Bachelor of Science in Biological Sciences

The Bachelor of Science (BS) in Biological Sciences includes a core program in Biological Sciences with two areas of study, and a core program in Microbiological Sciences. In Biological Sciences, completing courses from the cellular and molecular biology area prepares students for graduate and professional programs in areas such as medicine, dentistry and veterinary science, while completing courses from the organismal, ecology and evolutionary area prepares students for careers and graduate programs in environmental, organismal and evolutionary biology. Completing the Microbiological Sciences option prepares students for careers in infectious disease and epidemiology, environmental conservation and quality analysis, and graduate programs in microbiology, cell biology, molecular biology and other related fields, as well as professional programs such as medical school. It is imperative that students consult academic advisors within the Department of Biological Sciences to determine which electives are most appropriate to their career interests.

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/).
- Declare the major (see major requirements below) and select one of two options: biological sciences or microbiological sciences. To choose an option, students must meet with an advisor. To schedule the advising session, contact the Department of Biological Sciences.

Academic Requirements

To graduate with a Bachelor of Science (BS) in Biological Sciences, the student must complete all courses covered under major requirements for a BS in Biological Sciences with a minimum grade of C. All prerequisites for Biology (BIOL) courses must be completed with a minimum grade of C. Students who audit or are unable to earn a minimum grade of C in a lower-division (100- or 200-level) BIOL course may repeat the course two additional times on a space available basis. Students who audit or are unable to earn a minimum grade of C in an upper-division (300- or 400-level) BIOL or Microbiology (MBIO) course may repeat the course one additional time on a space-available basis. Students repeating a BIOL or MBIO course are required to complete all components of that course during the semester in which the course is retaken. When repeating a course with a lecture and laboratory component, both components must be repeated. Students enrolled in a BIOL or MBIO laboratory or experiential learning course must attend the lab or course the first week of class or they may be administratively dropped.

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/).
- Complete the General Education Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/).
- Complete an exit examination.
- Complete the following major requirements with a minimum grade of C:

Biological Sciences Option

Code	Title	Credits
Required Support Courses		
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory	4
CHEM A321	Organic Chemistry I	3
CHEM A322	Organic Chemistry II	3
CHEM A323L	Organic Chemistry Laboratory	2
MATH A251	Calculus I	4-6
or MATH A251F	F.A.T. Calculus I	
MATH A252	Calculus II	4-6
or MATH A252F	F.A.T. Calculus II	
STAT A253	Applied Statistics for the Sciences	4
or STAT A307	Probability and Statistics	
Select one of the following options:		8
Option 1:		
PHYS A123 & A123L	College Physics I and College Physics I Laboratory	
PHYS A124 & A124L	College Physics II and College Physics II Laboratory	
Option 2:		
PHYS A211 & A211L	General Physics I and General Physics I Laboratory	
PHYS A212 & A212L	General Physics II and General Physics II Laboratory	
Core Courses		
BIOL A108	Principles and Methods in Biology	6
BIOL A242	Fundamentals of Cell Biology	3
BIOL A243	Experiential Learning: Cell Biology and Genetics	4
or BIOL A273	Experiential Learning: Ecology and Evolution	
BIOL A252	Principles of Genetics	3
BIOL A271	Principles of Ecology	3
BIOL A288	Principles of Evolution	3
BIOL A492	Undergraduate Seminar	1
Upper-Division Program Electives		**24**
Complete a minimum of 3 credits from four of the five subject areas. A minimum of 6 credits must be experiential learning courses from two subject areas. [1]		
Genetics, Cellular and Molecular Biology		

BIOL A452	Human Genome
BIOL A455	Experiential Learning: Bioinformatics
BIOL A461	Molecular Biology
BIOL A463	Molecular Biology of Cancer
BIOL A464	Metals in Biology
BIOL A465	Experiential Learning: Molecular Biology
BIOL/CHEM A471	Immunology
MBIO A340	Microbial Biology
MBIO A342	Experiential Learning: Microbial Biology
MBIO A451	Microbial Biotechnology
MBIO A460	Host-Microbiome Interactions
MBIO A462	Virology
Ecology and Evolution	
ASTR/BIOL A365	Astrobiology
BIOL A430	Marine Mammal Biology
BIOL A441	Animal Behavior
BIOL A442	Experiential Learning: Animal Behavior
BIOL A467	Wildlife Ecology
BIOL A472	Biogeography
BIOL A473	Conservation Biology
BIOL/CHEM A474	Ecotoxicology
BIOL A477	Tundra and Taiga Ecosystems
BIOL A478	Biological Oceanography
BIOL A481	Marine Biology
BIOL A483	Exploration Ecology
BIOL A484	Experiential Learning: Exploration Ecology Field Study
BIOL A486	Evolutionary Ecology
BIOL A489	Population Genetics and Evolutionary Processes
MBIO A450	Microbial Ecology
MBIO/GEOL A468	Geomicrobiology
MBIO A470	Ecology and Evolution of Infectious Disease
Diversity and Organismal Biology	
BIOL A320	Vertebrate Biology
BIOL A321	Experiential Learning: Vertebrate Biology
BIOL A330	Plant Biology
BIOL A332	Experiential Learning: Plant Biology
BIOL A423	Ichthyology
BIOL A427	Marine Invertebrate Biology
BIOL A430	Marine Mammal Biology
BIOL A431	Plant Diversity and Evolution
BIOL A487	Comparative Anatomy of Vertebrates
MBIO A340	Microbial Biology
MBIO A342	Experiential Learning: Microbial Biology
MBIO A440	Microbial Diversity
Physiology	
BIOL A310	Principles of Animal Physiology
BIOL A311	Experiential Learning: Animal Physiology
BIOL A316	Principles of Plant Physiology
BIOL A317	Experiential Learning: Plant Physiology
BIOL A412	Behavioral Endocrinology
BIOL A413	Neurophysiology
BIOL A415	Comparative Animal Physiology
BIOL A417	Applied Kinesiology and Exercise Physiology
BIOL A418	Fish Physiology
BIOL A419	Sleep and Chronobiology
BIOL A487	Comparative Anatomy of Vertebrates
MBIO A410	Microbial Physiology
Additional Upper-Division Electives	
BIOL A490	Selected Lecture Topics in Biology
BIOL A490L	Selected Laboratory Topics in Biology [1]
BIOL A495	Instructional Practicum: Laboratory
BIOL A497	Independent Study in Biology
BIOL A498	Individual Research [1]
BIOL A499	Senior Thesis [1]
CHEM A441	Principles of Biochemistry I
CHEM A442	Principles of Biochemistry II
CHEM A443	Biochemistry Laboratory
PHYS A456	Nonlinear Dynamics and Chaos
Total	**83-87**

