

## ENVIRONMENTAL SCIENCES B.S.

All students must meet the Degree and University Requirements.

All students must meet the Catamount Core Curriculum Requirements.

All students must meet the Rubenstein Core Curriculum Requirements

Students in the ENSC major must choose one of the following concentrations or an advisor approved self-design concentration (14-17 credits):

Agriculture and the Environment (p. 1)

Conservation Biology and Biodiversity (p. 2)

Ecological Design (p. 2)

Environmental Analysis and Assessment (p. 3)

Environmental Biology (p. 3)

Environmental Geology (p. 4)

Environmental Health (p. 4)

Global Environment and Climate Change (p. 4)

Water Resources (p. 5)

Self Designed Concentration (p. 5)

## MAJOR REQUIREMENTS

A total of 120 credits is required for the degree.

BCOR 1400	Exploring Biology 1	4
or BIOL 1400	Principles of Biology 1	
or BIOL 1000	AP Biology 1	
BCOR 1450	Exploring Biology 2	4
or BIOL 1450	Principles of Biology 2	
or BIOL 1005	AP Biology 2	
CHEM 1400	General Chemistry 1	4
CHEM 1450	General Chemistry 2	4
CHEM 1580	Intro Organic Chemistry w/lab <sup>1</sup>	4
or CHEM 2580	Organic Chemistry 1	
GEOL 1400	Environmental Geology	4
or PSS 2610	Fundmntls of Soil Science	
MATH 1212	Fundamentals of Calculus I	3
or MATH 1234	Calculus I	

MATH 1224	Fundamentals of Calculus II	3
or MATH 1248	Calculus II	
NR 2400	Applied Environ Statistics <sup>2</sup>	3-4
or STAT 1410	Basic Statistical Methods 1	
ENSC 1010	Intro Environmental Sci	3
ENSC 1090	Orientation to Env Sciences <sup>2</sup>	1
ENSC 2300	Global Environmental Assessmnt	3
ENSC 3600	Pollutant Mvmt/Air, Land&Water	4
ENSC 4010	Recovery&Restor Altered Ecosys	4
ENSC 4020	Applied Envir Assess Analysis	4

<sup>1</sup> Students interested in concentrations such as environmental analysis and assessment should consider taking more advanced courses, such as CHEM 2580/CHEM 2585.

<sup>2</sup> Internal and external transfer students to ENSC are exempt from ENSC 1090. (\*Note: RSENR & CALS students only)

## CONCENTRATION REQUIREMENTS

### Agriculture and the Environment Concentration

Choose a minimum of 15 credits from the following courses:		15
CDAE 2050	Food Waste to Value	
CDAE 2080	Comparative Food Systems	
CDAE 3070	The Real Cost of Food	
NFS 1073	Farm to Table: Food Sys	
PBIO 2090	Plant Systematics	
PSS 1210	Intro to Agroecology	
PSS 2060	Entomology & Pest Mgmt	
PSS 2120	Weed Ecology & Management	
PSS 2170	Plant Pathology	
PSS 2560	Permaculture	
PSS 2430	Forage and Pasture Mgmt	
PSS 2620	Soil Fertility & Conservation	
PSS 3120	Advanced Agroecology	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
MMG 3200	Environmental Microbiology	
PSS 3250	Eco Frontiers in Agroecology	
PSS 3320	Biological Control	

PSS 3610	Soil Morph Class & Land Use	
PSS 3640	Chemistry of Soil & Water	
PSS 3680	Soil Ecology	
PSS 3690	Soil/Water Pollution/Bioremed	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Conservation Biology and Biodiversity Concentration**

WFB 3240	Conservation Biology	4
Choose ONLY one of the following :		4
PBIO 2090	Plant Systematics	
or BIOL 4245	Mammalogy	
or FOR 1210	Dendrology	
or WFB 1740	Wildlife Conservation	
or WFB 2300	Ornithology	
or WFB 4320	Ichthyology	
Choose a minimum of 7 additional credits from the following courses:		7
ASCI 2600	Zoos, Exotics & Endang Species	
ASCI 2700	Wildlife Hlth & Consvration	
BCOR 2100	Ecology and Evolution	
BCOR 2300	Genetics	
BIOL 1205	Climate Change Genetics	
BIOL 3100	Plant-Animal Interactions	
BIOL 3105	Community Ecology	
BIOL 3130	Behavioral Ecology	
BIOL 3140	Physiological Ecology	
BIOL 4230	Marine Mammal Biology	
BIOL 4260	Population Genetics	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
FOR 2220	Forest Ecosystem Analysis	
FOR 4720	Sustain Mgmt Forest Ecosys	
FOR 4280/ NR 3280	Ecosystems Ecology	
NR 3200	Landscape Ecology	
NR 4800	Stream Ecology	

