

# BIOLOGY (BS)

## Program Overview

The Bachelor of Science degree in Biology prepares students for employment in biological or life science careers and/or for entry into advanced degree programs in biology or health-related professional schools, by providing a more specialized biological education to include the analytical skills, knowledge, laboratory and field techniques across various disciplines within the biological sciences.

## Career Opportunities

Career opportunities are available in the following areas: conservation, medicine, pharmacy, biotechnology, research, genetic counseling, veterinary medicine.

## Program of Study

Code	Title	Credit Hours
<b>Core IMPACTS Area : Institutional Priorities <sup>1</sup></b>		<b>4-5</b>
COMM 1110	Public Speaking	3
ITDS 1779	Scholarship Across the Disciplines	2
LEAD 1705	Introduction to Servant Leadership	2
PERS 1506	Perspectives 1-hour	1
PERS 1507	Perspectives 2-hour	2
Foreign Language Course Options		
ARAB, CHIN, FREN, GERM, GREK, ITAL, JAPN, KREN, LATIN, PORT, SPAN - 1001, 1002, 2001, 2002		
SWAH 1001	Elementary Swahili I	
SWAH 1002	Elementary Swahili II	
<b>Core IMPACTS Area : Mathematics &amp; Quantitative Skills <sup>1</sup></b>		<b>3-7</b>
DATA 1501	Introduction to Data Science	3
MATH 1001	Quantitative Skills and Reasoning	3
MATH 1101	Introduction to Mathematical Modeling	3
MATH 1111	College Algebra	3
MATH 1113	Pre-Calculus	4
MATH 1125	Applied Calculus	3
MATH 1131	Calculus with Analytic Geometry I	4
MATH 1132	Calculus with Analytic Geometry II	4
MATH 1165	Computer-Assisted Problem Solving	3
MATH 1401	Introduction to Statistics	3
MATH 1501	Calculus I	4
MATH 2125	Introduction to Discrete Mathematics	3
STAT 1401	Elementary Statistics	3
<b>Core IMPACTS Area : Political Science and U.S. History</b>		<b>6</b>
HIST 2111	U. S. History to 1865	3
or HIST 2112	U. S. History since 1865	
POLS 1101	American Government	3
<b>Core IMPACTS Area : Arts, Humanities, and Ethics</b>		<b>6</b>
Select one Fine Arts course		3
ARTH 1100	Art Appreciation	
ARTH 2125	Introduction to the History of Art I– Prehistoric through Gothic	

ARTH 2126	Introduction to the History of Art II– Renaissance through Modern	
MUSC 1100	Music Appreciation	
THEA 1100	Theatre Appreciation	
ITDS 1145	Comparative Arts <sup>2</sup>	
Select one Humanities course		3
ENGL 2111	World Literature I	
ENGL 2112	World Literature II	
ITDS 1774	Introduction to Digital Humanities	
PHIL 2010	Introduction to Philosophy	
ITDS 1145	Comparative Arts <sup>2</sup>	
<b>Core IMPACTS Area : Communicating in Writing</b>		<b>6</b>
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
<b>Core IMPACTS Area : Technology, Mathematics, and Sciences <sup>1</sup></b>		<b>7-11</b>
ANTH 1145	Human Origins	3
ASTR 1105	Descriptive Astronomy: The Solar System	3
ASTR 1106	Descriptive Astronomy: Stars and Galaxies	3
ASTR 1305	Descriptive Astronomy Lab	1
ATSC 1112	Understanding the Weather	3
ATSC 1112L	Understanding the Weather Lab	1
BIOL 1125	Contemporary Issues in Biology Non-Lab	3
BIOL 1215K	Introductory Biology	4
BIOL 1225K	Contemporary Issues in Biology with Lab	4
CHEM 1151 & 1151L	Survey of Chemistry I and Survey of Chemistry I Lab	4
CHEM 1152 & 1152L	Survey of Chemistry II and Survey of Chemistry II Lab	4
CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab	4
CPSC 1105	Introduction to Computing Principles and Technology	3
CPSC 1301K	Computer Science I	4
ENVS 1105	Environmental Studies	3
ENVS 1105L	Environmental Studies Laboratory	1
ENVS 1205K	Sustainability and the Environment	4
GEOG 2215	Introduction to the Geographic Information Systems	3
GEOL 1110	Natural Disasters: Our Hazardous Environment	3
GEOL 1121	Introductory Geoscience I: Physical Geology	3
GEOL 1121L	Introductory Geoscience I: Physical Geology Lab	1
GEOL 1122	Introductory Geo-sciences II: Historical Geology	3
GEOL 1322	Introductory Geo-sciences II: Historical Geology Lab	1
GEOL 2225	The Fossil Record	4
PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab	4
PHYS 1125	Physics of Color and Sound	3
PHYS 1325	Physics of Color and Sound Lab	1

