

# BIOLOGICAL SCIENCES WITH CONCENTRATION B.S.

## Program Requirements

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## Minimum Requirements for Biological Sciences B.S.: 120 credits

**CONCENTRATIONS: BIOMEDICAL SCIENCE (P. 1), CELL AND MOLECULAR BIOLOGY (P. 2), ECOLOGY AND EVOLUTIONARY BIOLOGY (P. 2), PHYSIOLOGY (P. 2)**

Students must earn a C- grade or better in each course.

Code	Title	Credits
<b>General University Requirements</b>		
Complete the general university requirements. ( <a href="http://catalog.uaf.edu/bachelors/#gurbachelorsdegreestext">http://catalog.uaf.edu/bachelors/#gurbachelorsdegreestext</a> )		
<b>General Education Requirements</b>		
Complete the general education requirements. ( <a href="http://catalog.uaf.edu/bachelors/#generaleducationrequirementstext">http://catalog.uaf.edu/bachelors/#generaleducationrequirementstext</a> )		35-40
As part of the general education requirements, complete the following:		
CHEM F105X and CHEM F106X	General Chemistry I and General Chemistry II	
MATH F230X	Essential Calculus with Applications or MATH F251X Calculus I	
<b>B.S. Degree Requirements</b>		
Complete the B.S. degree requirements. ( <a href="http://catalog.uaf.edu/bachelors/#bachelorofsciencetext">http://catalog.uaf.edu/bachelors/#bachelorofsciencetext</a> )		15
As part of the B.S. requirements, complete the following:		
BIOL F115X	Fundamentals of Biology I	
BIOL F116X	Fundamentals of Biology II	
STAT F200X	Elementary Statistics	
or STAT F300	Statistics	
<b>Biological Sciences Program Requirements</b>		
Complete the following:		
BIOL F260	Principles of Genetics	4
BIOL F481	Principles of Evolution	4
CHEM F321	Organic Chemistry I	4
CHEM F325	Organic Chemistry II	3-4
or CHEM F449	General Biochemistry: Metabolism	
PHYS F123X	College Physics I	4
or PHYS F211X	General Physics I	
PHYS F124X	College Physics II	3-4
or PHYS F212X	General Physics II	
or CS F103	Introduction to Computer Programming	
or CS F201	Computer Science I	
Complete one of the following:		4-8

BIOL F111X and BIOL F112X	Human Anatomy and Physiology I and Human Anatomy and Physiology II	
BIOL F310	Animal Physiology	
BIOL F342	Microbiology	
BIOL F430	Plant Physiology and Development	
<b>Concentration</b>		
Complete one of the following: <sup>1</sup>		21-28
Biomedical Science		
Cell and Molecular Biology		
Ecology and Evolutionary Biology		
Physiology		
<b>Capstone</b> <sup>2</sup>		
BIOL F400	Research Capstone in Biological Sciences	0
Satisfactory completion of a capstone research project which can be done either working individually with a faculty member or within one of the following courses: <sup>3,4</sup>		0-4
BIOL F440	Behavioral Neuroscience Research Capstone	
BIOL F441	Animal Behavior	
BIOL F466	Advanced Cell and Molecular Laboratory	
BIOL F472	Community Ecology	
BIOL F473	Limnology	
BIOL F491	The Human Microbiome	
<b>Electives</b>		
General Electives		1-23
<b>Total Credits</b>		<b>120</b>

<sup>1</sup> BIOL F397, BIOL F497, URSA F388 or URSA F488 courses may be substituted by petition for a maximum of two required elective courses in biology (3-4 credits of independent study or research per substituted course). The subject area of the independent study or research will determine which biological subject areas the credits satisfy.

<sup>2</sup> Fulfills the baccalaureate capstone requirement.

<sup>3</sup> Students working individually with a faculty member may, for example, take BIOL F497 credits or work with a faculty member without taking course credits.

<sup>4</sup> Capstone courses may be double counted as electives.

## Concentrations

### BIOMEDICAL SCIENCE

Code	Title	Credits
<b>Biomedical Science Concentration Requirements</b>		
<i>General University Requirements</i>		
As part of the general education requirements, the following are recommended:		
ECON F120X	Introduction to Economic Analysis	
or ECON F101X	Principles of Microeconomics	
or ECON F102X	Principles of Macroeconomics	
PSY F101X	Introduction to Psychology	
SOC F101X	Introduction to Sociology	
<i>Program Requirements</i>		
As part of the program requirements, complete the following:		

BIOL F111X and BIOL F112X or BIOL F310	Human Anatomy and Physiology I and Human Anatomy and Physiology II Animal Physiology	
CHEM F325	Organic Chemistry II	
PHYS F124X or PHYS F212X	College Physics II General Physics II	
Complete the following:		
BIOL F342	Microbiology	4
BIOL F360	Cell and Molecular Biology	3
CHEM F449	General Biochemistry: Metabolism	3
<b>Biology Breadth Electives</b>		
Complete one additional course from lists C or D		3-4
<b>Biomedical Electives</b>		
Complete at least three additional courses from list E		9-12
<b>Total Credits</b>		<b>22-26</b>

## CELL AND MOLECULAR BIOLOGY

Code	Title	Credits
<b>Cell and Molecular Biology Concentration Requirements</b>		
<i>Program Requirements</i>		
As part of the program requirements, complete the following:		
CHEM F325	Organic Chemistry II	
Complete the following:		
BIOL F360	Cell and Molecular Biology	3
CHEM F449	General Biochemistry: Metabolism	3
CHEM F450	Information Storage and Transfer: Molecules and Pathways	3
<b>Cell and Molecular and Physiology Electives</b>		
Complete one additional course from list A		3-4
Complete two additional courses from lists A or B		6-8
<b>Biology Breadth Elective</b>		
Complete one additional course from lists C or D		3-4
<b>Total Credits</b>		<b>21-25</b>

