

# ACADEMIC PROGRAM

## DEGREE REQUIREMENTS

### 2021-2022 UVM CATALOGUE

Academic programs in the Rubenstein School include four kinds of requirements: **UNIVERSITY**, **GENERAL EDUCATION**, **CORE CURRICULUM**, and **MAJOR**.

#### ■ UNIVERSITY REQUIREMENTS

There are University requirements which must be fulfilled by all UVM degree candidates, regardless of school or college affiliation:

1. Diversity Course Requirement
2. Foundational Writing and Information Literacy Requirement
3. Sustainability Requirement
4. Quantitative Reasoning Requirement
5. Minimum cumulative grade point average of 2.00
6. 30 of the last 45 hours of academic credit applied toward the degree must be earned at UVM

#### ■ GENERAL EDUCATION REQUIREMENTS

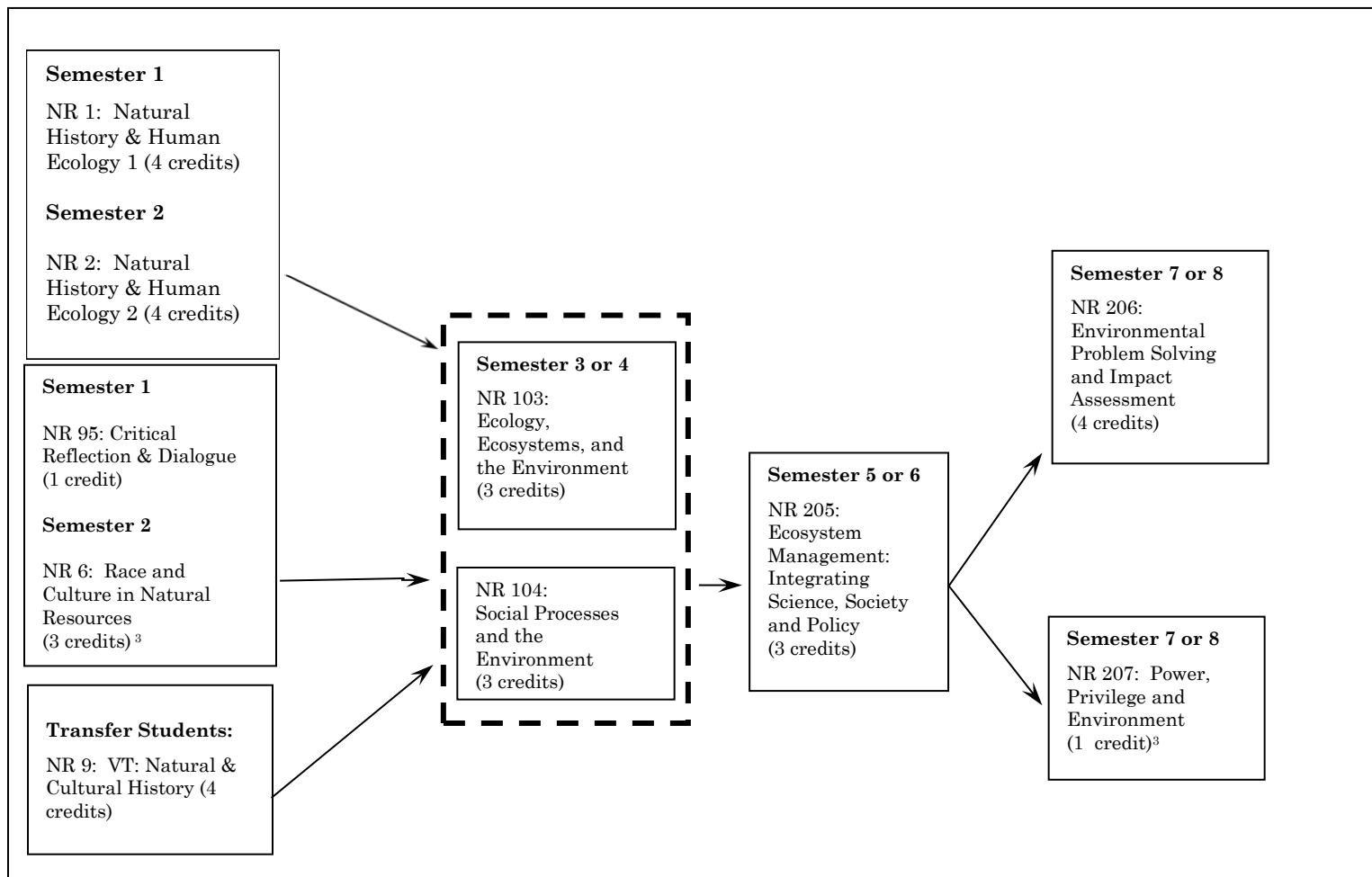
The Rubenstein School general education requirements are designed to enhance a student's ability to assimilate and analyze information, think and communicate clearly, and respect multiple perspectives. These requirements are flexible in order to encourage creativity in meeting educational goals. This is work that can be spread throughout the four-year sequence, though there are distinct advantages to taking certain classes early on. Also, some majors have specific requirements that should be considered as you make selections; you often can simultaneously fulfill a general education and a major requirement with a single course.

All students must complete each of the following general education requirements<sup>1</sup>. **PLEASE REVIEW THE DETAILED REQUIREMENTS FOR YOUR MAJOR, AS THEY VARY BY PROGRAM.**

1. **WRITING**<sup>2</sup>  
ENGS 1 (ENGS 2 if you are a sophomore, junior, or senior) or HCOL 85 (3 cr.)
2. **SPEAKING**  
SPCH 11 (3 cr.), CALS 183 (3 cr.), or NR 21 (2 cr.)
3. **RACE AND CULTURE IN NATURAL RESOURCES**<sup>3</sup>  
NR 6, NR 207, and 3 credits from the approved list of D1 or D2 diversity courses (7 cr.)
4. **MATHEMATICS**<sup>4</sup>  
MATH 9 or higher but **NOT** MATH 17 (ENVS, NR Planning, PRT), MATH 18 (FOR), MATH 19 (NR Ecology, WFB), MATH 19 & 20 (ENSC)
5. **STATISTICS**<sup>5</sup>  
NR 140 (4 cr.), STAT 111 (3 cr.), STAT 141 (3 cr.) or STAT 211 (3 cr.)

## ■ CORE CURRICULUM REQUIREMENTS

The core curriculum of the Rubenstein School represents a body of knowledge, skills, and values that the faculty believe is central to the study of natural resources and the environment. The core curriculum's required courses (**26 total credits**) cut across all academic programs within the School, integrating the natural and social sciences in an effort to approach full understanding and resolution of natural resource and environmental issues. The sequence of the core curriculum is shown schematically in the diagram below:



### **IMPORTANT NOTES:**

<sup>1</sup> With the exception of the third Race and Culture course chosen from the approved list of University Approved Diversity courses, no single course may be used to satisfy more than one of the above requirements.

<sup>2</sup> This requirement also fulfills the University Writing and Information Literacy Requirement. In addition to ENGS 1, ENGS 2 and HCOL 85, students may use any other course approved to count for the University Requirement.

<sup>3</sup> This requirement also fulfills the University Diversity Requirement. Internal and external transfer students to Rubenstein may take any 3-credit Category D1 course from the University Approved Diversity courses to substitute for NR 6 and NR 207, and any 3-credit Category D1 or D2 course to complete the University Diversity Requirement.

<sup>4</sup> Requirement varies depending on major choice.

