Note: Please be aware that many upper level courses have pre-requisites and some courses are only offered alternate years. Courses designed for non-science majors will not fulfill a requirement. If you are not sure, please check with your advisor. Foundation courses should not also be used to fulfill a concentration requirement.

The semester (Fall or Spring) some courses are offered might have switched. If the course is not listed in the current roster, check the prior semester.

Foundation  **The following courses are required.**

**Biology**
- 2 Introductory Courses
  Recommended: BLOG 1140, BLOG 1440, BLOG 1500, BIOEE 1780

**Calculus**
- 2 semesters Math 1110/1120, or 1910/1920 (Engineering)

**Chemistry and Physics**
- 4 semesters (at least 1 semester of each);
  Some suggested course sequences
  - Chemistry 1st semester: 1560/2070 or 2080 (as a prereq for CSS 3650), 2090
  - Chemistry 2nd semester: 1570/2080 or 2150/2160
  - Physics 1101/1102, 2207/2208 (prereq is Math 1106 or 1120),
  - Physics (Engineering based): 1112, 2213/2214 (prereq is Math 1910)
  - Physics 1116
  - EAS 1600: Environmental Physics (Note only choose EAS 1600 if you plan to complete a single Physics course to fulfill your requirement)

**Statistics**
- 1 semester AEM 2100 (F), STSCI 2100 (S), Math 1710 (F/S), NtRes 3130 (F)

**DEA 1501**
- Introduction to Human-Environment Relationships
  (special discussion section for “Writing in the major”) (Spring)

**NTRES/SNES 1101**
- Intro to the Science and Management of Environmental and Natural Resources
  (only required for Freshman only) (Fall)

**NTRES 2010**
- Environmental Conservation (Spring)

Environmental Core  **The following courses are required.**

**Biotic Systems**
- BIOEE 1610 Ecology and the Environment (Fall/Spring)

**Capstone Course**
- ALS 4000 Leadership for Campus Sustainability (Fall/Spring)

**Colloquium Series**
- SNES 2000 Environmental Sciences Colloquium (required twice, recommended SO & SR years) (Fall)

**Earth Systems**
- CSS 3650 Environmental Chemistry: Soil, Air and Water (Spring)

**Economic Systems**
- AEM 1500 Environmental and Resource Economics (Fall)
  - OR ECON 1110 Introductory Microeconomics (Fall/Spring)

**Social Systems**
- NtRes 2201 Society and Natural Resources (Spring)
  - OR DSOC 3240 Environment and Society (Spring)

SNES Concentrations  Choose one of four concentrations (or design your own)

The concentration component of the SNES major is intended to allow students to develop depth of knowledge and expertise in areas that are of specific interest to the student. A minimum of five courses is required. There are some common and popular concentration themes; however, students can be creative both in terms of the concept for the theme and in the courses chosen to develop the concept. The theme is one place where courses used for a minor or second major can be included.

Students may pursue one of four Faculty-designed Concentrations:

**Environmental Agriculture:** Students obtain a solid background in agriculture, including the impact of agriculture (e.g., via biotechnology), and to introduce approaches to mitigate soil and water pollution and environmental degradation.

**Environmental Biology:** Greater depth in biology though basic biology courses (e.g., genetics, evolution), organismal-focused courses (e.g., insects, birds, microbes), and ecosystem-centered courses (e.g., forest, lakes, streams)
Environmental Economics: Students obtain a solid background in economic theory and learn how important static and dynamic allocation problems arise when managing resources and environmental quality.

Environmental Information Science: Students obtain a critical understanding of the collection and use of environmental information, as well as to support students in developing skills necessary to acquire, process, and analyze environmental information.

Or, students may pursue a Student-designed Concentration: If you are interested to design your own concentration, please contact Suzanne, sw38@cornell.edu for more information.

Some examples:

Environment and Public Policy:
In addition to courses in natural systems or in built environments, a student might study ethics, democracy, and social problems.

Environmental Communications:
Greater depth in communication with courses on concepts and techniques might be combined with specialized courses dealing with environmental issues and policies.

Oceanography/Marine Science:
Interest in the physical, biological, or public policy aspects of oceans could be pursued through a variety of specialized courses in the Shoals Program, Earth and Atmospheric Sciences, or the Hawaii course, among many choices.

Sustainability:
The program of study could take many directions from in-depth work on technologies (e.g., energy, transportation), economic and social systems, systems analysis, to global environmental change. Students with interest in the built environment might utilize courses in City and Regional Planning, Design and Environmental Analysis, and engineering disciplines.

Courses for Concentrations

I. Environmental Agriculture
Choose one course from each group with at least two courses containing experimental work (*).