PBIO 2080	Morph & Evo of Vascular Plants	
PBIO 3220	Ecological Invasions	
PBIO 3750	Global Change Ecology	
PSS 3680	Soil Ecology	
WFB 2740	Prin of Wildlife Management	
WFB 3610	Fisheries Biology & Techniques	
WFB 3710	Wetlands Wildlife Ecology	
WFB 4610	Fisheries Management	
WFB 4750	Wildlife Behavior	
WFB 4830	Terrestrial Wildlife Ecology	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Ecological Design Concentration**

NR 3880	Ecol Design & Living Technol	3
Choose a minimum of 12 additional credits from the following courses:		12
CDAE 2020	Sustainable Community Dev	
CDAE 2370	Landscape Design Fundamentals	
CDAE 2700	Green Building Energy Systems	
CDAE 2720	Sust. Development Travel Study	
CDAE 2993	Independent Study	
CDAE 3180	Community Org & Development	
CDAE 3370	Economics of Sustainability	
CDAE 3760	Community Design Studio	
CDAE 3780	Applied Community Planning	
CEE 2120	Environmental Systems	
CEE 3510	Water Quality Engineering	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
GEOG 2770	Geography of Development	
MMG 3200	Environmental Microbiology	
NR 2880	Sustainability Science	
NR 4350	Legal Aspects Envir Planning	
NR 4880	Advanced Ecological Design	
PSS 2270	Greenhouse Operations & Mgmt	

PSS 2370	Landscape Design Fundamentals	
PSS 2620	Soil Fertility & Conservation	
PSS 2540	Composting Ecology & Mgmt	
PSS 2560	Permaculture	
PSS 3120	Advanced Agroecology	
PSS 3380	Ecological Landscape Design	
PSS 3680	Soil Ecology	
PSS 3690	Soil/Water Pollution/Bioremed	
PRT 1500	Tourism Planning	
PRT 3300	Ecotourism	
PRT 4350	Outdoor Recreation Planning	
VS 1500	Sustainable Vermont	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Environmental Analysis and Assessment Concentration**

Choose a minimum of 15 credits from the following courses:		15
BIOC 3001	Fundamentals of Biochemistry	
CEE 2120	Environmental Systems	
CEE 3510	Water Quality Engineering	
CEE 3530	Environmental Quanti. Analysis	
CHEM 2310	Quantitative Analysis	
CHEM 2400	Inorganic Chemistry	
CHEM 2600	Intro Physical Chemistry	
CHEM 3320	Instrumental Analysis	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
ENVS 2980	Environmental Field Studies	
FOR 2110	Nat Res Ecol and Assessment 1	
FOR 2120	Nat Res Ecol and Assessment 2	
GEOG 2250	Global Environmental Change	
GEOG 2764	Vermont Field Studies	
GEOL 2105	Earth Materials	
GEOL 2405	Environmental Geochemistry	
GEOL 4405	Geochemistry of Natural Waters	

MMG 3050	Biochemistry I	
MMG 3200	Environmental Microbiology	
NR 2430	Intro to Geog Info Systems	
NR 2460	Remote Sensing	
PSS 3610	Soil Morph Class & Land Use	
PSS 3640	Chemistry of Soil & Water	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Environmental Biology Concentration**

BCOR 2100	Ecology and Evolution	4
Choose a minimum of 12 additional credits from the following courses:		12
BIOL 1205	Climate Change Genetics	
BIOL 3100	Plant-Animal Interactions	
BIOL 3105	Community Ecology	
BIOL 3130	Behavioral Ecology	
BIOL 3140	Physiological Ecology	
BIOL 3165	Evolution	
BIOL 4240	Field Zoology of Arthropods	
BIOL 4245	Mammalogy	
BIOL 4260	Population Genetics	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
NR 3200	Landscape Ecology	
NR 3280	Ecosystems Ecology	
NR 4500	Limnology	
or NR 4800	Stream Ecology	
PBIO 3220	Ecological Invasions	
PBIO 3750	Global Change Ecology	
PSS 3680	Soil Ecology	
WFB 2300	Ornithology	
WFB 2310	Field Ornithology	
WFB 3240	Conservation Biology	
WFB 3710	Wetlands Wildlife Ecology	
WFB 4320	Ichthyology	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Environmental Geology Concentration**