<sup>5</sup> NR 140 is required for WFB, FOR, and NR Ecology majors.

## CORE CURRICULUM COURSE DESCRIPTIONS

NR 1 and NR 2 provide an introduction to the study of natural resources and the environment from natural and social science standpoints. Internal and external transfer students to Rubenstein substitute NR 9, VT: Natural & Cultural History for NR 1 and 2. NR 2. At the completion of these courses, students should (1) have a basic understanding of the School's integrated approach to natural resources and the environment, (2) be better prepared to make informed decisions about their academic majors, and (3) be prepared to advance to an intermediate level of study in natural resources. The intermediate courses in the sequence, NR 103 and NR 104, emphasize ecosystems and social systems, respectively. NR 205 and NR 206 focus directly on integrated and holistic management. In NR 205, students integrate natural and social science to understand environmental management principles and policies. In NR 206, the capstone course taken senior year, students are challenged to synthesize and apply the interdisciplinary knowledge, skills, and values they have learned to contemporary natural resources and environmental issues. NR 95, NR 6, and NR 207 explore how social justice and environmental issues are intertwined, and help students become culturally competent in an increasingly diverse world.

### CORE LEARNING OUTCOMES (Competencies & Knowledge Areas)

- Communication: Students will be able to employ effective speaking, writing, listening, and digital communication techniques.
- Teamwork: Students will be able to contribute to collaborative efforts, facilitate contributions of others, and address conflict directly and constructively.
- Working Across Difference: Students will be able to critically examine dimensions of difference and apply a nuanced understanding of power and privilege through effective communication.
- Problem Solving: Students will be able to design, evaluate, and employ appropriate frameworks in order to effect change and generate collaborative solutions to complex problems.
- Inquiry & Analysis: Students will be able to apply critical thinking skills and employ qualitative and quantitative methodologies in order to formulate questions and evaluate core knowledge areas.
- Integrative Learning: Students will be able to synthesize and transfer learning to complex situations across disciplinary boundaries through the application of critical reflection skills.
- Ecological Processes & Systems: Students will be able to identify and describe basic ecological processes and systems.
- Social Processes & Systems: Students will be able to identify, interpret, and analyze cultural, economic, historical, and political dynamics of environmental issues.
- Planning & Management: Students will be able to describe effective strategies in ecological planning, management, stewardship, and conservation of natural resources.
- Sustainability: Students will be able to discuss social, economic, and ecological principles of sustainability.

### NR 1 and 2

#### Natural History & Human Ecology 1

A two-semester course with introduction to dynamics of the natural world and basic concepts of biological, chemical, physical, and ecological sciences and application and interpretation of quantitative measurements. Emphasis on social/cultural perspectives and environmental history, values, and ethics with application to natural resources and environmental policy. Introduction to the dynamics of the natural world. Basic concepts of biological, chemical, physical, and ecological sciences and the application and interpretation of the quantitative measurements are presented within a natural history context. (4 credits + 4 credits)

### NR 95

#### Critical Reflection & Dialogue

Students practice reflection and dialogue skills while building a strong social network with advisors and peers. (1 credit)

### NR 6

#### Race and Culture in Natural Resources

Introduces the first-year student to issues of race and culture and their relevance to society, natural resources, and the environment. (3 credits)

**NR 9****Vermont: Natural and Cultural History**

Introduces students transferring into the Rubenstein School to natural resources and the environment from biological, ecological, and social/cultural perspectives. (4 credits)

**NR 103****Ecology, Ecosystems, and Environment**

Major ecological concepts and their application. Analysis of form, structure and function of organisms, populations, communities, ecosystems and landscapes. (3 credits)

**NR 104****Social Processes and the Environment**

Social science theories and their application to environmental issues. Analysis of issues using theories of government, economics, and social movements. Emphasis on integrating frameworks to analyze environmental issues. (3 credits)

**NR 205****Ecosystem Management: Integrating Science, Society, and Policy**

Integration of natural and social science into ecosystem management and policy. Consideration of ecosystem integrity, ecosystem degradation, human needs and values and the application of management principles within a holistic context. (3 credits)

**NR 206****Environmental Problem Solving and Impact Assessment**

Group dynamics, impact assessment, risk assessment and decision making. Emphasis on the process of solving complex environmental problems, interdisciplinary teamwork, and the National Environmental Policy Act. (4 credits)

**NR 207****Power, Privilege and Environment**

This course provides seniors with the opportunity to understand aspects of power, privilege, and injustice and its implications for the natural resource and environmental fields. (1 credit)

## ■ MAJOR REQUIREMENTS

Major requirements are the additional courses that you must take in order to graduate in a specific discipline. The Rubenstein School of Environment and Natural Resources awards degrees in six majors; several of these include distinct options, each of which has somewhat different requirements. The choices are:

### **Environmental Sciences**

*Agriculture and the Environment*  
*Conservation Biology and Biodiversity*  
*Ecological Design*  
*Environmental Analysis and Assessment*  
*Environmental Biology*  
*Environmental Geology*  
*Environmental Health*  
*Global Environment and Climate Change*  
*Water Resources*

### **Environmental Studies**

### **Forestry**

### **Natural Resources**

*Integrated Natural Resources*  
*Resource Ecology*  
*Resource Planning*

### **Parks, Recreation, and Tourism**

### **Wildlife and Fisheries Biology**

*Fisheries Biology*  
*Wildlife Biology*

## **MINORS**

A minor is a secondary concentration of course work, outside the area of the major. Some UVM academic programs require students to have a minor, but the Rubenstein School of Environment and Natural Resources does not. We do, however, offer minors in:

### **Environmental Studies**

### **Forestry**

### **Geospatial Technologies**

### **Parks, Recreation, and Tourism**

### **Sports Management**

### **Wildlife Biology**

These minors are available to students from any academic unit on campus. Rubenstein School students are also welcome to complete minors in academic departments outside the School.

## **ENVIRONMENTAL SCIENCES**

The demand for environmental scientists has increased dramatically in recent years. State and federal regulations addressing water pollution, solid waste management, air quality, global climate change, and environmental impact assessment have created a substantial demand for personnel with strong basic and applied scientific backgrounds. Large companies are hiring environmental scientists to help them respond to environmental regulations. Consulting firms are growing rapidly, and they are employing scientists with specific skills to work on multi-disciplinary teams. The need for environmental scientists trained to tackle environmental problems will continue to increase.

The interdisciplinary Environmental Sciences major combines a natural science-based core curriculum with hands-on experience needed to identify, analyze, and solve environmental problems. Blending hands-on field and laboratory instruction with real-world environmental internship, research, and study abroad opportunities, students acquire the skill set needed to tackle complex environmental problems. With the School's emphasis on such cutting-edge areas as ecological design, restoration of damaged ecosystems, and environmental assessment, Environmental Sciences graduates are equipped with the knowledge and professional skills required to successfully protect the health and integrity of our terrestrial, aquatic, and urban ecosystems.

Prior to the junior year, students select a concentration designed to provide greater depth of knowledge in a particular aspect of the field. Concentrations are offered in **Agriculture and the Environment, Conservation Biology and Biodiversity, Ecological Design, Environmental Analysis and Assessment, Environmental Biology, Environmental Geology, Environmental Health, Global Environment and Climate Change and Water Resources**. Students are also able to design a concentration that fits their personal interests.

Internships: Experiential learning is strongly recommended. Students are encouraged to do a professionally oriented internship under joint supervision of faculty and business, regulatory, or community representatives.