PHYS 2211 & PHYS 2311	Principles of Physics I and Principles of Physics I Lab	4
PHYS 2212 & PHYS 2312	Principles of Physics II and Principles of Physics II Lab	4
<b>Core IMPACTS Area : Social Sciences</b>		<b>6</b>
Select one Behavioral Science course		
ECON 2105	Principles of Macroeconomics	
ECON 2106	Principles of Microeconomics	
PHIL 2030	Moral Philosophy	
PSYC 1101	Introduction to General Psychology	
SOCI 1101	Introduction to Sociology	
Select one World Cultures course		3
ANTH 1107	Discovering Archaeology	
ANTH 1105	Cultural Anthropology	
ANTH 2105	Ancient World Civilizations	
ANTH 2136	Language and Culture	
ENGL 2136	Language and Culture	
GEOG 1101	World Regional Geography	
HIST 1111	World History to 1500	
HIST 1112	World History since 1500	
ITDS 1155	The Western Intellectual Tradition	
ITDS 1156	Understanding Non-Western Cultures	
<b>Core IMPACTS Total Hours</b>		<b>42</b>
<b>Health and Wellness</b>		<b>3</b>
KINS 1106 or PHED 1205	Lifetime Wellness Concepts of Fitness	2
Select one PEDS course ( <a href="https://catalog.columbusstate.edu/course-descriptions/peds/#peds">https://catalog.columbusstate.edu/course-descriptions/peds/#peds</a> )		

<sup>1</sup> The hours applied in the Institutional Priorities; Mathematics & Quantitative Skills; and Technology, Mathematics, and Sciences areas must add to 18 credit hours.

<sup>2</sup> ITDS 1145 Comparative Arts, though listed under both Fine Arts and Humanities, may be taken only once.

## Major Requirements

Code	Title	Credit Hours
<b>Core Requirements</b>		
Complete the core requirements for this program		45
<b>Field of Study Requirements</b>		
Minimum grade of C is required		
BIOL 1107K	Principles of Biology I	4
BIOL 1108K	Principles of Biology II	4
BIOL 2206K	Organismic Biology I	4
BIOL 2207K	Organismic Biology II	4
Apply one hour of Guided Electives		1
Apply one hour from Area A (MATH 1113 or MATH 1131)		1
Field of Study Requirements Total		18
<b>Required for the Major</b>		
Minimum grade of C is required		
BIOL 3215K	Cell Biology	4
BIOL 3216K	Genetics	4