## ECOLOGY AND EVOLUTIONARY BIOLOGY

Code	Title	Credits
<b>Ecology and Evolutionary Biology Concentration Requirements</b>		
Complete the following:		
BIOL F371	Principles of Ecology	4
<b>Ecology and Evolutionary Biology Electives</b>		
Complete two additional courses from list C		6-8
<b>Organismal Elective</b>		
Complete one additional course from list D		3-4
<b>Biology Breadth Elective</b>		
Complete one additional course from lists A, B, or E		3-4
<b>Biology Elective</b>		
Complete one additional course from lists A, B, C, D, or E		3-4
STAT F401 or STAT F402	Regression and Analysis of Variance Scientific Sampling	3-4
<b>Total Credits</b>		<b>22-28</b>

## PHYSIOLOGY

Code	Title	Credits
<b>Physiology Concentration Requirements</b>		
Complete the following:		
BIOL F360	Cell and Molecular Biology	3
<b>Physiology or Cell and Molecular Biology Electives</b>		
Complete two additional courses from list B		6-8
Complete two additional courses from lists A or B		6-8
<b>Biology Breadth Elective</b>		
Complete one additional course from lists C or D		3-4
<b>Biology Elective</b>		
Complete one additional course from lists A, B, C, D, or E		3-4
<b>Total Credits</b>		<b>21-27</b>

## Biology Elective Course Lists

Courses that satisfy upper-division elective credit may require prerequisites.

### LIST A - CELL AND MOLECULAR BIOLOGY

Code	Title	Credits
BIOL F342	Microbiology	4
BIOL F360	Cell and Molecular Biology	3
BIOL F417	Neurobiology	3
BIOL F435	Introduction to Biology of Cancer	3
BIOL F460	Principles of Virology	3
BIOL F462	Infectious Diseases	3
BIOL F463	Immunology	3
BIOL F466	Advanced Cell and Molecular Laboratory	3
CHEM F325	Organic Chemistry II	4
CHEM F450	Information Storage and Transfer: Molecules and Pathways	3
CHEM F470	Cellular and Molecular Neuroscience	3
CHEM F474	Neurochemistry	3
WLF F305	Wildlife Diseases	3

### LIST B - PHYSIOLOGY

Code	Title	Credits
BIOL F310	Animal Physiology	4
BIOL F312	Medical Physiology	3
BIOL F335	Principles of Epidemiology	3
BIOL F342	Microbiology	4
BIOL F412	Exercise Physiology	3
BIOL F417	Neurobiology	3
BIOL F430	Plant Physiology and Development	3
BIOL F440	Behavioral Neuroscience Research Capstone	3
BIOL F441	Animal Behavior	4
BIOL F455	Environmental Toxicology	3
BIOL F457	Environmental Microbiology	3
BIOL F462	Infectious Diseases	3

**LIST C - ECOLOGY AND EVOLUTIONARY BIOLOGY**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
BIOL F371	Principles of Ecology	4
BIOL F385	Global Change Biology	3
BIOL F415	Systematic and Comparative Biology	4
BIOL F418	Biogeography	3
BIOL F431	Population Genetics	3
BIOL F441	Animal Behavior	4
BIOL F446	Freshwater Habitat Dynamics	3
BIOL F457	Environmental Microbiology	3
BIOL F469	Landscape Ecology and Wildlife Habitat	3
BIOL F471	Population Ecology	3
BIOL F472	Community Ecology	4
BIOL F473	Limnology	4
BIOL F483	Stream Ecology	3
BIOL F486	Vertebrate Paleontology	3
BIOL F487	Conceptual Issues in Evolutionary Biology	3
BIOL F488	Arctic Vegetation Ecology: Geobotany	3
BIOL F489	Vegetation Description and Analysis	3
BIOL F491	The Human Microbiome	4
WLF F301	Design of Wildlife Studies	3
WLF F421	Ecology and Management of Large Mammals	3

BIOL F491	The Human Microbiome	4
CHEM F450	Information Storage and Transfer: Molecules and Pathways	3
CHEM F470	Cellular and Molecular Neuroscience	3
CHEM F474	Neurochemistry	3
WLF F305	Wildlife Diseases	3

**LIST D - ORGANISMAL BIOLOGY**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
BIOL F239	Introduction to Plant Biology	4
BIOL F331	Systematic Botany	3
BIOL F406	Entomology	4
BIOL F418	Biogeography	3
BIOL F425	Mammalogy	3
BIOL F426	Ornithology	3
BIOL F427	Ichthyology	4
BIOL F486	Vertebrate Paleontology	3
BIOL F489	Vegetation Description and Analysis	3

**LIST E - BIOMEDICAL SCIENCE**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
BIOL F312	Medical Physiology	3
BIOL F335	Principles of Epidemiology	3
BIOL F402	Biomedical and Research Ethics	3
BIOL F412	Exercise Physiology	3
BIOL F417	Neurobiology	3
BIOL F435	Introduction to Biology of Cancer	3
BIOL F440	Behavioral Neuroscience Research Capstone	3
BIOL F455	Environmental Toxicology	3
BIOL F460	Principles of Virology	3
BIOL F462	Infectious Diseases	3
BIOL F463	Immunology	3
BIOL F466	Advanced Cell and Molecular Laboratory	3