Students may enroll in the Environmental Sciences major through the Rubenstein School of Environment and Natural Resources, the College of Agriculture and Life Sciences, or the College of Arts and Sciences. Majors in the College of Arts and Sciences complete ENSC 1, 130, and 160, while those in the College of Agriculture and Life Sciences and the Rubenstein School complete all six Environmental Sciences Foundation Courses and major requirements. General education and other school-based requirements differ.

Successful Environmental Sciences graduates will demonstrate the following competencies:

- Apply a range of scientific methodologies and disciplinary perspectives through scientific inquiry, modeling and real-world experience in addressing pressing environmental issues.
- Employ a systems approach to analyze how human and ecological systems interact to influence processes in air, on land, and in water, including the transport and fate of nutrients and contaminants through the environment.
- Assess and articulate the scientific evidence surrounding key environmental issues and evaluate ongoing efforts to mitigate environmental problem.
- Design solutions to real world problems in collaboration with community partners.
- Deepen their understanding of the concepts, processes, problems and solutions of their chosen concentration.

**Program Director:** Professor Eric Roy Room# 210 Aiken, Ph: (802) 656-7359. Eric.Roy.1@uvm.edu

## **DEGREE REQUIREMENTS**

All students who enroll in the Environmental Sciences major in the Rubenstein School must fulfill the following requirements for graduation:

1. Complete the Rubenstein School's core curriculum.
2. Complete the Rubenstein School's general education requirements.

3. Complete a minimum of 120 credit hours of courses.
4. Complete the Environmental Sciences minimal basic science/quantitative coursework:

BCOR 11 and 12, Exploring Biology (8 cr.) preferred  
- or - BIOL 1 and 2, Principles of Biology (8 cr.)  
CHEM 31 and 32, General Chemistry 1 and 2 (8 cr.)  
CHEM 42, Introduction to Organic Chemistry\* (4 cr.)  
- or - CHEM 141 Organic Chemistry I (4 cr.)  
GEOL 55, Environmental Geology  
- or - PSS 161, Introduction to Soil Science (4 cr.)  
MATH 19 and 20, Fundamentals of Calculus I and Calculus II\*\* (6 cr.)  
- or - MATH 21 and 22 Calculus I and Calculus II (8 cr.)  
NR 140, Applied Environmental Statistics (4 cr.)  
- or - STAT 141, Basic Statistical Methods\*\* (3 cr.)

\*Students interested in areas such as environmental analysis and assessment should consider taking more advanced courses such as CHEM 141/142.

\*\* Also fulfills a Rubenstein School general education requirement.

5. Complete the Environmental Sciences foundation courses:

ENSC 1, Introduction to Environmental Sciences (3 cr.)  
ENSC 9, Orientation to Environmental Sciences\* (1 cr.)  
ENSC 130, Global Environmental Assessment (3 cr.)  
ENSC 160, Pollutant Movement through Air, Land, and Water (4 cr.)  
ENSC 201, Recovery and Restoration of Altered Ecosystems (4 cr.)  
ENSC 202, Applied Environmental Analysis and Assessment (4 cr.)

\*Internal and External Transfer students to ENSC are exempt from ENSC 9

6. Complete concentration requirements (14 credits) in **Agriculture and the Environment, Conservation Biology and Biodiversity, Ecological Design, Environmental Analysis and Assessment, Environmental Biology, Environmental Geology, Environmental Health, Global Environment and Climate Change and Water Resources**. A list of courses approved for each track is available from the Program Director or from the ENSC website <https://www.uvm.edu/environmentalsciences>. Students may also elect a self-designed track in a particular area of interest.

## **ENVIRONMENTAL STUDIES**

Environmental Studies is an interdisciplinary major, which combines required introductory and intermediate core courses with an individual-designed program of study chosen to meet individual learning goals. Intermediate core breadth courses teach important knowledge and offer perspectives in the natural sciences, social sciences, and humanities in local, national, and global contexts. Students complete a culminating nine-credit senior capstone thesis, internship, or advanced course option.

The Environmental Program at the University of Vermont was established in 1972 to meet the need for greater understanding of the ecological and cultural systems supporting all life on earth. This broadly interdisciplinary program is a campus-wide program serving students in four colleges across the university. The faculty are committed interdisciplinary thinkers drawing on the sciences, social sciences, and humanities to create a lively hub, addressing local and global issues with equal concern. We believe in collaborative problem solving and the power of human imagination to create a more sustainable future. The Environmental Program offers a major in Environmental Studies that can be pursued in three different colleges, including the College of Agriculture and Life Sciences, the College of Arts

and Sciences, and the Rubenstein School of Environment and Natural Resources. Students can choose which college/school best suits their broad educational needs and then pursue the Environmental Studies major from within that college. While major requirements differ slightly from college to college, the core curriculum is the same. Following the introductory courses and working closely with faculty advisors, each student creates an individually designed major plan. This learning plan culminates in a final capstone thesis, project, internship, or advanced level course sequence usually carried out in the senior year.

Many graduates pursue graduate or professional degrees; others enter employment in public and private sectors as consultants, educators, ecologists, planners, analysts, field researchers, farmers, green energy specialists, sustainability coordinators, writers and activists. Common choices for graduate programs include environmental education, biodiversity and endangered species, natural areas management, environmental policy and law, mediation, landscape restoration, wetlands protection, land conservation and land use planning, sustainable development, gender studies, ecotourism, and environmental communication.

Upon completion of the Bachelor of Sciences Degree in Environmental Studies, graduates will:

- Demonstrate a deep understanding of the scope, scale, and multiple dimensions of current environmental challenges.
- Demonstrate the ability to apply interdisciplinary approaches to critically evaluate environmental challenges and solutions.
- Understand how people from diverse walks of life value, engage with, and are affected by environmental challenges.
- Provide solutions to environmental challenges using creative and entrepreneurial approaches.

**Acting Program Director:** Amy Seidl, Bittersweet, Ph: (802) 656-4055, Amy.Seidl@uvm.edu

**Program Administrative Support:** Bittersweet, Ph: (802) 656-4055, envs@uvm.edu

**Professional Advisors:** Benjamin Langton, Bittersweet, Ph: (802) 656-4055, blangton@uvm.edu

## **DEGREE REQUIREMENTS**

All students who enroll in the Environmental Studies major in the Rubenstein School must fulfill the following requirements for graduation:

1. Complete the Rubenstein School's core curriculum.
2. Complete the Rubenstein School's general education requirements.
3. Complete a minimum of 120 credit hours of courses.
4. Complete the Environmental Studies major core courses:
  - ENVS 1 SU: Introduction to Environmental Studies (4 cr.)
  - ENVS 2 SU/D2: Solutions in Environmental Studies (4 cr.)
  - ENVS 101 Academic Planning Workshop (1 cr.)
  - Breadth Courses: (9 cr. total)
    - Natural Science: ENVS 173 Landscape Natural History or ENVS 188 Sustainability Science (3 cr.)
    - Social Science: ENVS 141 Ecolog. Economics or ENVS 143 Political Ecology or ENVS 142 Intro to Environmental Policy or ECON 133 Economics of Environmental Policy (3 cr.)
    - Humanities: ENVS 167 Global Env. History or ENVS 195 Env. Lit. Arts and Media or ENVS 178 Environmental Ethics (3 cr.)
  - Senior Capstone (9 cr.)



5. Complete an individually designed program:  
Twenty-one (21) credits of approved environmentally related courses at the 100- or 200-level, including three credits at the 200-level. These courses may be chosen from disciplines across the University and are in addition to the Rubenstein School's core and general education requirements.

