

ENVIRONMENTAL SCIENCES (ENVS)

School of Environmental Sciences, Ontario Agricultural College

This major combines a foundation in the breadth of environmental science while giving students practical experience in integrating the basic science in environmental problem solving. The integration of biophysical sciences with real-world applications provides students with a unique skill set for engaging with current and future environmental issues. The many opportunities in the major for experiential learning and independent research give students an ability to collect, analyze and interpret environmental data, and propose solutions that account for both the biophysical science and the socio-economic context. The second year core curriculum develops a cross-disciplinary understanding of the biophysical environment, while the third and fourth years allow students to engage more deeply with issues of interest to them. Students will graduate from this major ready to address diverse problems such as pollinator conservation, soil and water conservation, greenhouse gas mitigation, plant disease management and chemical movement in the environment. It provides a solid background for careers in environmental protection, resource management and research, in both the public and private sectors.

Major

| Code | Title | Credits |
|---|---|---------|
| Semester 1 | | |
| BIOL*1070 | Discovering Biodiversity | 0.50 |
| CHEM*1040 | General Chemistry I | 0.50 |
| ENVS*1030 | Introduction to Environmental Sciences | 1.00 |
| MATH*1080 | Elements of Calculus I | 0.50 |
| Semester 2 | | |
| BIOL*1090 | Introduction to Molecular and Cellular Biology | 0.50 |
| CHEM*1050 | General Chemistry II | 0.50 |
| FARE*1040 | Introduction to Environmental Economics, Law and Policy | 1.00 |
| GEOG*1300 | Introduction to the Biophysical Environment | 0.50 |
| Semester 3 | | |
| ENVS*2030 | Meteorology and Climatology | 0.50 |
| ENVS*2060 | Soil Science | 0.50 |
| ENVS*2240 | Fundamentals of Environmental Geology | 0.50 |
| 1.00 electives or restricted electives | | 1.00 |
| Semester 4 | | |
| BIOL*2060 | Ecology | 0.50 |
| ENVS*2080 | Introduction to Environmental Microbiology | 0.50 |
| ENVS*2310 | Introduction to Biogeochemistry | 0.50 |
| STAT*2040 | Statistics I | 0.50 |
| 0.50 electives or restricted electives | | 0.50 |
| Semester 5 ¹ | | |
| 2.00 electives or restricted electives | | 2.00 |
| Select 0.50 credits from the following: | | |
| ECON*2100 | Economic Growth and Environmental Quality | 0.50 |

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|--|--|------|
| FARE*2700 | Survey of Natural Resource Economics | 0.50 |
| GEOG*2210 | Environment and Resources ² | 0.50 |
| Semester 6 | | |
| ENVS*3150 | Aquatic Systems ¹ | 0.50 |
| 2.00 electives or restricted electives | | 2.00 |
| Semester 7 | | |
| ENVS*4001 | Project in Environmental Sciences | 0.50 |
| 2.00 electives or restricted electives | | 2.00 |
| Semester 8 | | |
| ENVS*4002 | Project in Environmental Sciences | 0.50 |
| 2.00 electives or restricted electives | | 2.00 |

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Students wishing to register in BIOL*4350 Limnology of Natural and Polluted Waters must substitute BIOL*3450 Introduction to Aquatic Environments in Semester 5 for ENVS*3150 Aquatic Systems in Semester 6.

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Students can take GEOG*2210 Environment and Resources in semester 6 or 8.

Restricted Electives

Students must take a total of 6.50 restricted elective credits as prescribed by the following lists.

Students must take 0.50 credits from each of List A & B

List A

| Code | Title | Credits |
|--------------|--|---------|
| ENVS*2330 | Current Issues in Ecosystem Science and Biodiversity | 0.50 |
| or ENVS*2040 | Plant Health and the Environment | |

List B

| Code | Title | Credits |
|--|------------------------------|---------|
| Select 0.50 credits from the following: ² | | |
| PHYS*1070 | Physics for Life Sciences II | 0.50 |
| PHYS*1080 | Physics for Life Sciences | 0.50 |
| PHYS*1300 | Fundamentals of Physics | 0.50 |

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Students lacking 4U Physics or equivalent must take PHYS*1300 Fundamentals of Physics.

Students are required to choose a minimum of 5.50 credits from Lists C, D, E, and F. Students must take a minimum of 1.50 credits from List C, a minimum of 1.00 credits from List D, and students may not count more than 1.00 credits from List F towards their restricted electives. Students should note that many restricted electives, particularly in List D, require other courses as prerequisites. Students should consult the most recent Undergraduate Calendar for specific requirements.

