

# CLIMATE AND ENVIRONMENTAL CHANGE B.S.

## Program Requirements

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## Minimum Requirements for Climate and Environmental Change B.S.: 120 credits

**CONCENTRATIONS: ECOLOGICAL PROCESSES (P. 1), ENVIRONMENTAL EARTH SCIENCE (P. 2), PHYSICAL PROCESSES (P. 2), SUSTAINABILITY (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: <sup>1,2</sup>		
ECON F235X	Introduction to Natural Resource Economics	
MATH F251X	Calculus I	
	or MATH F230X Essential Calculus with Applications	
NRM F111X	Introduction to Sustainability Science	
PS F101X	Introduction to American Government and Politics	
<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: <sup>3</sup>		
NRM F303X	Environmental Ethics and Actions	
STAT F200X	Elementary Statistics <sup>4</sup>	
	or STAT F300 Statistics	
<b>Climate and Environmental Change Program Requirements</b>		
Complete the following:		
ATM/GEOS F480	Climate Change Processes: Past, Present, Future	4
BIOL F115X	Fundamentals of Biology I <sup>4</sup>	4
	or BIOL F103X Biology and Society	
	or BIOL F104X Natural History of Alaska	
CHEM F105X	General Chemistry I	4
CLIM F400	Climate and Environmental Change Capstone ePortfolio <sup>5</sup>	1
GEOS F101X	The Dynamic Earth	4

GEOS F483	Research Design, Writing and Presentation Methods	3
	or STO F401 Communicating Science	
	or ENGL F314 Technical Writing	
	or ENGL F414 Research Writing	
NRM F125	Our Changing Climate: Past, Present, Future	3
NRM F338	Introduction to Geographic Information Systems	3
PHYS F123X	College Physics I	4
	or PHYS F211X General Physics I	
PS F447	U.S. Environmental Politics	3
<b>Concentration</b>		
Complete one of the following:		35-36
Ecological Processes		
Environmental Earth Science		
Physical Processes		
Sustainability		
<b>Electives</b>		
General Electives		0-2
<b>Total Credits</b>		<b>120-124</b>

- <sup>1</sup> Students in the Environmental Earth Science and Physical Processes concentrations must take MATH F251X to meet this requirement
- <sup>2</sup> WRTG F213X is recommended
- <sup>3</sup> Quantitatively-inclined students are encouraged to take STAT F300
- <sup>4</sup> Students in the Ecological Processes and Sustainability Concentrations must take BIOL F115X
- <sup>5</sup> Fulfills the baccalaureate capstone requirement

## Concentrations

### ECOLOGICAL PROCESSES

Code	Title	Credits
<b>Ecological Processes Concentration Requirements</b>		
As part of the general education requirements, complete the following:		
MATH F230X	Essential Calculus with Applications	
	or MATH F251X Calculus I	
As part of the B.S. requirements, complete the following:		
BIOL F115X	Fundamentals of Biology I	
BIOL F116X	Fundamentals of Biology II	
Complete the following:		
BIOL F371	Principles of Ecology	4
BIOL F385	Global Change Biology	3
BIOL F476	Ecosystem Ecology	4
CHEM F106X	General Chemistry II	4
GEOS F112X	The History of Earth and Life	4
STAT F401	Regression and Analysis of Variance	4
Complete two courses from the Policy, Society and Humanities course list <sup>6</sup>		6
Complete one course from the Physical Processes Course List <sup>6</sup>		3

Complete one course from the Biotic Processes or Technical & Data Skills lists <sup>6</sup>	3
<b>Total Credits</b>	<b>35</b>

<sup>6</sup> When choosing electives, students should consider the requirement for 39 credits of upper division coursework prior to graduation.

## ENVIRONMENTAL EARTH SCIENCE

Code	Title	Credits
<b>Environmental Earth Science Concentration Requirements</b>		
As part of the general education requirements, complete the following:		
MATH F251X	Calculus I	
As part of the B.S. requirements, complete the following:		
GEOS F112X	The History of Earth and Life	
Complete the following:		
ATM F456	Climate and Climate Change	3
or OCN F481	The Ocean and Global Change	
GEOS F213	Mineralogy	4
GEOS F304	Geomorphology	3
GEOS F315	Paleobiology and Paleontology	4
or GEOS F322	Stratigraphy and Sedimentation	
GEOS F422	Geoscience Applications of Remote Sensing	3
NRM F370	Introduction to Watershed Management	3
NRM F380	Soils and the Environment	3
Complete two courses from the Policy, Society and Humanities course list <sup>6</sup>		6
Complete one additional course from the Physical Processes course list <sup>6</sup>		3
Complete one additional course from the Biotic Processes or Technical & Data Skills course lists <sup>6</sup>		3
<b>Total Credits</b>		<b>35</b>

<sup>6</sup> When choosing electives, students should consider the requirement for 39 credits of upper-division coursework prior to graduation.