**Visit the Environmental Program website for useful academic planning tools:** [www.uvm.edu/envprog](http://www.uvm.edu/envprog)

### **ENVIRONMENTAL STUDIES MINOR REQUIREMENTS**

A minimum of 17 credit hours is required. Students must earn at least a 2.0 cumulative GPA in their Environmental Studies minor courses to earn a minor in Environmental Studies. Courses required are:

- ENVS 1, Introduction to Environmental Studies (4 cr.)
- ENVS 2, International Environmental Studies (4 cr.)

9 credits of ENVS at the 100-level or above. Of the 9 credits, one non-ENVS course at the appropriate level may be substituted with the approval of the student's advisor and the Environmental Program.

## **FORESTRY**

The Forestry Major trains students to meet the needs of the 21st century, which include managing forests for resilience, adaptation, and climate mitigation. Students learn how to tackle the ever-increasing demands and pressures placed on the world's forests while sustaining the many services forest ecosystems provide. The program attracts students who want a career working outdoors, excel at math and science, learn by doing, and can embrace both the fundamentals of traditional forestry and emerging perspectives in the field. The Forestry major provides students with an education in ecologically responsible forestry, emphasizing the complex landscapes of the northeastern United States, while also stressing global context and change. Students develop the ability to coordinate and manage all aspects of sustainable forestry through an education that combines a strong foundation in natural and social sciences with hands-on field classes, internships, research experience, and forest management projects.

A student-proposed, faculty-approved, **area of concentration** provides curricular flexibility and addresses the individual interests of the Forestry major. This concentration may be an **individually designed area of emphasis** such as forest ecosystem health, forest ecology, consulting forestry, or urban forestry; or **a professionally appropriate University minor** such as wildlife biology, botany, or international development; or **a study abroad experience** that has a clear environmental and natural resources emphasis.

We emphasize experiential learning through extensive field instruction on University-owned forestland near the campus, the Green Mountain National Forest, and other public as well as private forests throughout Vermont. We strongly encourage students to gain valuable career-oriented experience while earning academic credit by assisting with ongoing forestry field or laboratory research, or through internship opportunities with public agencies and private organizations.

Graduates may be employed as resource professionals on public forests, consultants to private forest landowners, or managers of industrial forest lands; or they may choose related employment with organizations such as the Peace Corps, or land conservation groups; or they may pursue certification for secondary school education in biological and natural sciences; or they may decide to continue their education at the master's or doctoral level. To enhance their professional employability, students are strongly encouraged to pursue, and are assisted in finding, forestry internship and summer employment opportunities.

### **Forestry Program Learning Outcomes**

Our courses are outcome based, focused on achieving demonstrated student comprehension and proficiencies. The program expects that upon completion of the SAF-accredited BS degree in forestry, students will be able to:

- **Apply** essential skills of measurement, spatial orientation, sampling, and data analysis.
- **Incorporate** the foundational natural and social sciences into decision making.

- **Articulate** historical context and contemporary trajectory of the profession.
- **Evaluate** human dimensions of sustainable forest management, including the diverse universe of forest stakeholders, perspectives, and policies.
- **Develop** and implement well-justified forest management strategies that address a diversity of objectives at spatial scales ranging from stands to the entire planet.

**Program Director:** Professor Anthony D'Amato, 204E Aiken, [Awdamato@uvm.edu](mailto:Awdamato@uvm.edu)

## **DEGREE REQUIREMENTS**

All students who enroll in the Forestry curriculum must fulfill the following requirements for graduation:

1. Complete the Rubenstein School's core curriculum.
2. Complete the Rubenstein School's general education requirements.
3. Complete a minimum of 123 credit hours of courses.
4. Complete the required Forestry courses:

PBIO 4, Introduction to Botany (4 cr.)  
 - or - BIOL 1 and 2, Principles of Biology (8 cr.)  
 CHEM 23, General Chemistry (4 cr.)  
 MATH 18, Basic Mathematics\* (3 cr.)  
 NR 140, Applied Environmental Statistics\* (4 cr.)  
 FOR 95 Introduction to Forestry and Wildlife Biology (1 cr.)  
 FOR 111, Natural Resource Ecology and Assessment 1 (4 cr.)  
 FOR 112, Natural Resource Ecology and Assessment 2 (4 cr.)  
 PSS 161, Introduction to Soil Science (4 cr.)  
 A course in Economics or Ecological Economics (3 cr.)  
 NR 143, Introduction to Geographic Information Systems (3 cr.)  
 FOR 21, Dendrology (4 cr.)  
 FOR 122, Forest Ecosystem Analysis\*\* (4 cr.)  
 FOR 223, Multi-Resource Silviculture (4 cr.)  
 FOR 235, Forest Ecosystem Health (4 cr.)  
 FOR 190, Forestry Internship (3 cr.)  
 FOR 233, Management of Forest Woodlots (3 cr.)  
 FOR 272, Sustainable Management of Forest Ecosystems (4 cr.)

\* Also fulfills general education requirement.

\*\* Field intensive course **OFFERED ONLY DURING THE SUMMER SESSION—ADDITIONAL TUITION & FEES CHARGED.**

5. Complete a Forestry area of concentration:  
 Nine additional credit hours of student-proposed, faculty-approved<sup>1</sup> course work addressing individual interests of the student. The concentration may be **self-designed**<sup>2</sup> such as forest ecosystem health, forest ecology, consulting forestry, public forestry administration, or international development; an appropriate University **minor**; or a natural resource-oriented **study abroad** experience.

<sup>1</sup> Must be endorsed by the student's advisor and approved by the Forestry faculty prior to the last 3 semesters of study.

<sup>2</sup> The self-designed sequence of this coursework for the student's concentration should be at least six credits at the 100-level or higher.

## **FORESTRY MINOR REQUIREMENTS**

A minimum of 16 credit hours is required, with at least 9 at the 100-level or higher. Applications for the minor must be filed no later than June 1 of the year preceding graduation. Students must earn at least a 2.0 cumulative GPA in their Forestry minor courses to earn a minor in Forestry. Required courses:

FOR 21, Dendrology (4 cr.)

FOR 111, Natural Resource Ecology and Assessment 1 (4 cr.)

FOR 223, Multi-Resource Silviculture (4 cr.)

Additional FOR courses to total 16 credit hours. \*

\*Note: Rubenstein School students may not count FOR 1 towards completion of Forestry minor.

## **GEOSPATIAL TECHNOLOGIES**

The recent availability of high spatial resolution (detailed) satellite and aerial imagery, desktop and online software for Geographic Information Systems (GIS), Remote Sensing (RS), and inexpensive Global Positioning Systems (GPS) have driven geospatial technologies to the forefront of a revolution in acquisition, integration, and analysis of geospatial data. These data can be applied to a wide array of environmental issues at local to global scales. The tools offered by these technologies can incorporate huge volumes of data from many sources tied to a location on the Earth and analyze that data using new and innovative methods to reveal relationships in time and space.

Training in Geospatial Technologies will complement many major fields of study, including but not limited to computer sciences, engineering, environmental sciences, forestry, geography, geology, and natural resources. Skills learned in the Geospatial Technologies minor are highly sought after by future employers. The field is considered emerging with strong growth by US Labor and Statistics.