<table>
<thead>
<tr>
<th>Group 1: Systems Course</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC/CSS 4120</td>
<td>Whole-Farm Nutrient Management (Spring)</td>
</tr>
<tr>
<td>BIOEE/HORT 4730</td>
<td>Ecology of Agricultural Systems (Fall)</td>
</tr>
<tr>
<td>CSS/IARD 4140</td>
<td>Tropical Cropping Systems: Biodiversity, Social, and Environmental Impacts (Fall)</td>
</tr>
<tr>
<td>NTRES 4800</td>
<td>Global Seminar: Building Sustainable Environments and Secure Food Systems for a Modern World (Spring)</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Group 2: Biotechnology</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BIOMI/CSS 3970</td>
<td>Environmental Microbiology (Spring)</td>
</tr>
<tr>
<td>BIOPL 3430</td>
<td>Molecular Biology and Genetic Engineering of Plants (Spring)</td>
</tr>
<tr>
<td>BIOPL/CSS 3470</td>
<td>Laboratory in Molecular Biology &amp; Genetic Engineering of Plants (*) (Spring)</td>
</tr>
<tr>
<td>CSS 4100</td>
<td>The GMO Debate: Environmental Impacts (Spring)</td>
</tr>
<tr>
<td>PLBR 2010</td>
<td>Plants, Genes, and Global Food Production (Fall)</td>
</tr>
</tbody>
</table>

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<tr>
<th>Group 3: Crop Protection and the Environment</th>
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</thead>
<tbody>
<tr>
<td>CSS 3150</td>
<td>Weed Biology and Management (*) (Fall)</td>
</tr>
<tr>
<td>CSS/ENTOM 4440</td>
<td>Integrated Pest Management (*) (Spring)</td>
</tr>
<tr>
<td>ENTOM 3070</td>
<td>Pesticides, the Environment and Human Health (Fall)</td>
</tr>
<tr>
<td>ENTOM 2410</td>
<td>Applied Entomology in the Field (Fall)</td>
</tr>
<tr>
<td>PLPA 3010</td>
<td>Biology and Management of Plant Diseases (Fall)</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Group 4: Soil Management</th>
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</thead>
<tbody>
<tr>
<td>CSS 3210</td>
<td>Soil Management for Sustainability (Spring)</td>
</tr>
<tr>
<td>CSS 4720</td>
<td>Nutrient Management in Agroecosystems (*) (Spring)</td>
</tr>
<tr>
<td>CSS/HORT 4660</td>
<td>Soil Ecology (*) (Spring)</td>
</tr>
<tr>
<td>CSS/EAS 4830</td>
<td>Environmental Biophysics (Fall)</td>
</tr>
</tbody>
</table>
Group 5: **Crop and Animal Production**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSC 3510</td>
<td>Dairy Herd Management</td>
<td>(Spring)</td>
</tr>
<tr>
<td>CSS 4050</td>
<td>Field Crop Systems</td>
<td>(Fall)</td>
</tr>
<tr>
<td>HORT 4420</td>
<td>Berry Crops: Culture and Management</td>
<td>(Fall)</td>
</tr>
<tr>
<td>HORT 4450</td>
<td>Ecological Orchard Management</td>
<td>(Spring)</td>
</tr>
<tr>
<td>NTRES 3250</td>
<td>Forest Management and Maple Syrup Production</td>
<td>(Spring)</td>
</tr>
</tbody>
</table>

(or related course on production)

II. **Environmental Biology**

*Choose six courses to complete the concentration.*

Group 1: **Foundations in Biology**  *Choose two courses.*

- **Biochemistry**
  - BIOBM 3300  Principles of Biochemistry, Individual Instruction  (Fall/Spring)
  - or  BIOBM 3330  Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology  (Summer)
  - or  the sequence BIOBM 3310/BIOBM 3320  Principles of Biochemistry: Proteins and Metabolism  (Fall)

- **Evolution**
  - BIOPL 4480  Plant Evolution & the Fossil Record  (Spring)

- **Genetics**
  - BIOGD 2810  Genetics  (Fall/Spring)
  - or  NTRES 2830  Genetics for Population Biologists  (Spring)

Group 2: **The Physical and Biological Environment**  *Choose two courses.*

- **BEE**
  - 3710  Hydrology and the Environment  (Spring)
  - 4570  Limnology: Ecology of Lakes (alternate years)  (Spring)
  - 4620  Marine Ecology (alternate years)  (Fall)
  - 4780  Ecosystem Biology (alternate years, next 2013)  (Spring)

- **CSS**
  - 4660  Soil Ecology  (Spring)
  - 4830  Environmental Biophysics (4)  (Fall)

- **EAS/BIOEE**
  - 3500  Dynamics of Marine Ecosystems  (Fall)

- **NTRES**
  - 3220  Global Ecology and Management  (Spring)
  - 4560  Stream Ecology (alternate years)  (Fall)

Group 3: **Plants, Animals, Microbes and the Environment**  *Choose two courses.*

