Bachelor of Science in Natural Sciences

The Bachelor of Science (BS) in Natural Sciences provides a broad, customizable program of studies in the sciences, with coursework across multiple disciplines. It prepares students for advanced study or careers in the environmental sciences and the health professions, and professional certifications such as science educators. Graduates of the program have gone on to further study and jobs in a diversity of fields, such as veterinary, medical, and dental schools, certification as secondary school science educators, and environmental consulting.

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Programs (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/).
- Declare the major (see major requirements) and select one of three options: General Sciences, Pre-health Professions or Environmental Sciences. To declare the Bachelor of Science (BS) in Natural Sciences as their major, students must meet with an advisor to be accepted into the major. To schedule an advising session, contact the Department of Biological Sciences. At the advising session students are required to:
  - Choose one of the three options.
  - File a preliminary program of study with the Department of Biological Sciences.

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/).
- It is recommended that mathematical and statistical requirements be completed in the first two years of study.
- No more than 6 credits may come from courses designated as A495, A498 and A499 combined, with no more than 2 credits from A495.
- No more than 4 credits may be A492, with no more than 2 credits from the same discipline.
- Courses not listed as approved for the BS In Natural Sciences may be considered by petition, which should be signed by an advisor.
- It is strongly recommended that any changes to the preliminary program be reviewed by an advisor to ensure that the final program of study will meet all requirements for graduation.
- Students must submit a final Program of Study-Natural Sciences Degree form signed by their advisor to both the Office of the Registrar and the Department of Biological Sciences during the semester prior to the semester in which they plan to graduate. All courses listed in the form must be approved by the formal advisor before submitting the form to the Office of the Registrar and the Department of Biological Sciences.
- All prerequisites for courses used to meet the natural sciences degree requirements must be completed with a minimum grade of C. Students who audit a course intended to meet the natural sciences degree requirements or who are unable to earn a minimum grade of C in the course may repeat the course. Students who audit or are unable to earn a minimum grade of C in a lower-division (100- or 200-level) Biology (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 course may repeat the course one additional time on a space-available basis. Students repeating a BIOL 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 laboratory must attend lab the first week of class or they may be administratively dropped.
- All Natural Sciences majors are required to take an exit examination, a standardized test of knowledge. There is no minimum score required for graduation. The exam may be completed at the UAA Testing Center and a fee will be charged to students, or as part of BIOL A492.
- Complete the following major requirements with a minimum grade of C:

Environmental Sciences Option

Code	Title	Credits
BIOL A108	Principles and Methods in Biology	6
BIOL A492	Undergraduate Seminar	1
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory	4
ENVI A211	Environmental Science: Systems and Processes	3
ENVI A212	Living on Earth: Introduction to Environmental Studies	3
GEOL A111 & A111L	Physical Geology and Physical Geology Laboratory	4
or GEOL A121	Physical Geology for Science and Engineering Majors	
or GEOL A115 & A115L	Environmental Geology and Environmental Geology Laboratory	
GEOL A221	Historical Geology	4
Select 51 credits of degree electives, of which 31 must be upper-division credits, from the following course lists.		51
Natural and Physical Sciences		
Complete a minimum of 20 credits from the following:		
ASTR/BIOL A365	Astrobiology	
BIOL/GEOL A178	Introduction to Oceanography	
BIOL/GEOL A179	Introduction to Oceanography Laboratory	