**GST Minor Coordinator:** Professor Gillian Galford, [Gillian.Galford@uvm.edu](mailto:Gillian.Galford@uvm.edu)

**GST Curricular Committee:** Professor Gillian Galford (Rubenstein), [Gillian.Galford@uvm.edu](mailto:Gillian.Galford@uvm.edu), Professor Beverley Wemple (CAS), [Beverley.Wemple@uvm.edu](mailto:Beverley.Wemple@uvm.edu), Professor Donna Rizzo (CEMS), [Drizzo@uvm.edu](mailto:Drizzo@uvm.edu).

## **GEOSPATIAL TECHNOLOGIES MINOR REQUIREMENTS**

The courses for the minor include a minimum of 15 required credits. At least 9 credit hours must be at the 100-level or above. At least half of the courses (8 credits) used to satisfy the minor must be taken at UVM. Students must earn at least a 2.0 cumulative GPA in their Geospatial Technologies minor courses to earn a minor in Geospatial Technologies. The courses for the minor include:

- 1) One or more course(s) on Geospatial Technologies in the Disciplines 3-6 cr.

*Choose from:*

CE 10, Geomatics (4 cr.)

CDAE 101: Computer Aided Drafting and Design (3 cr.)

ENGR 2: Graphical Communication (2 cr.)

ENSC 130, Global Environmental Assessment (3 cr.)

GEOG 81, Geospatial Concept & Visualization (3 cr.)

GEOL 151/GEOL 144 Geomorphology (4 cr.)

GEOL 185: Geocomputing (3 cr.)

- 2) Courses in two or more categories (Geographic Information Systems, Remote Sensing & Data Science) 6-9 cr.

Geographic Information Systems (Choose one) (3 cr.)

GEOG 184, Geographic Information: Concepts & Application (3 cr.)

NR 143, Introduction to Geographic Information Systems (3 cr.)

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Remote Sensing (Choose one) (3 cr.)

NR 146/FOR 146: Remote Sensing of Natural Resources (3 cr.)

GEOG 185, Remote Sensing (3 cr.)

Data Science (Choose one) 3-6 cr.

CS 8: Intro to Web Site Development (3 cr.)

CS 21: Computer Programming (3 cr.)

CS 87/STAT 87: Intro to Data Science (3 cr.)

CS 110: QR: Intermediate Programming (4 cr.)

CS 142: QR: Advanced Web Design (3 cr.)

CS 148, QR: Database Design for the Web (3 cr.)

3) One or more advanced or capstone experience(s) 3-6 cr.

*Choose from:*

CS 204: QR: Database Systems (3 cr.)

GEOG 281: Adv Topics in GIS & Remote Sensing (3 cr.)

GEOG 287: Spatial Analysis (3 cr.)

MATH 266: Chaos, Fractals, and Dynamical Systems (3 cr.)

NR 242, Advanced Geospatial Techniques (1-3 cr.)

NR 243, GIS Practicum (3 cr.)

NR 245, Integrating GIS & Statistics (3 cr.)

NR 346: Digital Image Processing (2 cr.)

STAT 201: QR: Stat Computing and Data Analysis (3 cr.)

With approval of the curriculum committee, students may substitute a credit-bearing internship or research credits for one of the capstone courses.

## **NATURAL RESOURCES**

The Natural Resources Curriculum combines course work from disciplines inside and outside the Rubenstein School to produce an individualized major focused on an ecological theme or the human-environment relationship. Students concentrate in Resource Ecology, Resource Planning, or Integrated Natural Resources. They take foundational courses in natural or social sciences and then tap into upper-level and field-based courses to focus in areas such as aquatic ecology; terrestrial ecology; environmental policy, economics and law; community-based resource planning; environmental education; sustainability and resource management; and energy and environmental systems. Most students incorporate internship, research, and/or study abroad experiences into their academic program. Graduates are competitive for positions in the environmental field in a range of settings. They also are prepared to pursue graduate studies in environment and natural resources including advanced study in the natural sciences and in law, urban, regional and community planning, and public administration. Students may choose to concentrate their studies in **Resource Ecology** or **Resource Planning**, or to develop an individualized program of study in **Integrated Natural Resources**.

The **Resource Ecology** option explores the biology and ecology of plants and animals in both aquatic and terrestrial systems and allows students to select courses around specific individual interests. Students can concentrate their studies on areas such as conservation biology, ecosystem analysis, or ecological dimensions of environmental quality.

Successful students in Resource Ecology will be able to:

- Describe components, structures, processes, & functions of ecological systems, including relationships between abiotic & biotic dimensions, at multiple scales (e.g. community, landscape, global) (scientific knowledge);
- Apply skills of measurement, spatial orientation, sampling, and data analysis to characterize natural resource phenomena (methods/tools);

- Analyze and synthesize scientific data to characterize and evaluate the status of at least one type of ecological system (systems/process thinking).

The **Resource Planning** option explores interactions among individuals, communities, and society with nature, resources and the environment. It allows students to select courses around specific individual interests such as natural resource planning and community, policy and economic dimensions of resource planning, and international dimensions of resource planning.

Successful students in Resource Planning will be able to:

- Describe key social components, structures, processes, & functions occurring in a given social-environmental context at multiple scales (e.g. individual, community, institutional, global) (scientific knowledge);
- Demonstrate skills to use evidence appropriate to chosen area of study, e.g., integrating evidence into persuasive policy arguments, gathering & analyzing data to characterize human interactions with the environment, mapping data for land use design, incorporating natural resources information into educational & interpretative tools (methods/tools);
- Analyze & synthesize knowledge/data about human processes related to environment/natural resources to interpret & assess a social-environmental context using conceptual frameworks from at least one area of the social sciences (systems/process thinking).

The **Integrated Natural Resources** (INR) option provides a broad natural resources education, giving students considerable flexibility in selecting courses. It is for students who have strong interests in natural resources and the environment, clear academic direction, and the motivation to develop a well-focused, personally meaningful course of study. Students in INR have developed concentrations in Environmental Education, Sustainable Resource Management, Resource Conservation, International Resource Issues, and Spatial Analysis of Natural Resources.

Students in Integrated Natural Resources will:

- Create a program of study that includes clear learning objectives and learning outcomes for conceptual foundations and applications pertinent to natural resources and environment that (1) are distinct from other majors in the Rubenstein School, (2) locate the program of study in the context of systems or processes that encompass the intersection of social and ecological dimensions of natural resources and environment, and (3) contain an integrative component that addresses the intersection of ecological and social dimensions of natural resources and environment.
- Demonstrate proposal writing skills through a proposal that explains clearly a program of study for review, input, and approval by a committee of 3 faculty members.
- Complete an in-depth program of study that includes learning outcomes appropriate to the defined learning objectives and courses that will support the achievement of learning objectives and outcomes.

**Program Director:** Professor Clare Ginger, 308F Aiken, Ph: (802) 656-2698, [Clare.Ginger@uvm.edu](mailto:Clare.Ginger@uvm.edu)

## **DEGREE REQUIREMENTS**

All students who enroll in the Natural Resources curriculum must fulfill the following requirements for graduation:

1. Complete the Rubenstein School's core curriculum.
2. Complete the Rubenstein School's general education requirements.
3. Complete a minimum of 120 credit hours of courses.
4. Complete option requirements for **Resource Ecology, Resource Planning, or Integrated Natural Resources.**

## Resource Ecology option:

Required Basic Science courses (31-34 credits, depending on Chemistry courses taken):

BIOL 1 and 2, Principles of Biology (8 cr.)

GEOL 1, Earth System Science (4 cr.)

- or - PSS 161, Introduction to Soil Science (4 cr.)

MATH 19, Fundamentals of Calculus I \* (3 cr.)

NR 140, Applied Environmental Statistics \* (4 cr.)