## PHYSICAL PROCESSES

Code	Title	Credits
<b>Physical Processes Concentration Requirements</b>		
As part of the general education requirements, complete the following:		
MATH F251X	Calculus I	
As part of the B.S. requirements, complete the following:		
PHYS F211X	General Physics I	
PHYS F212X	General Physics II	
Complete the following:		
ATM F401	Introduction to Atmospheric Sciences	3
ATM F456	Climate and Climate Change	3
or OCN F481	The Ocean and Global Change	
GEOS F304	Geomorphology	3
GEOS F422	Geoscience Applications of Remote Sensing	3
or NRM F435	GIS Analysis	

GEOS F477	Ice in the Climate System	3
or GEOS F481	Snow in the Environment	
MATH F252X	Calculus II	4
MATH F253X	Calculus III	4
Complete two courses from the Policy, Society, and Humanities course list <sup>6</sup>		6
Complete two additional courses from the Physical Processes or Technical & Data Skills course lists <sup>6</sup>		6
<b>Total Credits</b>		<b>35</b>

<sup>6</sup> When choosing electives, students should consider the requirement for 39 credits of upper-division coursework prior to graduation.

## SUSTAINABILITY

Code	Title	Credits
<b>Sustainability Concentration Requirements</b>		
As part of the general education requirements, complete the following:		
MATH F230X	Essential Calculus with Applications	
or MATH F251X	Calculus I	
As part of the B.S. requirements, complete the following:		
BIOL F115X	Fundamentals of Biology I	
BIOL F116X	Fundamentals of Biology II	
Complete the following:		
ANS F461	Native Ways of Knowing <sup>7</sup>	3
or ANS F347	Voices of Native American Peoples	
ATM F101X	Weather and Climate of Alaska	4
or BIOL F104X	Natural History of Alaska	
or ECON F111X	The Economy of Rural Alaska	
BIOL F371	Principles of Ecology	4
NRM F101	Natural Resources Conservation and Policy	3
or FISH F110	Fish and Fisheries in a Changing World	
or WLF F101	Survey of Wildlife Science	
NRM F210	Principles of Sustainable Agriculture	3
NRM F277	Introduction to Conservation Biology	3
NRM F380	Soils and the Environment	3
or NRM F370	Introduction to Watershed Management	
NRM F430	Resource Management Planning	3
or NRM F407	Environmental Law	
STAT F401	Regression and Analysis of Variance	4
Complete one course from the Biotic or Physical Processes course list <sup>6</sup>		3
Complete one course from the Technical & Data Skills course list <sup>6</sup>		3
<b>Total Credits</b>		<b>36</b>

<sup>6</sup> When choosing electives, students should consider the requirement for 39 credits of upper-division coursework prior to graduation.

<sup>7</sup> ANS F461 fulfills the Alaska Native-themed requirement (<http://catalog.uaf.edu/bachelors/#alaskanativethemedrequirementtext>).

## Course Lists

### PHYSICAL PROCESSES

Code	Title	Credits
ATM F401	Introduction to Atmospheric Sciences	3
ATM F456	Climate and Climate Change	3
CHEM F321	Organic Chemistry I	4
CHEM F325	Organic Chemistry II	4
CHEM F331	Physical Chemistry I	4
CHEM F332	Physical Chemistry II	4
GEOS F304	Geomorphology	3
GEOS F380	Geological Hazards	3
GEOS F460	The Dynamic Alaska Coastline	3
GEOS F477	Ice in the Climate System	3
OCN F419	Concepts in Physical Oceanography	3
OCN F481	The Ocean and Global Change	3
PHYS F413	Atmospheric Radiation	3
or ATM F413	Atmospheric Radiation	3

### BIOTIC PROCESSES

Code	Title	Credits
BIOL F371	Principles of Ecology	4
BIOL F418	Biogeography	3
BIOL F457	Environmental Microbiology	3
BIOL F476	Ecosystem Ecology	4
GEOS F315	Paleobiology and Paleontology	4
GEOS F453	Palynology and Paleopalynology	4
GEOS F485	Mass Extinctions, Neocatastrophism and the History of Life	3
MBI F482	Human Impacts to the Marine Biosphere	3
NRM F370	Introduction to Watershed Management	3
NRM F380	Soils and the Environment	3
NRM F466	Environmental Soil Chemistry	3