BIOL 3217K	Ecology	4
BIOL 4795	Capstone Senior Seminar	2
CHEM 3111	Organic Chemistry I	3
CHEM 3112	Organic Chemistry II	3
CHEM 3311	Organic Chemistry I Lab	1
CHEM 3312	Organic Chemistry II Lab	1
MATH 1111	College Algebra	3
PHYS 1111	Introductory Physics I	3
PHYS 1112	Introductory Physics II	3
PHYS 1311	Introductory Physics I Lab	1
PHYS 1312	Introductory Physics II Lab	1
Select one of the following options:		4
Option 1:		
BIOL 4392	Undergraduate Research	
BIOL 4393	Research Presentation	
Option 2:		
BIOL 4698	Internship	
Option 3:		
Choose 4 additional hours from List 1-3 of Area H		
Required for the Major Total		37
<b>Major Electives</b>		
Minimum grade of C is required		
Select 3-4 hours from Cellular and Molecular Biology Electives (List 1) 3-4		
BIOL 5117U	Medical Genetics and Genomics	
BIOL 5118U	Neuroscience	
BIOL 5215U	Developmental Biology	
BIOL 5216U	Histology and Histotechniques	
BIOL 5217U	Cell and Molecular Techniques	
BIOL 5218U	Introduction to Virology	
BIOL 5219U	Immunology	
BIOL 5225U	Microbial Pathogenesis	
BIOL 5317U	Genomics and Bioinformatics Lab	
BIOL 5318U	Neuroscience Lab	
BIOL 5515U	Selected Topics in Cell and Molecular Biology	
Select 3-4 hours from Organismal Biology Electives (List 2)		3-4
BIOL 5245U	Comparative Animal Physiology	
BIOL 5246U	Entomology	
BIOL 5247U	Microbial Diversity	
BIOL 5248U	Ornithology	
BIOL 5249U	Parasitology	
BIOL 5255U	Vertebrate Diversity	
BIOL 5256U	Plant Taxonomy	
BIOL 5257U	Biology of Aging	
BIOL 5259U	Comparative Vertebrate Anatomy	
BIOL 5265U	Food Microbiology	
BIOL 5525U	Selected Topics in Organismic Biology	
Select 3-4 hours from Ecological and Evolutionary Electives (List 3)		3-4
BIOL 5285U	Aquatic Biology	
BIOL 5286U	Community Ecology	
BIOL 5287U	Conservation Genetics	
BIOL 5288U	Plant Ecology	
BIOL 5289U	Environmental Toxicology	

BIOL 5295U	Animal Communication	
BIOL 5535U	Selected Topics in Ecological and Evolutionary Biology	
Select one additional course from List 1-3 or from the following:		3-4
CHEM 3141	Biochemistry I	
GEOL 5275U	Vertebrate Paleontology	
PSYC 4116	Comparative Animal Behavior	
Major Electives Total		15-16
<b>General Electives</b>		
Select 7-8 credits of General Electives		7-8
General Electives Total		7-8
<b>Total Credit Hours</b>		<b>123</b>

## Program Map

### Suggested four year course schedule with MATH 0999 or lower

Course	Title	Credit Hours
<b>First Year</b>		
<b>Fall</b>		
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1
AREA C	Fine Arts	3
AREA E	World Culture	3
BIOL 1715	Professionalism and Careers in Biology (recommended Area F Guided Elective; minimum grade of C)	1
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1111	College Algebra (minimum grade of C)	3
MATH 0999B or MATH 0999C	Support for College Algebra B or Support for College Algebra C	
<b>Credit Hours</b>		<b>14</b>
<b>Spring</b>		
BIOL 1231K	minimum grade of C	4
CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab (minimum grade of C)	4
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1113	Pre-Calculus (minimum grade of C) <sup>1</sup>	4
<b>Credit Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
AREA E	Behavioral Science	3
BIOL 1232K	minimum grade of C	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab (minimum grade of C)	4
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2

STAT 1401	Elementary Statistics (minimum grade of C)	3
<b>Credit Hours</b>		<b>16</b>

#### Spring

AREA I	Elective	2
BIOL 2206K	Organismic Biology I (minimum grade of C)	4
BIOL 2207K	Organismic Biology II (minimum grade of C)	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3
PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>17</b>

#### Third Year

##### Fall

BIOL 3215K	Cell Biology (minimum grade of C)	4
BIOL 3216K	Genetics (minimum grade of C)	4
CHEM 3111 & CHEM 3311	Organic Chemistry I and Organic Chemistry I Lab (minimum grade of C)	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>16</b>