CHEM 23, Outline of General Chemistry (4 cr.)

- or - CHEM 31 and 32, General Chemistry 1 and 2 (8 cr.)

CHEM 26, Outline of Organic and Biochemistry (4 cr.)

- or - CHEM 42, Introduction to Organic Chemistry (4 cr.) - or - CHEM 141 and 142, Organic Chemistry (8 cr.)

FOR 111, Natural Resource Ecology and Assessment 1 (4 cr.)

NR 143, Introduction to Geographic Information Systems (3 cr.)

- or - NR/FOR 146, Remote Sensing of Natural Resources (3 cr.)

\*Also fulfills general education requirement.

Option Electives -- ecology or ecology-related courses (27 credits): In consultation with an academic advisor, student chooses 27 additional credits from an approved list of courses available on the Rubenstein Student Services website, [http://www.uvm.edu/rsenr/student\\_services](http://www.uvm.edu/rsenr/student_services), under *Forms, Policies, Advising, Support* (sub link is Program Specific Forms for Natural Resources). In choosing courses, students pursue interests in the biology and ecology of plants and animals in aquatic and terrestrial systems. They may concentrate their studies in areas such as conservation biology, ecosystem analysis, or ecological dimensions of environmental processes and quality.

Any course substitution request should be approved prior to the end of the add/drop period for the semester in which the student enrolls in the substitution course.

## Resource Planning option:

Required distribution courses (21-22 credits):

PSYS 1, General Psychology

- or - PSYS 111, Learning, Cog. & Beh. - or - PSYS 130, Social Psyc. - or - PSYS 150 Develop. Psyc. (3 cr.)

CDAE 2, D2: World Food, Pop., & Develop. (3 cr.)

- or - ENVS 2, D2: International Environmental Studies (4 cr.)

POLS 21, American Political System

- or - POLS 41, Introduction to Political Theory - or - POLS 51, Intro International Relations (3 cr.)

SOC 1, Introduction to Sociology

- or - SOC 11, Social Problems (3 cr.)

PHIL 10, Introduction to Philosophy (Ethics or Ethics of Eating)

- or - CDAE 208, Agricultural Policy and Ethics - or - ENVS 178, Environmental Ethics (3 cr.)

ANTH 21, D2: Cultural Anthropology

- or - GEOG 50, D2: World Regional Geography (3 cr.) (*cont. on p. 36*)

EC 11, Principles of Macroeconomics

- or - EC 12, Principles of Microeconomics - or - CDAE 61, Principles of Community Development (3 cr.)

Option Electives (27 credits): In consultation with an academic advisor, student chooses a minimum of 27 additional credits from an approved list of courses available on the Rubenstein Student Services website, [http://www.uvm.edu/rsenr/student\\_services](http://www.uvm.edu/rsenr/student_services), under *Forms, Policies, Advising, Support* (sub link is Program Specific Forms for Natural Resources). In choosing these courses, students pursue interests in interactions among



individuals, communities, and society with nature, resources, and the environment. They may concentrate their studies in areas such as natural resource planning and community, policy and economic dimensions of resource planning, and international dimensions of resource planning.

Any course substitution request should be approved **prior to the end of the add/drop period** for the semester in which the student enrolls in the substitute course.

### **Integrated Natural Resources** option:

Option Required courses (minimum of 9 credits):

Students select from a list of approved courses, at least one course in each of three areas: *biology/ecology*; *NR courses in social sciences and communications*; and *quantitative and analytical methods*. These courses are IN ADDITION to those taken to fulfill Rubenstein's general education requirements. The list of approved courses is available on the Rubenstein Student Services website, [http://www.uvm.edu/rsenr/student\\_services](http://www.uvm.edu/rsenr/student_services), under *Forms, Policies, Advising, Support* (sub link is Program Specific Forms for Natural Resources).

Individualized Program of Study (minimum of 39 credits):

The student develops an Individualized Program of Study composed primarily of intermediate level Rubenstein courses (ENVS, ENSC, FOR, NR, PRT or WFB prefix). This must include at least twenty-four credits inside the School and no more than six credits below the 100-level. With careful selection of courses, students develop concentrations such as ***Environmental Education, Sustainable Resource Management, Environmental Health, and Spatial Analysis of Natural Resources***.

All programs of study must be endorsed by the advisor, then approved by the faculty. If not approved, the student may not continue in the INR option and must seek another major. **The program of study is to be completed by the end of the sophomore year (60 credits)**. Transfer students with more than sixty credits must have a program of study approved as part of the transfer application. It is expected that transfer students will be active in the Program for at least two years (four semesters) after transferring into the INR option. Any course substitution request should be approved *prior to the end of the add/drop period* for the semester in which the student plans to enroll in the substitute course.

## **PARKS, RECREATION, AND TOURISM**

The Parks, Recreation, and Tourism Program provides outstanding learning opportunities for students interested in the world of tourism management and environmental education in outdoor recreation and cultural heritage settings. Those who major in Parks, Recreation, and Tourism will receive professional training in sustainable planning and management of outdoor recreation and tourism resources. Students will also learn how to design and deliver high-quality recreation and tourism programs and services that enrich peoples' lives, create livable communities, and preserve the natural environment. Parks, Recreation, and Tourism courses are offered in combination with a well-rounded liberal education.

The program prepares students to become leaders in the recreation and tourism fields. Students learn about experience-based program design and management in recreation and sports management, ecotourism, entrepreneurial business management, leisure behavior, resort marketing and management, green design, environmental interpretation, leisure programming, leadership, visitor-centered services, and more. Vermont's natural environment provides an ideal laboratory to learn first-hand about recreation and tourism practices that are environmentally sustainable, socially inclusive, and economically responsible.

A professional internship is a required part of the PRT program at UVM. Internship opportunities provide valuable work experiences and assist students with career planning; they provide education not offered in campus course work, lead to professional contacts, and provide a transition to full time jobs. Past PRT graduates are employed in the management of ski areas, private campgrounds, marinas, four-season resorts, travel businesses, and local, state, and national parks and outdoor recreation places.

Graduates from the program will be able to:

- Draw upon knowledge of the historical, scientific, and philosophical foundations of the park, recreation, and tourism fields to envision sustainable futures and plan for professional success.
- Design, implement, and evaluate park management plans, recreation and sports programs, and tourism services that contribute to positive outcomes of community tourism development, and park and recreation resource management and planning.
- Explain how natural, economic, and social systems interact to foster sustainability within parks, recreation, and tourism settings, and propose policy alternatives to encourage sustainability practices.
- Identify and evaluate domestic and international issues associated with achieving and supporting diversity, equity and inclusion in the planning, management, and implementation of park, recreation, sports and tourism programs and services.
- Demonstrate entry level knowledge of entrepreneurial business practices including business planning, marketing, hospitality services, and program administration supporting high quality tourist experiences.
- Demonstrate entry level knowledge of management practices, including principles of resource management, agency leadership, legislative mandates, planning processes, and sustainable design.
- Demonstrate, through a comprehensive internship of at least 135 hours, the ability to use structured ways of thinking to address challenges and stimulate innovation in applied parks, recreation, and tourism settings.