BIOL A200	Introduction to Complexity
BIOL A242	Fundamentals of Cell Biology
BIOL A243	Experiential Learning: Cell Biology and Genetics
BIOL A252	Principles of Genetics
BIOL A271	Principles of Ecology
BIOL A273	Experiential Learning: Ecology and Evolution
BIOL A288	Principles of Evolution
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 A415	Comparative Animal Physiology
BIOL A418	Fish Physiology
BIOL A423	Ichthyology
BIOL A427	Marine Invertebrate Biology
BIOL A430	Marine Mammal Biology
BIOL A431	Plant Diversity and Evolution
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 A487	Comparative Anatomy of Vertebrates
BIOL A489	Population Genetics and Evolutionary Processes
BIOL A490	Selected Lecture Topics in Biology
BIOL A490L	Selected Laboratory Topics in Biology
BIOL A495A	Internship in the Biological Sciences
BIOL A498	Individual Research
BIOL A499	Senior Thesis
CHEM A253	Principles of Inorganic Chemistry
CHEM A312	Quantitative Analysis
CHEM A321	Organic Chemistry I
CHEM A322	Organic Chemistry II
CHEM A323L	Organic Chemistry Laboratory
CHEM A411	Biophysical Chemistry
CHEM A441	Principles of Biochemistry I
CHEM A442	Principles of Biochemistry II
CHEM A443	Biochemistry Laboratory
CHEM A492	Undergraduate Seminar
CHEM A498	Individual Research
GEOG A375	Environmental Applications of Geographic Information Systems (GIS)
GEOL A225	Earth Surface Processes
GEOL A310	Professional Practices in Geology
GEOL A315	Geological Data Visualization and Analysis
GEOL A320	Volcanology
GEOL A321	Mineralogy
GEOL A322	Igneous and Metamorphic Petrology
GEOL A325	Geology of Ore Deposits
GEOL A331	Sedimentology and Stratigraphy
GEOL A332	Sedimentary Petrology Laboratory
GEOL A333	Earthquakes and Seismic Hazards
GEOL A345	Hydrogeology
GEOL A350	Geomorphology
GEOL A335	Structural Geology
GEOL A361	Earth Resources and Society
GEOL A436	Petroleum Geology
GEOL A437	Depositional Systems and Dynamic Stratigraphy
GEOL A441	Paleoclimatology
GEOL A444	The Cryosphere
GEOL A448	Structural Geology and Geomechanics
GEOL A454	Glacial and Quaternary Geology
GEOL A458	Geology of Alaska
GEOL A461	Geochemistry
GEOL A463	Environmental Geochemistry
GEOL A465	Isotope Geochemistry
GEOL A468	Geomicrobiology
GEOL A476	Applied Geophysics
GEOL A477	Integrated Subsurface Mapping and Analysis
GEOL A480	Geologic Field Methods
GEOL A481	Alaskan Field Investigations
GEOL A482	Geologic Field Investigations
GEOL A490	Advanced Topics in Geology
GEOL A492	Geology Seminar
GEOL A495	Geology Internship
GEOL A498	Student Research

GEOL A499	Senior Thesis
MBIO A340	Microbial Biology
MBIO A342	Experiential Learning: Microbial Biology
MBIO A410	Microbial Physiology
MBIO A420	Pathogenic Microbiology
MBIO A421	Experiential Learning: Pathogenic Microbiology
MBIO A440	Microbial Diversity
MBIO A450	Microbial Ecology
MBIO A451	Microbial Biotechnology
MBIO A452	Microbial Genetics
MBIO A453	Experiential Learning: Microbial Ecology
MBIO/GEOL A468	Geomicrobiology
PHYS A123 & A123L	College Physics I and College Physics I Laboratory [1]
or PHYS A211 & A211L	General Physics I and General Physics I Laboratory
PHYS A124 & A124L	College Physics II and College Physics II Laboratory [1]
or PHYS A212 & A212L	General Physics II and General Physics II Laboratory
PHYS A303	Modern Physics
Math and Computational Skills	
Complete a minimum of 15 credits from the following:	
CS A109	Computer Programming (Languages Vary)
or CS A110	Java Programming
or CSCE A201	Computer Programming I
CSCE A222	Object-Oriented Programming I
CSCE A311	Data Structures and Algorithms
CSCE A351	Automata, Algorithms and Complexity
CSCE A360	Database Systems
CSCE A381	Computer Graphics
CSCE A405	Artificial Intelligence
CSCE A412	Evolutionary Computing
GEO A359	Geodesy and Map Projections
GIS A370	GIS and Remote Sensing for Natural Resources
GIS A458	Spatial Data Management
GIS A466	Spatial Analysis
GIS A467	Image Analysis
MATH A251	Calculus I
MATH A252	Calculus II
MATH A253	Calculus III
MATH A261	Introduction to Discrete Mathematics
MATH A265	Fundamentals of Mathematics
MATH A302	Ordinary Differential Equations
MATH A305	Introduction to Geometries
MATH A306	Discrete Methods
MATH A314	Linear Algebra
MATH A371	Stochastic Processes
MATH A401	Introduction to Real Analysis
MATH A405	Introduction to Abstract Algebra
MATH A407	Mathematical Statistics
MATH A410	Introduction to Complex Analysis
MATH A432	Partial Differential Equations
STAT A253	Applied Statistics for the Sciences
or STAT A307	Probability and Statistics
STAT A308	Intermediate Statistics for the Sciences
STAT A402	Scientific Sampling
STAT A403	Regression Analysis
STAT A404	Analysis of Variance
STAT A407	Time Series Analysis
STAT A408	Multivariate Statistics
Social Sciences	
Complete a minimum of 9 credits from the following:	
ANTH A101	Introduction to Anthropology
ANTH A202	Cultural Anthropology
ANTH A205	Biological Anthropology
ANTH A415	Applied Anthropology
CEL A292	Introduction to Civic Engagement
CEL A390	Special Topics in Civic Engagement
ECON A101	Principles of Microeconomics
ECON A102	Principles of Macroeconomics
ECON A210	Environmental Economics and Policy
ECON A300	The Economy of Alaska
ECON A321	Intermediate Microeconomics
ECON A324	Intermediate Macroeconomics
ECON A435	Natural Resource Economics
ENVI A470	Environmental Planning and Problem Solving
ENVI A490	Topics in Environment and Society
GEOG/INTL A101	Local Places/Global Regions: An Introduction to Geography
PHIL A303	Environmental Ethics
SOC A101	Introduction to Sociology
SOC A404	Environmental Sociology
Total	**80**