##### Spring

BIOL 3217K	Ecology (minimum grade of C)	4
AREA I	Elective	1
AREA H	BIOL Cell/Molecular Senior Elective (minimum grade of C)	4
CHEM 3112 & CHEM 3312	Organic Chemistry II and Organic Chemistry II Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>13</b>

#### Fourth Year

##### Fall

Select one of the following:		2-4
BIOL 4392	Undergraduate Research (option #1; minimum grade of C)	
BIOL 4698	Internship (option #2; minimum grade of C)	
	4 additional hours from List 1-3 of Area H (option #3; minimum grade of C)	
BIOL 4795	Capstone Senior Seminar (minimum grade of C)	2
AREA H	BIOL Organismal Senior Elective (minimum grade of C)	4
HIST 2111 or HIST 2112	U. S. History to 1865 or U. S. History since 1865	3
PEDS Activity		1
POLS 1101	American Government	3
<b>Credit Hours</b>		<b>15-17</b>

##### Spring

AREA C	Humanities	3
AREA I	Elective	4
BIOL 4393	Research Presentation (minimum grade of C)	2

AREA H	BIOL Ecology/Evolution Senior Elective (minimum grade of C)	4
AREA H	BIOL Senior Elective Option (minimum grade of C)	4
<b>Credit Hours</b>		<b>17</b>
<b>Total Credit Hours</b>		<b>123-125</b>

<sup>1</sup> MATH 1113 Pre-Calculus has 4 credits. Count 3 credits in Area A and 1 credit in Area F.

## Suggested four year course schedule with MATH 1111 College Algebra

Course	Title	Credit Hours
<b>First Year</b>		
<b>Fall</b>		
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1
AREA C	Fine Arts	3
BIOL 1231K	minimum grade of C	4
BIOL 1715	Professionalism and Careers in Biology (recommended Area F Guided Elective; minimum grade of C)	1
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1111	College Algebra (minimum grade of C)	3
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
BIOL 1232K	minimum grade of C	4
CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab (minimum grade of C)	4
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1113	Pre-Calculus (minimum grade of C) <sup>1</sup>	4
<b>Credit Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
AREA E	Behavioral Science	3
BIOL 2206K	Organismic Biology I (minimum grade of C)	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab (minimum grade of C)	4
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2
STAT 1401	Elementary Statistics (minimum grade of C)	3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
AREA E	World Culture	3
AREA I	Elective	2
BIOL 2207K	Organismic Biology II (minimum grade of C)	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3

PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>16</b>

### Third Year

#### Fall

BIOL 3215K	Cell Biology (minimum grade of C)	4
BIOL 3216K	Genetics (minimum grade of C)	4
CHEM 3111 & CHEM 3311	Organic Chemistry I and Organic Chemistry I Lab (minimum grade of C)	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>16</b>

#### Spring

BIOL 3217K	Ecology (minimum grade of C)	4
AREA I	Elective	1
AREA H	BIOL Cell/Molecular Senior Elective (minimum grade of C)	4
CHEM 3112 & CHEM 3312	Organic Chemistry II and Organic Chemistry II Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>13</b>

### Fourth Year

#### Fall

Select one of the following:		2-4
BIOL 4392	Undergraduate Research (option #1; minimum grade of C)	
BIOL 4698	Internship (option #2; minimum grade of C)	
4 additional hours from List 1-3 of Area H (option #3; minimum grade of C)		
BIOL 4795	Capstone Senior Seminar (minimum grade of C)	2
AREA H	BIOL Organismal Senior Elective (minimum grade of C)	4
HIST 2111 or HIST 2112	U. S. History to 1865 or U. S. History since 1865	3
PEDS Activity		1
POLS 1101	American Government	3
<b>Credit Hours</b>		<b>15-17</b>

#### Spring

AREA C	Humanities	3
AREA I	Elective	4
BIOL 4393	Research Presentation (minimum grade of C)	2
AREA H	BIOL Ecology/Evolution Senior Elective (minimum grade of C)	4
AREA H	BIOL Senior Elective Option (minimum grade of C)	4
<b>Credit Hours</b>		<b>17</b>
<b>Total Credit Hours</b>		<b>123-125</b>

<sup>1</sup> MATH 1113 Pre-Calculus has 4 credits. Count 3 credits in Area A and 1 credit in Area F.