**Program Director:** Professor Patricia A. Stokowski, 313A Aiken, Ph: (802) 656-3093, [Patricia.Stokowski@uvm.edu](mailto:Patricia.Stokowski@uvm.edu)

## **DEGREE REQUIREMENTS**

In addition to completing University requirements, all students enrolled in the Parks, Recreation, and Tourism Program must fulfill the following requirements for graduation:

1. Complete the Rubenstein School's core curriculum.
2. Complete the Rubenstein School's general education requirements.
3. Complete a minimum of 120 credit hours of courses, including requirements and electives.
4. Complete four Parks, Recreation, and Tourism foundation courses:
  - One 3-credit course in humanities (Classics, History, Philosophy, Religion)
  - One 3-credit course in communications (Art, Art History, English Literature, Foreign Language, Music, Theater, World Literature)
  - One 3-credit course in social sciences (Anthropology, Economics, Geography, Political Science, Psychology, Sociology)
  - One 4-credit laboratory course in natural sciences (Astronomy, Biology, Chemistry, Geology, Physics, Plant Biology). *Neither NR 1 or NR 9 count towards this requirement.*
5. Complete the PRT Program requirements (8 courses):
  - PRT 10 Introduction to Sustainable Recreation and Tourism (3 cr.)
  - PRT 50 Tourism Planning (3 cr.)
  - PRT 96 Parks and Protected Areas (3 cr.)
  - PRT 158 Resort Marketing and Management (3 cr.)
  - PRT 230 Ecotourism (3 cr.)

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PRT 235 Parks, Recreation and Sports Planning (3 cr.)  
PRT 255 Environmental and Cultural Interpretation (3 cr.)  
PRT 191 Internship (3 cr.) – must be approved by an advisor in advance.

6. Choose ONE of the following two concentrations – either (1) Tourism Planning and Management, or (2) Recreation Leadership and Environmental Education – and take at least two courses in that concentration:

**Concentration 1: Tourism Planning and Management – take 2 courses from this list:**

PRT 138 Park and Recreation Design (4 cr.)  
PRT 157\* Ski Area Management (4 cr.)  
PRT 258 Entrepreneurship in Recreation and Tourism (3 cr.)  
NR / ENVS 141 Introduction to Ecological Economics (3 cr.)  
Other courses by permission

**Concentration 2: Recreation Leadership and Environmental Education – take 2 courses from this list:**

PRT 149\*\* Wilderness Education and Leadership (3 cr.)  
HLTH 51 Wilderness First Responder (3 cr.)  
ENVS 294 Environmental Education (3 cr.)  
ENVS 295 Birding for Change (4 cr.)  
Other courses by permission

\*PRT 157 includes a required week of class during the Winter Session, prior to the start of the Spring semester.

\*\*PRT 149 includes an additional course fee to cover travel expenses.

***PARKS, RECREATION, AND TOURISM MINOR REQUIREMENTS***

A minimum of 15 credit hours is required, including:

- at least 9 credits to be selected from PRT 10, 50, 096, 138, 149, 157, 158
- at least 6 credits to be selected from PRT 230, 235, 255, 258.

Students must earn at least a 2.0 cumulative GPA in their Parks, Recreation, and Tourism minor courses to earn a minor in Parks, Recreation, and Tourism.

**SPORTS MANAGEMENT**

The Sports Management minor is sponsored by the Rubenstein School of Environment and Natural Resources, in collaboration with the College of Agriculture and Life Sciences, the College of Education and Social Services, and the Grossman School of Business. The minor is for students who aspire to include the management of sporting endeavors, including entrepreneurial sports ventures, professional, amateur, interscholastic, intercollegiate, community recreation, and youth sport organizations into their majors. Career paths may lead students to minor or major league sport management or marketing, working as an administrator in college or high school sports, owning or managing a fitness club, working in event facilities management, etc. The Rubenstein School, as the sponsoring unit on campus, seeks to cultivate an awareness and enhanced understanding of the interaction between human activities, like sports and recreation, and the natural environment.

***SPORTS MANAGEMENT MINOR REQUIREMENTS***

The courses for the minor include three required courses and at least three elective courses, one from each category, for

a minimum of 18 required credits. At least half the courses must be taken at UVM. Students must earn at least a 2.0 cumulative GPA in their Sports Management minor courses to earn a minor in Sports Management. The courses for the minor include:

**Required Courses (3): 9 credits total (no prerequisites)**

EDPE 220, Sport in Society (3 cr.)

EDPE 101, Sports Management (3 cr.)

– or – EDPE 241 at 3 credits (EDPE 241 is a fee-based spring break travel course)

PRT 235, Outdoor Recreation Planning (3 cr.)

**One of the following Management courses, 3 credits total**

BSAD 120, Organizational Behavior and Leadership (3 cr.)

EDPE 119, Careers in College Athletics (3 cr.)

EDPE 230, Philosophy of Coaching (3 cr.)

PRT 157, Ski Area Management (3 cr.)

**One of the following Marketing/Communications courses, 3 credits total**

BSAD 150, Marketing Management (3 cr.)

CDAE 168, Marketing: Community Entrepreneurs (3 cr.)

CDAE 119, Event Planning for Athletics (3 cr.)

CDAE 024, Fundamentals of Public Communication (3 cr.)

PRT 158, Resort Management and Marketing (3 cr.)

**One of the following Entrepreneurship courses, 3 credits total**

BSAD 138, Entrepreneurship: Business Planning (3 cr.)

CDAE 166, Introduction to Community Entrepreneurship (3 cr.)

CDAE 267, Strategic Planning: Community Entrepreneurs (3 cr.)

PRT 258, Entrepreneurship, Recreation and Tourism (3 cr.)

**OTHER INFORMATION**

Consult your major advisor for any applicable course/major restrictions and information regarding the use of one course to meet multiple degree requirements. Majors in Parks, Recreation and Tourism, or Business Administration may double count at most two courses from the Sports Management minor towards the major.

## **WILDLIFE AND FISHERIES BIOLOGY**

The Wildlife and Fisheries Biology program focuses on the biology, ecology, management, and conservation of animal populations that range from species common enough to be hunted/fished to species that are threatened and endangered. Management strategies include direct manipulation of populations or indirect manipulation through alteration of habitat and other landscape conditions. Courses emphasize applied ecology and techniques for managing populations and provide hands-on experience in labs and field trips. The four-year curriculum emphasizes interdisciplinary wildlife fisheries science and provides a background for many wildlife, and fisheries-related positions. Students elect to concentrate in either Wildlife Biology or Fisheries Biology typically in their second year.

The WFB program prepares students to be applied scientists and leaders in the fields of management and conservation. Common career directions include working in 1) wildlife and fisheries management (state and federal agencies), 2) wildlife and fisheries conservation (nonprofit organizations), 3) wildlife and fisheries research (academic institutions and state and federal agencies), 4) game warden/law enforcement (state and federal government), 5) environmental consulting (private sector and nonprofits), and 6) animal care specialist (zoos and aquariums). Students are encouraged to speak with their academic advisor about career planning and development. Students are also encouraged to join wildlife-related SGA clubs on campus, including the Wildlife and Fisheries Society (an official student chapter of The Wildlife Society) and Audubon Society Student Chapter.

Successful Wildlife and Fisheries Biology graduates will demonstrate the following competencies:

- Biological Principles: Understand and apply life history and concepts of behavior, ecology, population dynamics, and conservation biology to issues surrounding the management and conservation of fish and wildlife.
- Scientific Method: Apply the scientific method – develop a hypothesis, use deduction to make predictions, observe and collect data (through appropriate sampling), analyze data, and use induction to infer, verify, or falsify the hypothesis.
- Communication: Effectively communicate scientific information for a variety of audiences and purposes.
- Policy/Legislation: Define key local, national, and international environmental legislation, policies, and agreements, their impact on the management and conservation of fish and wildlife, and which agency/organization is responsible for their development and implementation.
- Values/Beliefs: Evaluate the diversity of values, attitudes, and beliefs that affect the management and conservation of fish and wildlife within local, regional, and global contexts.