List C

Students must take a minimum of 1.50 credits from the following list:

| Code | Title | Credits |
|-----------|---|---------|
| BIOL*3130 | Conservation Biology | 0.50 |
| CHEM*3360 | Environmental Chemistry and Toxicology | 0.50 |
| ENVS*2120 | Introduction to Environmental Stewardship | 0.50 |

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|-----------|--|------|
| ENVS*2210 | Apiculture and Honey Bee Biology | 0.50 |
| ENVS*2230 | Communications in Environmental Science | 0.50 |
| ENVS*3000 | Nature Interpretation | 0.50 |
| ENVS*3010 | Climate Change Biology | 0.50 |
| ENVS*3020 | Pesticides and the Environment | 0.50 |
| ENVS*3040 | Natural Chemicals in the Environment | 0.50 |
| ENVS*3050 | Microclimatology | 0.50 |
| ENVS*3060 | Groundwater | 0.50 |
| ENVS*3080 | Soil and Water Conservation | 0.50 |
| ENVS*3090 | Insect Diversity and Biology | 0.50 |
| ENVS*3180 | Sedimentary Environments | 0.50 |
| ENVS*3210 | Plant Pathology | 0.50 |
| ENVS*3220 | Terrestrial Chemistry | 0.50 |
| ENVS*3230 | Agroforestry Systems | 0.50 |
| ENVS*3240 | Creative Writing for Environmental Science | 0.50 |
| ENVS*3250 | Forest Health and Disease | 0.50 |
| ENVS*3270 | Forest Biodiversity | 0.50 |
| ENVS*3290 | Waterborne Disease Ecology | 0.50 |
| ENVS*3300 | Introduction to Controlled Environment Systems | 0.50 |
| ENVS*3310 | Soil Biodiversity and Ecosystem Function | 0.50 |
| ENVS*3340 | Environmental Data Analysis | 0.50 |
| ENVS*3370 | Terrestrial Ecosystem Ecology | 0.50 |
| MICR*3220 | Plant Microbiology | 0.50 |
| TOX*2000 | Principles of Toxicology | 0.50 |

List D

Students must take a minimum of 1.00 credits from the following list:

| Code | Title | Credits |
|-----------|--|---------|
| BIOL*4350 | Limnology of Natural and Polluted Waters | 0.50 |
| ENVS*4000 | Toxicological Risk Assessment | 0.50 |
| ENVS*4030 | Ecohydrology | 0.50 |
| ENVS*4050 | Predicting Impacts of Environmental Change | 0.50 |
| ENVS*4070 | Pollinator Conservation | 0.50 |
| ENVS*4090 | Soil Management | 0.50 |
| ENVS*4100 | Integrated Management of Invasive Insect Pests | 0.50 |
| ENVS*4160 | Soil and Nutrient Management | 0.50 |
| ENVS*4180 | Insecticide Biological Activity and Resistance | 0.50 |
| ENVS*4190 | Biological Activity of Herbicides | 0.50 |
| ENVS*4210 | Meteorological and Environmental Instrumentation | 0.50 |
| ENVS*4230 | Biology of Aquatic Insects | 0.50 |
| ENVS*4260 | Field Entomology | 0.50 |
| ENVS*4320 | Laboratory and Field Methods in Soil Biodiversity | 1.00 |
| ENVS*4350 | Forest Ecology | 0.50 |
| ENVS*4360 | Glacial Environments | 0.50 |
| ENVS*4370 | Natural and Anthropogenic Compounds in the Environment | 0.50 |
| ENVS*4390 | Soil Variability and Land Evaluation | 1.00 |

| | | |
|-----------|---|------|
| ENVS*4440 | Advanced Controlled Environment Systems | 0.50 |
| PBIO*4290 | Cannabis Production | 0.50 |
| PBIO*4530 | Plants and Environmental Pollution | 0.50 |

List E

| Code | Title | Credits |
|-----------|---|---------|
| ENVS*3330 | Environmental Flexible Internship | 0.50 |
| ENVS*4410 | Introduction to Advanced Independent Research | 0.50 |
| ENVS*4420 | Advanced Independent Research | 0.50 |
| ENVS*4430 | Advanced Independent Research | 1.00 |
| ENVS*4510 | Topics in Environmental Sciences | 0.50 |

List F

Students may count up to 1.00 credits from the following list towards their 6.50 credit restricted electives

| Code | Title | Credits |
|-----------|-----------------------------------|---------|
| GEOG*2420 | The Earth From Space | 0.50 |
| GEOG*2480 | Mapping and GIS | 0.50 |
| GEOG*3420 | Remote Sensing of the Environment | 0.50 |
| GEOG*3480 | GIS and Spatial Analysis | 0.50 |

Credit Summary

(20.00 Total Credits)

| Code | Title | Credits |
|--------------------------------|-------|-----------|
| Environmental Sciences Core | | 7.00 |
| Required Courses for the Major | | 4.50 |
| Restricted Electives | | 5.50 |
| Free Electives | | 3.00 |
| Total Credits | | 20 |

Students are encouraged to seek advice from their faculty advisor and are reminded that 6.00 credits of their B.Sc.(Env.) degree must be at the 3000-4000 level. With prior approval, students may be able to use courses not on Lists C, D, E, or F toward their restricted electives