### Suggested four year course schedule with MATH 1113 Pre-Calculus or higher.

Course	Title	Credit Hours
<b>First Year</b>		
<b>Fall</b>		
Area B2	ITDS 1779 (2), LEAD 1705 (2), PERS 1506 (1; may be repeated with different topic), PERS 1507 (2)	1
AREA C	Fine Arts	3
BIOL 1231K	minimum grade of C	4
BIOL 1715	Professionalism and Careers in Biology (recommended Area F Guided Elective; minimum grade of C)	1
CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab (minimum grade of C)	4
ENGL 1101	English Composition I (minimum grade of C)	3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
BIOL 1232K	minimum grade of C	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab (minimum grade of C)	4
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1113	Pre-Calculus (minimum grade of C) <sup>1</sup>	4
<b>Credit Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
AREA E	Behavioral Science	3
BIOL 2206K	Organismic Biology I (minimum grade of C)	4
CHEM 3111 & CHEM 3311	Organic Chemistry I and Organic Chemistry I Lab (minimum grade of C)	4
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2
STAT 1401	Elementary Statistics (minimum grade of C)	3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
AREA E	World Culture	3
AREA I	Elective	2
BIOL 2207K	Organismic Biology II (minimum grade of C)	4
CHEM 3112 & CHEM 3312	Organic Chemistry II and Organic Chemistry II Lab (minimum grade of C)	4
Area B1	COMM 1110 Public Speaking or foreign language 1001, 1002, 2001, 2002	3
<b>Credit Hours</b>		<b>16</b>

### Third Year

#### Fall

AREA C	Humanities	3
BIOL 3215K	Cell Biology (minimum grade of C)	4
BIOL 3216K	Genetics (minimum grade of C)	4
PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>15</b>

#### Spring

AREA G	Elective (minimum grade of C)	3
BIOL 3217K	Ecology (minimum grade of C)	4
AREA I	Elective	1
AREA H	BIOL Cell/Molecular Senior Elective (minimum grade of C)	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab (minimum grade of C)	4
<b>Credit Hours</b>		<b>16</b>

### Fourth Year

#### Fall

Select one of the following:		2-4
BIOL 4392	Undergraduate Research (option #1; minimum grade of C)	
BIOL 4698	Internship (option #2; minimum grade of C)	
4 additional hours from List 1-3 of Area H (option #3; minimum grade of C)		
BIOL 4795	Capstone Senior Seminar (minimum grade of C)	2
AREA H	BIOL Organismal Senior Elective (minimum grade of C)	4
HIST 2111 or HIST 2112	U. S. History to 1865 or U. S. History since 1865	3
PEDS Activity		1
POLS 1101	American Government	3
<b>Credit Hours</b>		<b>15-17</b>

#### Spring

AREA I	Elective	4
BIOL 4393	Research Presentation (minimum grade of C)	2
AREA H	BIOL Ecology/Evolution Senior Elective (minimum grade of C)	4
AREA H	BIOL Senior Elective Option (minimum grade of C)	4
<b>Credit Hours</b>		<b>14</b>
<b>Total Credit Hours</b>		<b>123-125</b>

<sup>1</sup> MATH 1113 Pre-Calculus has 4 credits. Count 3 credits in Area A and 1 credit in Area F.

## Admission Requirements

In order to declare a major in biology, a student is required to have an overall GPA of 2.5.

## **Additional Program Requirements**

Students must receive a grade of "C" or better for all classes in Areas D, F, G, and H. Classes with grades lower than a "C" cannot be used to satisfy prerequisite requirements for courses required in the major. To complete a degree in biology, students must obtain a minimum overall grade point average of 2.0 in all science courses applied to graduation.