

# B.S. Biology with Concentration in Biomedical Sciences

## Bachelor of Science in Biology

The purpose of the B.S. in Biology is to serve students who have a broad interest in the biological sciences and who seek substantial flexibility in the development of their own programs. This degree fosters, in students, knowledge and understanding of major concepts in the discipline as well as the processes of scientific investigation. Students served by this Major are those interested in preparing for a career in biology, ecology, conservation or natural history, entering a health-related professional program (i.e., physician assistant, occupational therapist, medical doctor, etc.), certifying to teach in public schools, or developing a variety of laboratory skills. The B.S. in Biology requires significant exposure to biological sciences, as well as concepts in math and the physical sciences, while providing a large number of electives. The consequence is an understanding of the biological sciences and the flexibility and opportunity to specialize in areas of interest to students. Up to 8 credits of Independent Problems and/or Mentored Research (AMOEBA) can be applied to the student's undergraduate degree.

### Core Requirements

Students pursuing the B.S. degree must satisfy 8 of the 9 General Education Objectives (a minimum of 36 credits--see the General Education Requirements (<http://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 the requirements of one of the concentrations in biology. All graduates of this degree program will earn a B.S. in Biology, regardless of the concentration selected.

### Required Courses:

Code	Title	Credits
BIOL 1101 & 1101L	Biology I and Biology I Lab	4
BIOL 1102 & 1102L	Biology II and Biology II Lab	4
BIOL 2206 & BIOL 2207	Cell Biology and Cell Biology Laboratory <sup>1</sup>	4
BIOL 2209 & 2209L	General Ecology and General Ecology Laboratory	4
BIOL 3316	Biometry Laboratory	1
BIOL 3358	Genetics	3
BIOL 4417	Organic Evolution	3
BIOL 4491 & BIOL 4492	Seminar and Seminar	2
MATH 1160	Survey of Calculus	3
MATH 3350	Statistical Methods	3
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 3301 & CHEM 3303	Organic Chemistry I and Organic Chemistry Laboratory I	4
PHYS 1111 & PHYS 1113	General Physics I and General Physics I Laboratory	4
Select two of the following:		7
CHEM 3302 & CHEM 3304	Organic Chemistry II and Organic Chemistry Laboratory II	
PHYS 1112 & PHYS 1114	General Physics II and General Physics II Laboratory	
BIOL 4432	Biochemistry	
General Education		24
Total Credits		79

<sup>1</sup> BIOL 2235, BIOL 2235L, General Microbiology and Lab, may substitute for BIOL 2206, BIOL 2207 in the ECB and IOB concentrations, but not in the BMS concentration. Students in the BMS concentration must take BIOL 2206, BIOL 2207.

### Concentration in Biomedical Sciences (BMS)

The concentration in Biomedical Sciences (BMS) focuses on developing an understanding of the key disciplines that serve as the foundation for biomedical sciences. This includes substantial coursework in chemistry and physics, as well as electives in mammalian anatomy and physiology, development, and neurobiology. The BMS concentration prepares students for graduate studies in biomedical research as well as admission to medical, dental, and veterinary and other health professional programs (pharmacy, physician assistant, optometry, podiatry).

In addition to completing the core requirements, students in the BMS concentration have the opportunity to select from a broad range of physiology, anatomy, and biomedical courses.

## Biomedical Sciences Requirements

### Anatomy and Physiology:

Code	Title	Credits
BIOL 3301 & 3301L	Advanced Human Anatomy and Physiology 1 and Advanced Human Anatomy and Physiology 1 Lab	4

### Choose one of the following:

BIOL 3302 & 3302L	Advanced Human Anatomy and Physiology 2 and Advanced Human Anatomy and Physiology 2 Lab	4-5
OR		
BIOL 3304 & 3304L	Comparative Vertebrate Morphology and Physiology and Vertebrate Morphology and Physiology Lab	

### Upper Division BMS Electives:

Select a minimum of 12 credits from the following<sup>1</sup>:

Code	Title	Credits
BIOL 3305	Introduction to Pathobiology	3
BIOL 3324 & 3324L	Developmental Biology and Developmental Biology Lab <sup>1</sup>	4
BIOL 4400 & 4400L	Oral Histology and Embryology and Oral History and Embryology Lab <sup>2</sup>	3
BIOL 4419 & 4419L	Mammalian Histology and Mammalian Histology Lab <sup>2</sup>	4
BIOL 4423	General Parasitology	3
BIOL 4432	Biochemistry <sup>1</sup>	3
BIOL 4437	Experimental Biochemistry	1
BIOL 4433 & 4433L	Microbial Physiology and Microbial Physiology Laboratory	4
BIOL 4440 & 4440L	Human Gross Anatomy and Human Gross Anatomy Lab <sup>2</sup>	4
BIOL 4443	Endocrinology	3
BIOL 4444 & 4444L	Cell and Molecular Biology and Cell and Molecular Biology Lab	4
BIOL 4449	Human Physiology I <sup>2</sup>	4
BIOL 4450 & 4450L	Head and Neck Anatomy and Head and Neck Anatomy Lab <sup>2</sup>	3
BIOL 4451 & 4451L	Immunology and Immunology Laboratory	4
BIOL 4453	Foundations in Neuroscience	3
BIOL 4455	Pathogenic Microbiology	3
BIOL 4456	Human Physiology II <sup>2</sup>	4
BIOL 4463 & 4463L	Human Pathophysiology and Human Pathophysiology Lab <sup>2</sup>	4
BIOL 4466	Medical Mycology	3
BIOL 4470	Cross-Sectional Anatomy <sup>2</sup>	2
BIOL 4475	General Virology	3

BIOL 4486 & 4486L	Human Systemic Physiology and Human Systemic Physiology Lab <sup>2</sup>	5
BIOL 4481 or BIOL 4482	Independent Problems	1-4
BIOL 2280 or BIOL 4480	Mentored Research Alliance	2

<sup>1</sup> BIOL 3324 Developmental Biology and BIOL 4432 Biochemistry are strongly recommended as these are often required by medical, dental, and veterinary schools.

<sup>2</sup> Indicates limited enrollment for undergraduates.

**Microbiology:**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
BIOL 2221 & 2221L	Introductory Microbiology and Introductory Microbiology Laboratory	4
or BIOL 2235 & 2235L	General Microbiology and General Microbiology Lab	

**Total BMS Concentration Requirements:**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
Anatomy and Physiology		5-8
BMS Electives		12
Microbiology		4
Minimum Total		21-24
Core Requirements		79-80
Total		100-104