[1] *Students cannot get credit for both PHYS A123/PHYS A123L and PHYS A211/PHYS A211L or PHYS A124/PHYS A124L and PHYS A212/PHYS A212L.*

Pre-Health Professions Option

Code	Title	Credits
BIOL A108	Principles and Methods in Biology	6
BIOL A492	Undergraduate Seminar	1
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory	4
PHYS A123 & A123L	College Physics I and College Physics I Laboratory	4
PHYS A124 & A124L	College Physics II and College Physics II Laboratory	4
Complete 57 credits of degree electives, of which a minimum of 31 must be upper-division, from the following course lists:		57
Natural Sciences		
Complete a minimum of 24 credits from the following:		
BIOL A111	Human Anatomy and Physiology I	
BIOL A112	Human Anatomy and Physiology II	
BIOL A200	Introduction to Complexity	
BIOL A240	Introductory Microbiology for Health Sciences	
or MBIO A340 & MBIO A342	Microbial Biology and Experiential Learning: Microbial Biology	
BIOL A242	Fundamentals of Cell Biology	
BIOL A243	Experiential Learning: Cell Biology and Genetics	
BIOL A252	Principles of Genetics	
BIOL A288	Principles of Evolution	
BIOL A310	Principles of Animal Physiology	
BIOL A311	Experiential Learning: Animal Physiology	
BIOL A320	Vertebrate Biology	
BIOL A321	Experiential Learning: Vertebrate Biology	
BIOL A412	Behavioral Endocrinology	
BIOL A413	Neurophysiology	
BIOL A415	Comparative Animal Physiology	
BIOL A417	Applied Kinesiology and Exercise Physiology	
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	
BIOL A487	Comparative Anatomy of Vertebrates	
BIOL A489	Population Genetics and Evolutionary Processes	
BIOL A490	Selected Lecture Topics in Biology	
BIOL A490L	Selected Laboratory Topics in Biology	
BIOL A495A	Internship in the Biological Sciences	
BIOL A498	Individual Research	
BIOM A418	Human Gross Anatomy	
CHEM A312	Quantitative Analysis	
CHEM A321	Organic Chemistry I	
CHEM A322	Organic Chemistry II	
CHEM A323L	Organic Chemistry Laboratory	
CHEM A411	Biophysical Chemistry	
CHEM A441	Principles of Biochemistry I	
CHEM A442	Principles of Biochemistry II	
CHEM A443	Biochemistry Laboratory	
CHEM A492	Undergraduate Seminar	
CHEM A498	Individual Research	
MBIO A410	Microbial Physiology	
MBIO A420	Pathogenic Microbiology	
MBIO A421	Experiential Learning: Pathogenic Microbiology	
MBIO A451	Microbial Biotechnology	
MBIO A452	Microbial Genetics	
MBIO A462	Virology	
PHYS A456	Nonlinear Dynamics and Chaos	
Social Sciences		
Complete a minimum of 15 credits from the following:		
ANTH A101	Introduction to Anthropology	
ANTH A205	Biological Anthropology	
ANTH A452	Culture and Human Biodiversity	
ANTH A455	Culture and Health	
ANTH A490	Selected Topics in Anthropology	
ECON A101	Principles of Microeconomics	
ECON A102	Principles of Macroeconomics	
HS A210	Introduction to Environmental Health	
HS A220	Core Concepts in the Health Sciences	
HS A230	Introduction to Global Health	
HS A326	Introduction to Epidemiology	
HS A370	Medical Sociology	

