses in Microbiology. (Need 36 upper division course hours.) In order to make timely progress toward the degree, it is imperative that the student work closely with a major advisor.

General Education

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

Code	Title	Credits
Objective 1		6
Objective 2		3
Objective 3 - MATH 1160 or MATH 1170		3-4
Objective 4		6
Objective 5 - BIOL 1101, BIOL 1101L, PHYS 1111		7
Objective 6		6
Students must fulfill Objective 7 or Objective 8		**3**
Objective 7		
Objective 8		
Objective 9		3
Total Credits		**37-38**

Required Courses in Biological Sciences:

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 1191	Wonder about Biology	1
BIOL 2233 & 2233L	Principles of Microbiology and Principles of Microbiology Lab	4
BIOL 3358	Genetics	3
Choose either:		**3-6**
BIOL 4432	Biochemistry	
OR		
BIOL/CHEM 4445	Biochemistry I	
Or		
BIOL/CHEM 4447	Biochemistry II	
BIOL 4433 & 4433L	Microbial Physiology and Microbial Physiology Laboratory	4
BIOL 4434 & 4434L	Microbial Diversity and Microbial Diversity Lab	4
BIOL 4444 & 4444L	Molecular Biology and Molecular Biology Lab	4
BIOL 4451 & 4451L	Immunology and Immunology Laboratory	4
Or		
BIOL 4455 & 4455L	Pathogenic Microbiology and Pathogenic Microbiology Laboratory	
BIOL 4498	Seminar in Biochemistry, Microbiology, and Molecular Biology	1
Total Credits		**36-39**

Required Courses in Chemistry, Mathematics, and Physics:

Code	Title	Credits
CHEM 1111 & 1111L	General Chemistry I and General Chemistry I Lab	5
CHEM 1112 & 1112L	General Chemistry II and General Chemistry II Lab	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
MATH 1160	Survey of Calculus (Satisfies General Education Objective 3)	3-4
or MATH 1170	Calculus I	
PHYS 1111 & PHYS 1113	General Physics I and General Physics I Laboratory (Partially satisfies General Education Objective 5)	4
PHYS 1112 & PHYS 1114	General Physics II and General Physics II Laboratory (Partially satisfies General Education Objective 5)	4
Total Credits		**32-33**

Students in the Bachelor of Science in Microbiology degree program must take a minimum of 13 credits from the Microbiology Electives course list. These 13 credits require a minimum of six credits of BIOL electives.

Microbiology Electives (13 credits)

Code	Title	Credits
BIOL 4423	General Parasitology	3
BIOL 4436	Food Microbiology	3
BIOL 4437/CHEM 4438	Experimental Biochemistry	1
BIOL 4451 & 4451L	Immunology and Immunology Laboratory [1]	4

BIOL 4454	Advanced Immunology	3
BIOL 4455 & 4455L	Pathogenic Microbiology and Pathogenic Microbiology Laboratory [1]	4
BIOL 4461	Microbial Genetics	3
BIOL 4469	Special Topics in Microbiology	1-4
BIOL 4473 & 4473L	Applied and Environmental Microbiology and Applied Environmental Microbiology Lab	4
BIOL 4475	General Virology	3
BIOL 4480	Vertically Integrated Project	1
or BIOL 4481	Independent Problems	
or BIOL 4482	Independent Problems	
CHEM 2211 & CHEM 2213	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 3311 & CHEM 3312	Introduction to Research and Introduction to Research	2
CHEM 3331 & CHEM 3334	Instrumental Analysis and Instrumental Analysis Laboratory	4
CHEM 3341	Topics in Physical Chemistry I	3
CHEM 3342	Topics in Physical Chemistry II	3
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

[1] One of these courses may be taken as an elective, providing the other course is used to fulfill the core requirement.

Degree Totals

Code	Title	Credits
Program Admission Requirements		0
General Education		37-38
Major Requirements (Required General Education credits removed.)		58-62
Upper Division Free Electives		2-5
Free Electives		15-23
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/)