- **BIOEE**
  - 4660  Physiological Plant Ecology, Lectures (alternate years)  (Spring)
  - 4700/4720  Herpetology Lectures/Laboratory  (Spring)
  - 4750  Ornithology  (Spring)
  - 4760  Biology of Fishes  (Fall)
  - BIOMI 2900  General Microbiology  (Fall/Spring)
  - BIOMI/CSS 3970  Environmental Microbiology  (Spring)
  - BIOMI 4180  Microbial Ecology  (Spring)

- **CSS**
  - 3150  Weed Biology and Management  (Fall)

- **ENTOM**
  - 2120  Insect Biology  (Fall)
  - 3440  Insect Conservation Biology  (Spring)
  - 3070  Pesticides, the Environment and Human Health  (Fall)
  - ENTOM/BIOEE 4550  Insect Ecology  (Fall)

- **HORT**
  - 4400  Restoration Ecology  (Fall)

- **NTRES**
  - 3110  Fish Ecology, Conservation and Management  (Spring)
  - 3140  Conservation of Birds  (Summer)
  - 4100  Conservation Biology  (Fall)
  - 4110  Quantitative Ecology and Management of Fisheries Resources  (Spring)
  - 4120  Wildlife Population Analysis  (Spring)
  - 4200  Forest Ecology  (Fall)
I. Course Descriptions

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Instructor(s)</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTRES 4220</td>
<td>Wetland Ecology and Management</td>
<td>(Fall)</td>
<td></td>
</tr>
<tr>
<td>PLPA 3010</td>
<td>Biology and Management of Plant Diseases</td>
<td>(Fall)</td>
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<tr>
<td>PLPA 3090</td>
<td>Fungi</td>
<td>(Fall)</td>
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<tr>
<td>PLPA 4010</td>
<td>Microbial Pathogens vs Plants: Molecular Weapons, Defenses, and Rules of Engagement</td>
<td>(Spring)</td>
<td></td>
</tr>
<tr>
<td>PLPA 4020</td>
<td>Biology of Plant Pathogens</td>
<td>(Spring)</td>
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<tr>
<td>PLPA 4330</td>
<td>Disease Ecology</td>
<td>(Fall)</td>
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</tr>
</tbody>
</table>

II. Environmental Economics

**Required.**

- AEM 4500 Resource Economics (Fall)
- AEM 4510 Environmental Economics (Spring)
- ECON 1110 Introductory Microeconomics (Fall, Spring, Winter & Summer)
- ECON 1120 Introductory Macroeconomics (Fall, Spring, Winter & Summer)
- ECON 3030 Intermediate Microeconomic Theory (Fall, Spring, & Summer)
- ECON 3040 Intermediate Macroeconomic Theory (Fall, Spring, & Summer)

*Choose one course.*

- AEM 4110 Introduction to Econometrics (Fall)
- AEM 4120 Computational Methods for Management and Economics (Spring)
- BEE 4750 Environmental Systems Analysis (Fall)
- CRP/NTRES 4440 Resource Management and Environmental Law (Spring)

IV. Environmental Information Science

**Information Acquisition**

**Group 1: Remote Information Acquisition**  
*Choose one course.*

- CSS/CEE 4110 Remote Sensing for Environmental Resource Inventory (Fall)
- CSS 6600/CEE 6100 Remote Sensing Fundamentals (Fall)

**Group 2: Ground-based Information Acquisition**  
*Choose two courses.*

- BEE 4270 Water Sampling and Measurement (Fall)
- BIOEE 2630 Field Ecology (Fall)
- BIOEE 4560 Stream Ecology (alternate years) (Fall)
- COMM 2820 Research Methods in Communication Studies (Fall)
- DSOC 3130 Social Indicators and Research (Fall)
- EAS 3010 Evolution of the Earth System (Fall)
- EAS 4170 Field Mapping in Argentina (Summer)
- EAS 4370 Geophysical Field Methods (Fall)
- NTRES 4200/4201 Forest Ecology (Fall)
- NTRES 4220/4221 Wetland Ecology and Management (Fall)

**Information Processing**  
*Choose one course.*

- CEE 6150 Digital Image Processing (Spring)
- CRP 4080 Introduction to GIS (Spring)
- CSS 4200 Geographic Information Systems (Spring)
- CSS 6200 Spatial Modeling and Analysis (Spring)

**Information Analysis**  
*Choose one course.*

- BEE 4750 Environmental Systems Analysis (Fall)
- BIOEE 3620 Dynamic Models in Biology (Spring)
- NTRES 3100 Applied Population Ecology (Fall)
- NTRES 4110 Quantitative Ecology and Management of Fisheries Resources (Spring)
- NTRES 4120 Wildlife Population Analysis: Techniques and Models (Spring)
- NTRES 4240 Landscape Impact Analysis (Spring)