**Program Director:** Professor Jason Stockwell, 308H Aiken Ph: (802) 656-3009. [Jason.Stockwell@uvm.edu](mailto:Jason.Stockwell@uvm.edu)

## **DEGREE REQUIREMENTS**

All students who enroll in the Wildlife and Fisheries Biology curriculum must fulfill the following requirements for graduation:

1. Completion of the Rubenstein School's core curriculum.
2. Completion of the Rubenstein School's general education requirements.
3. Completion of a minimum of 120 credit hours of courses.
4. Completion of the Wildlife and Fisheries Biology professional core courses:
  - MATH 19, Fundamentals of Calculus I (3 cr.)
  - or - MATH 21, Calculus I\* (4 cr.)
  - NR 140, Applied Environmental Statistics \* (4 cr.)
  - BIOL 1 and 2, Principles of Biology (8 cr.)
  - or - BCOR 11 and 12, Exploring Biology (8 cr.)
  - CHEM 23, Outline of General Chemistry (4 cr.)
  - CHEM 26, Outline of Organic and Biochemistry (4 cr.)
  - or - CHEM 42, Introduction to Organic Chemistry (4 cr.)
  - FOR 111, Natural Resource Ecology and Assessment 1 (4 cr.)
  - NR 143, Introduction to Geographic Information Systems (3 cr.)
  - WFB 117, Scientific Writing and Interpretation (3 cr.)
  - WFB 161, Fisheries Biology & Techniques (4 cr.)
  - WFB 174, Principles of Wildlife Management (3 cr.)
  - WFB 224, Conservation Biology (4 cr.)

\* Also fulfills general education requirement
5. Completion of option requirements in **Wildlife Biology** or **Fisheries Biology**.

**Wildlife Biology** option courses:

- FOR 21, Dendrology (4 cr.)
- WFB 130, Ornithology (3 cr.)

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WFB 131, Field Ornithology\*\* (2 cr.)  
WFB 150, Wildlife Habitat and Population Measurements\*\* (1 cr.)  
BIOL 217, Mammalogy (4 cr.)

**Two** courses (one must have a lab<sup>§</sup>) selected from:

PBIO 109, Plant Systematics<sup>§</sup> (4 cr.)  
WFB 271, Wetlands Wildlife Ecology<sup>§</sup> (4 cr.)  
WFB 141, Field Herpetology (4 cr.)  
WFB 275, Wildlife Behavior (3 cr.)  
WFB 175 Wildlife and Society (3 cr.)

*A relevant study abroad, internship, or research experience may potentially count towards this requirement with approval of the Program Director.*

\*\* Courses **OFFERED ONLY DURING SUMMER SESSION—ADDITIONAL TUITION & FEES CHARGED.**

**Fisheries Biology** option courses:

WFB 261, Fisheries Management (3 cr.)  
WFB 232, Ichthyology (3 cr.)  
NR 250, Limnology (4 cr.)  
NR 280, Stream Ecology (4 cr.)

**Two** courses selected from:

BIOL 264, Community Ecology (3 cr.)  
BIOL 276 Behavioral Ecology (3 cr.)  
GEOL 235 Geochemistry of Natural Waters (3 cr.)  
NR 295 Advanced Special Topics (Phycology)  
BIOL 199 Intro to Marine Science

*A relevant study abroad, internship, or research experience may count towards this requirement with approval of the Program Director.*

### **WILDLIFE BIOLOGY MINOR REQUIREMENTS**

A minimum of 15 credit hours is required. Students must earn at least a 2.0 cumulative GPA in their Wildlife Biology minor courses to earn a minor in Wildlife Biology. Required courses:

WFB 130, Ornithology (3 cr.)  
- or - WFB 232 Ichthyology (3 cr.) - or - WFB 141 Herpetology (4 cr.)  
WFB 174, Principles of Wildlife Management (3 cr.)  
WFB 074 Wildlife Conservation (3 cr.)

Choose additional courses to total at least 15 credits:

WFB 130, 131\*\*, 141, 150\*\*, 175, 176, 177, 187, 191, 192, 195, 224, 232, 271, 275, 279, 283, 287, 295

\*\* Courses **OFFERED ONLY DURING SUMMER SESSION—ADDITIONAL TUITION & FEES CHARGED.**

Pre / co-requisites: BIOL 1 and 2, Principles of Biology (8 cr.) - or - BCOR 11 and 12, Exploring Biology (8 cr.)  
and NR 103 Ecology, Ecosystems & Environ (3 credits) - or - BCOR 102 Ecology and Evolution (4 credits)

# **HONORS COLLEGE REQUIREMENTS**

If students complete all four years of Honors College requirements (or three years for students accepted as sophomores) in addition to their school or college major requirements, they will graduate as an Honors College Scholar. The following requirements should be discussed with your academic advisor.

## **First Year and Sophomore Year**

The Honors College experience begins with two three-credit special topics seminars; **HCOL 085** in the fall, and **HCOL 086** in the spring. Each semester of the second year, students take a three-credit honors seminar (**HCOL 185** and **HCOL 186**), choosing from an extensive slate of offerings created for Honors College students by schools and colleges throughout the university. Honors course offerings oftentimes fulfill university requirements (including FWIL, diversity, sustainability, quantitative reasoning. Sophomore honors courses can also sometimes be applied to fulfill requirements within the Rubenstein School. Students and their advisors should consult the Honors College list of course offerings to see if any offerings may fit school requirements.

SEE: [https://www.uvm.edu/honorscollege/sophomore\\_curriculum](https://www.uvm.edu/honorscollege/sophomore_curriculum). In the junior and senior year, the Honors College requirements are determined within the home school or college to focus more intensively on a field of study related to your major.

## **Junior Year**

SEE: [https://www.uvm.edu/honorscollege/junior/senior\\_curriculum](https://www.uvm.edu/honorscollege/junior/senior_curriculum)

All HCOL students in Rubenstein take ENVS 201 (Research Methods, 3 credits), regardless of program or major. This course covers research methods, project design, and thesis planning, and culminates in the preparation of a literature review and thesis proposal. ENVS 201 is offered in the fall. **Students who are abroad in the junior year** may be able to take the course in fall of the senior year.

Rubenstein Honors students are also required to take NR 199 (Honors Seminar, 1 credit) during the spring of their junior year. Those spending spring semesters abroad during junior year may arrange to take NR 199 during their sophomore year or senior year. While Rubenstein students may choose a thesis advisor through these courses, students most frequently identify their advisors through specialized coursework in their program and major.

Students planning to study abroad during their junior year should consult with their advisors and the Rubenstein School ([rsenr@uvm.edu](mailto:rsenr@uvm.edu)) to plan ahead for completing required courses. ENVS students planning to study abroad should consult with advisors in the Environmental Program offices ([envs@uvm.edu](mailto:envs@uvm.edu)).

## **Senior Year**

*During the final year, students carry out their senior thesis or research project. A total of 6 credits will be earned for this work between fall and spring semester through registration in one of the following discipline areas:*

- ENSC 299 Environmental Sciences Honors
- ENVS 202/203 Environmental Studies Honors Thesis
- FOR 299 Forestry Honors
- NR 299 Natural Resources Honors
- PRT 299 Parks, Rec and Tourism Honors
- WFB 299 Wildlife & Fisheries Honors