Choose a minimum of 15 credits from the following courses:		15
GEOL 2105	Earth Materials	
or GEOL 3105 Earth Materials w/lab		
GEOL 2405	Environmental Geochemistry	
or GEOL 3405 Environmental Geochem w/lab		
GEOL 2525	Geocomputing	
GEOL 3410	Geomorphology	
GEOL 3515	Field Geology	
GEOL 4105	Structural Geology	
GEOL 4405	Geochemistry of Natural Waters	
NR 2430	Intro to Geog Info Systems	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

**Environmental Health Concentration**

NR 2070	Human Health & the Envirnmt	3
Choose a minimum of 12 additional credits from the following courses:		12
ANTH 2191	Foundations of Global Health	
ANTH 3192	Anthro Research Global Health	
BCOR 2300	Genetics	
BIOC 3001	Fundamentals of Biochemistry	
BIOC 3075	Adv Biochem of Human Disease	
BIOL 3505	Neurobiology	
CHEM 2585	Organic Chemistry 2	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
FS 2030	Human Health in the Food Syst	
HLTH 2400	Issues in Women's Health	
HSCI 1100	Introduction to Public Health	
HSCI 2100	Fndns of Global Health	

HSCI 2200	Rsrch Methods in Public Health	
MMG 2010	Microbiol & Infectious Disease	
NFS 2114	Human Health in the Food Syst	
NR 2430	Intro to Geog Info Systems	
NR 3360	Women, Health and Environment	
NR 3370	Human Ecology & Health-Arctic	
NURS 3000	Health and Sustainability	
PHRM 3010	Pharmacology and Therapeutics	
PHRM 5400	Molecules & Medicine	
PHRM 3720	Toxicology	
SOC 2300	Population Health Research	
STAT 3000	Med Biostat&Epidemiology	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards concentration credits with advisor approval.

**Global Environment and Climate Change Concentration**

Choose a minimum of 15 credits from the following courses:		15
BIOL 1205	Climate Change Genetics	
CEE 2120	Environmental Systems	
ECON 1280	Economics of Climate Change	
ENSC 1490	Climate Change I	
or ENSC 2490 Climate Change II		
ENSC 2991	Internship <sup>1</sup>	
ENSC 2480	Global Environmental Change	
ENSC 2995	Undergraduate Research <sup>1</sup>	
ENSC 4740	Climate Chg: Sci & Percept	
GEOG 1200	Weather, Climate & Landscapes	
GEOG 2205	Biogeography	
GEOG 2230	Climatology: Concepts & Tools	
GEOG 2715	The Circumpolar Arctic	
GEOG 3230	Topics in Climate & Water (Climatology and Natural Hazards)	
GEOG 3230	Topics in Climate & Water (Paleoclimatology)	
GEOG 3250	Topics In Global Change	
GEOG 3760	Topics in Human Env Interact (The Anthropocene)	

GEOL 3410	Geomorphology	
NR 2020	Water as a Natural Resource	
	or GEOG 2235 Geography of Water	
NR 3200	Landscape Ecology	
NR 3940	Energy and Climate Law	
PBIO 3750	Global Change Ecology	
PSS 3610	Soil Morph Class & Land Use	

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

### Self-Designed concentration

Students may develop learning objectives and a concentration curriculum in consultation with the ENSC Program Director to focus on their specific area of interest. Students must complete a minimum of 15 credits of pre-approved coursework.

<sup>1</sup> A maximum of 3 credits of ENSC 2991 or ENSC 2995 may apply towards the concentration credits with advisor approval.

### Water Resources Concentration

Choose a minimum of 15 credits from the following courses:		15
CEE 2120	Environmental Systems	
BIOL 2105	Introduction to Marine Science	
BIOL 4230	Marine Mammal Biology	
ENSC 2991	Internship <sup>1</sup>	
ENSC 2995	Undergraduate Research <sup>1</sup>	
GEOG 3230	Topics in Climate & Water (Snow Hydrology)	
GEOL 2405	Environmental Geochemistry	
GEOL 4405	Geochemistry of Natural Waters	
NR 2020	Water as a Natural Resource	
	or GEOG 2235 Geography of Water	
NR 2430	Intro to Geog Info Systems	
NR 3880	Ecol Design & Living Technol	
NR 4500	Limnology	
NR 4800	Stream Ecology	
PBIO 3750	Global Change Ecology	
PSS 3640	Chemistry of Soil & Water	
PSS 3690	Soil/Water Pollution/Bioremed	
WFB 2410	Field Herpetology	
WFB 3610	Fisheries Biology & Techniques	
WFB 3710	Wetlands Wildlife Ecology	
WFB 4320	Ichthyology	
WFB 4610	Fisheries Management	