### POLICY, SOCIETY AND CULTURE

Code	Title	Credits
ACNS F449	Northern and Environmental Literature	3
ACNS F453	Fire, Ice, and the Fate of Humanity: A History of Energy and Climate Change	3
ANS F242X	Indigenous Cultures of Alaska <sup>8</sup>	3
ANS F347	Voices of Native American Peoples	3
ANS F350	Cross-cultural Communication: Alaska Perspectives <sup>8</sup>	3
ANS F365	Alaska Native Art History <sup>8</sup>	3
ANS F461	Native Ways of Knowing <sup>8</sup>	3
HIST F483	20th-century Circumpolar History	3
HSEM F461	Human Security in Alaska <sup>8</sup>	3
NRM F204	Public Lands Law and Policy	3
NRM F407	Environmental Law	3
NRM F430	Resource Management Planning	3
PS F403	Public Policy	3

<sup>8</sup> Fulfills the Alaska Native-themed requirement (<http://catalog.uaf.edu/bachelors/#alaskanativethemedrequirementtext>).

### TECHNICAL AND DATA SKILLS

Code	Title	Credits
ATM F473	Micrometeorology with Focus on Subarctic and Arctic Ecosystems	3
CS F201	Computer Science I	3
GEOS F422	Geoscience Applications of Remote Sensing	3
MATH F302	Differential Equations	3
MATH F314	Linear Algebra	3
NRM F240	Natural Resources Measurement and Inventory	3
NRM F435	GIS Analysis	4
STAT F401	Regression and Analysis of Variance	4
STAT F402	Scientific Sampling	3
STAT F461	Applied Multivariate Statistics	3

### Road Maps

## Climate and Environmental Change B.S. Environmental Earth Science Concentration

Course	Title	Credits
<b>First Year</b>		
<b>Fall</b>		
GEOS F101X	The Dynamic Earth (NS GER 1)	4
LS F101X	Library Information and Research (NS GER 1)	1
MATH F251X	Calculus I (Concentration Requirement, M GER)	4
PS F101X	Introduction to American Government and Politics (Concentration Requirement, M GER)	3
WRTG F111X	Writing Across Contexts (Communication GER 1)	3
		<b>Credits</b>
		<b>15</b>
<b>Spring</b>		
NRM F125	Our Changing Climate: Past, Present, Future	3
COM F131X/F141X	Fundamentals of Oral Communication: Group Context (Communication GER 2)	3
NRM F111X	Introduction to Sustainability Science (S GER 2 (discipline 2))	3
CHEM F105X	General Chemistry I (NS GER 2)	4
Arts GER		3
		<b>Credits</b>
		<b>16</b>
<b>Second Year</b>		
<b>Fall</b>		
BIOL F115X	Fundamentals of Biology I (NS degree requirement)	4

ECON F235X	Introduction to Natural Resource Economics (One more Art, H, or S GER)	3	Open elective	3
PHYS F211X	General Physics I (Major)	4	<b>Credits</b>	<b>13</b>
WRTG F213X	Writing and the Sciences (Communication GER 3)	3	<b>Total Credits</b>	<b>122</b>
<b>Credits</b>		<b>14</b>		
<b>Spring</b>				
GEOS F112X	The History of Earth and Life	4		
GEOS F304	Geomorphology	3		
STAT F200X	Elementary Statistics	3		
Open Elective		3		
H GER 1		3		
<b>Credits</b>		<b>16</b>		
<b>Third Year</b>				
<b>Fall</b>				
GEOS F213	Mineralogy (Concentration)	4		
GEOS F315	Paleobiology and Paleontology (Concentration)	4		
GEOS F422	Geoscience Applications of Remote Sensing (Concentration)	3		
PS F447	U.S. Environmental Politics (Major)	3		
NRM F380	Soils and the Environment (Concentration)	3		
<b>Credits</b>		<b>17</b>		
<b>Spring</b>				
NRM F303X	Environmental Ethics and Actions (S GER 1 (discipline 1))	3		
Policy List (Concentration)		3		
Policy List (Concentration)		3		
Open Elective		3		
Open Elective		3		
<b>Credits</b>		<b>15</b>		
<b>Fourth Year</b>				
<b>Fall</b>				
ATM F480	Climate Change Processes: Past, Present, Future (Major)	4		
GEOS F483	Research Design, Writing and Presentation Methods (Major)	3		
OCN F481	The Ocean and Global Change (Concentration)	3		
NRM F370	Introduction to Watershed Management (Concentration)	3		
NRM F338	Introduction to Geographic Information Systems (Major)	3		
<b>Credits</b>		<b>16</b>		
<b>Spring</b>				
CLIM F400	Climate and Environmental Change Capstone ePortfolio (Major)	1		
Open elective		3		
Physical List (Concentration)		3		
Bio or Tech list (Concentration)		3		