Microbiological Sciences Option

Code	Title	Credits
Required Support Courses		
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory	4
CHEM A321	Organic Chemistry I	3
CHEM A322	Organic Chemistry II	3
CHEM A323L	Organic Chemistry Laboratory	2

MATH A251	Calculus I	4-6
or MATH A251F	F.A.T. Calculus I	
MATH A252	Calculus II	4-6
or MATH A252F	F.A.T. Calculus II	
STAT A253	Applied Statistics for the Sciences	4
or STAT A307	Probability and Statistics	
Select one of the following options:		8
Option 1:		
PHYS A123 & A123L	College Physics I and College Physics I Laboratory	
PHYS A124 & A124L	College Physics II and College Physics II Laboratory	
Option 2:		
PHYS A211 & A211L	General Physics I and General Physics I Laboratory	
PHYS A212 & A212L	General Physics II and General Physics II Laboratory	
Core Courses		
BIOL A108	Principles and Methods in Biology	6
BIOL A242	Fundamentals of Cell Biology	3
BIOL A243	Experiential Learning: Cell Biology and Genetics	4
or BIOL A273	Experiential Learning: Ecology and Evolution	
BIOL A252	Principles of Genetics	3
BIOL A271	Principles of Ecology	3
BIOL A288	Principles of Evolution	3
BIOL A455	Experiential Learning: Bioinformatics	4
BIOL A492	Undergraduate Seminar	1
MBIO A340	Microbial Biology	3
MBIO A342	Experiential Learning: Microbial Biology	4
MBIO A440	Microbial Diversity	3
or MBIO A450	Microbial Ecology	
or MBIO A468	Geomicrobiology	
MBIO A460	Host-Microbiome Interactions	3
or MBIO A462	Virology	
or BIOL A471	Immunology	
Upper-Division Program Electives in Microbiology		**9**
Complete a minimum of 9 credits from the Upper-Division Program Electives in Microbiology. Only 3 credits of BIOL A495, BIOL A497, BIOL A498, or BIOL A499 can count toward this 9 credit requirement. [1]		
ASTR/BIOL A365	Astrobiology	
BIOL A461	Molecular Biology	
BIOL A465	Experiential Learning: Molecular Biology	
BIOL A471	Immunology	
BIOL A490	Selected Lecture Topics in Biology	
BIOL A490L	Selected Laboratory Topics in Biology	
BIOL A495	Instructional Practicum: Laboratory	
BIOL A497	Independent Study in Biology	
BIOL A498	Individual Research	
BIOL A499	Senior Thesis	
CHEM A441	Principles of Biochemistry I	
CHEM A442	Principles of Biochemistry II	
CHEM A443	Biochemistry Laboratory	
MBIO A410	Microbial Physiology	
MBIO A440	Microbial Diversity	
MBIO A450	Microbial Ecology	
MBIO A451	Microbial Biotechnology	
MBIO A460	Host-Microbiome Interactions	
MBIO A462	Virology	
MBIO A468	Geomicrobiology	
MBIO A470	Ecology and Evolution of Infectious Disease	
Total		**85-89**

[1] *Several courses are listed in more than one area. Each course can only count toward the credit requirement in one area. BIOL A490L and BIOL A498 credits may not be counted toward the experiential learning minimum requirement in the Biological Sciences option.*

A minimum of 120 credits is required for the degree, 39 credits of which must be upper-division.

Biological Sciences Exit Examination

All BS Biological Sciences majors are required to complete a nationally standardized exit examination during the semester immediately prior to or during the semester they intend to graduate. There is no minimum score required for graduation.

Honors in Biological Sciences

The Bachelor of Science (BS) in Biological Sciences recognizes distinguished achievement by conferring programmatic honors in biological sciences. In order to receive honors in biological sciences, a student must meet the following requirements:

- Meet the requirements for Graduation with Honors (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/graduation/);
- Meet the requirements for a BS in Biological Sciences;
- Earn a minimum GPA of 3.50 in the major requirements;
- During the senior year of their academic program, the student must gain faculty approval for and complete, with a minimum grade of B, a senior thesis research project, with enrollment in BIOL A499. Biological science faculty members must approve the project proposal and final written report.

Program Student Learning Outcomes

Students graduating with a Bachelor of Arts or a Bachelor of Science in Biological Sciences will be able to:

- Demonstrate an understanding of the core concepts in the biological sciences: evolution; structure and function relationships; information flow, exchange and storage; transformation of energy and matter.
- Apply the process of science and construct knowledge through observations, experimentation, quantitative reasoning and hypothesis testing.
- Read, analyze and synthesize primary literature, and communicate scientific concepts and data in written and oral form.