HS A492	Senior Seminar: Contemporary Health Policy
KIN A383	Movement Theory and Motor Development
KIN A384	Cultural and Psychological Aspects of Health and Physical Activity
PHIL A302	Biomedical Ethics
PSY A111	Introduction to Psychology
PSY A143	Death and Dying
PSY A150	Lifespan Development
PSY A200	Introduction to Behavior Analysis
PSY A260	Statistics for Psychology
PSY A260L	Statistics for Psychology Lab
PSY A261	Research Methods in Psychology
PSY A261L	Research Methods in Psychology Laboratory
PSY A316	Motivation and Emotion
PSY A345	Abnormal Psychology
PSY A366	Sensation and Perception
PSY A367	Cognitive Psychology
PSY A368	Personality
PSY A370	Behavioral Neuroscience
PSY A375	Social Psychology
PSY A398	Individual Research
PSY A400	Strategies of Behavior Change
PSY A412	History of Psychology
PSY A425	Clinical Psychology
PSY A428	Evolutionary Psychology
PSY A442	Psychopathology of Childhood and Adolescence
PSY A447	Behavioral Treatment of Autism Spectrum Disorder
PSY A450	Adult Development and Aging
PSY A455	Interventions for Challenging Behavior
PSY A485	Health Psychology
PSY A498	Individual Research
PSY A499A	Developing Psychological Research
SOC A370	Medical Sociology

Math and Computational Skills

Complete a minimum of 9 credits from the following:	
MATH A221	Applied Calculus for Managerial and Social Sciences
or MATH A251	Calculus I
MATH A252	Calculus II
MATH A253	Calculus III
MATH A261	Introduction to Discrete Mathematics
MATH A265	Fundamentals of Mathematics
MATH A302	Ordinary Differential Equations
MATH A305	Introduction to Geometries
MATH A306	Discrete Methods
MATH A314	Linear Algebra
MATH A371	Stochastic Processes
MATH A401	Introduction to Real Analysis
MATH A405	Introduction to Abstract Algebra
MATH A407	Mathematical Statistics
MATH A410	Introduction to Complex Analysis
MATH A432	Partial Differential Equations
MATH A490	Selected Topics in Mathematics
MATH A498	Individual Research
STAT A253	Applied Statistics for the Sciences
or STAT A307	Probability and Statistics
STAT A308	Intermediate Statistics for the Sciences
STAT A402	Scientific Sampling
STAT A403	Regression Analysis
STAT A404	Analysis of Variance
STAT A407	Time Series Analysis
STAT A408	Multivariate Statistics
Total	**80**

General Sciences Option

Code	Title	Credits
BIOL A108	Principles and Methods in Biology	6
CHEM A105 & A105L	General Chemistry I and General Chemistry I Laboratory	4
CHEM A106 & A106L	General Chemistry II and General Chemistry II Laboratory	4
GEOL A111 & A111L	Physical Geology and Physical Geology Laboratory	4
GEOL A221	Historical Geology	4
PHYS A123 & A123L	College Physics I and College Physics I Laboratory	4
or PHYS A211 & A211L	General Physics I and General Physics I Laboratory	
PHYS A124 & A124L	College Physics II and College Physics II Laboratory	4
or PHYS A212 & A212L	General Physics II and General Physics II Laboratory	
BIOL A492	Undergraduate Seminar	1
Complete an additional 49 credits of degree electives. The credits may come from the following course lists:		49
Environmental Sciences Option Course Lists (see above)		
Pre-Health Professions Option Course Lists (see above)		
ASTR A103	Solar System Astronomy	

ASTR A103L	Solar System Astronomy Laboratory
ASTR A104	Stars, Galaxies and Cosmology
ASTR A104L	Stars, Galaxies and Cosmology Laboratory
EE/PHYS A314	Electromagnetics
EE/PHYS A324	Electromagnetics II
PHYS A311	Intermediate Classical Mechanics
PHYS A320	Simulation of Physical Systems
PHYS A403	Quantum Mechanics
PHYS A413	Statistical and Thermal Physics
PHYS A498	Individual Research
At least two of the following disciplines must be represented at the upper-division level: astronomy, biology, chemistry, geology, mathematics, physics, statistics	
Total	**80**

A minimum of 120 credits is required for the degree, of which 42 credits must be upper-division.

Program Student Learning Outcomes

Students graduating with a Bachelor of Science in Natural Sciences will be able to:

- Design and implement scientific investigations to explore natural phenomena using experimentation, which includes exploration and discovery, and testing ideas (gathering and interpreting data)
- Clearly and accurately communicate scientific ideas, theories, and observations in oral and written forms
- Apply scientific data, concepts, and models to craft interdisciplinary explanations of scientific ideas across two of the natural sciences