UNIVERSITY of GUELPH


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UNIVERSITY OF GUELPH – GRADUATE STUDIES

# Environmental Science: Which program is right for you?

Environmental Science is the study of ecosystems and human/environmental interactions. It is inherently multi-disciplinary and is often applied in the resolution of a particular environmental problem. At the University of Guelph, environmental research is embedded in a variety of graduate programs ranging from the social sciences to ecology, human, and biophysical processes. The chart below summarizes the main graduate programs that focus on or may relate to the environment, environmental protection and remediation of social environments. We encourage you to explore the many graduate opportunities in Environmental Science at the University of Guelph.

| Economics, Philosophy, Policy & Social Change | Ecology & Environment | Human Health | Physical Processes |
|---|---|---|---|
| Business Administration MBA | Animal Biosciences MSc, PhD | Animal Biosciences MSc, PhD | Chemistry MSc, PhD |
| Capacity Development & Extension MSc | Bioinformatics MSc, MBNF., PhD | Applied Nutrition MAN | Engineering MASc, MEng, PhD, GDip. |
| Economics MA, PhD | Biophysics MSc, PhD | Biomedical Sciences MSc, MBS, PhD | Environmental Sciences MSc, MES, PhD |
| Food, Agricultural & Resource Economics MSc, MFARE, PhD | Business Administration MBA | Biophysics MSc, PhD | Geography MA, MSc, PhD |
| Geography MA, MSc, PhD | Computer Science MSc | Engineering MASc, MEng, PhD, GDip. | Physics MSc, PhD |
| History MA, PhD | Engineering MASc, MEng, PhD, GDip. | Family Relations & Applied Nutrition MSc, PhD | |
| International Development* MA, MSc, PhD | Environmental Sciences MSc, MES, PhD | Food Safety & Quality Assurance MSc, GDip. | |
| Management MA, PhD | Geography MA, MSc, PhD | Landscape Architecture MLA | |
| Marketing & Consumer Studies MSc | Integrative Biology MSc, PhD | Mathematics & Statistics MSc, PhD | |
| Philosophy MA, PhD | Landscape Architecture MLA | Molecular & Cellular Biology MSc, PhD | |
| Political Science MA, PhD | Plant Agriculture MSc, PhD | Pathobiology MSc, PhD, GDip. | |
| Public Health MPH, GDip. | Rural Studies PhD | Population Medicine MSc, PhD | |
| Rural Planning & Development MSc (Planning), MPlan | | Public Health MPH, GDip. | |
| Rural Studies PhD | | Toxicology* MSc, PhD | |
| Sociology MA, PhD | | | |

**Indicates a collaborative specialization that must be taken in conjunction with another program.*

# Graduate Programs Environmental Science: Which program is right for you?

### Animal Biosciences MSc, PhD
Students can explore the characteristics of livestock product outputs, as well as the impacts of animal production on the environment and ways to mitigate those impacts in a sustainable manner.

### Applied Nutrition MAN
The Master's of Applied Nutrition, a Dietitians of Canada accredited program, provides eligible students entry into the dietetics profession as Registered Dietitians. Students complete graduate coursework, work placements, as well as a significant research project to prepare for careers in agri-food and health.

### Bioinformatics MSc, MBNF, PhD
Bioinformatics is a uniquely interdisciplinary program that will teach you to apply the latest computational and statistical techniques to biological data to solve problems like measuring biodiversity at the cutting edge of Environmental Science. Students in this program will be guided by an interdepartmental supervisory team to extend their undergraduate expertise into a comprehensive bioinformatics education that emphasizes the application of informatics tools in Environmental Science.

### Biomedical Sciences MSc, MBS, PhD
Research in the Department of Biomedical Sciences utilizes cell lines and tissues from animals and humans as well as animal models to understand topics such as, biomechanics, cancer biology, endocrinology, neuroscience, pharmacology, toxicology, stem cell & regenerative biology, and reproductive biotechnology that impact animal and human physiology and health.

### Biophysics MSc, PhD
Biophysics is a unique interdisciplinary program that seeks to further our understanding of biological processes through the application of concepts and techniques of the physical sciences. Biophysics research spans the entire breadth of the life science spectrum, including: structural biology, biochemistry, molecular biology, biological chemistry, microbiology, bioinformatics and biomechanics.

### Business Administration MBA
Guelph's MBA is offered in three fields of specialization: Sustainable Commerce, Food and Agribusiness, and Hospitality and Tourism. Learn, collaborate and grow from industry experts at the University of Guelph. Explore topics in policy and economics, marketing and strategy. Offered online, you'll be able to complete your MBA without interrupting your career.

### Capacity Development & Extension MSc
CDE focuses on processes of change, including both social and environmental change, and a recognition of how society and environment are implicitly linked to one another. As a field of practice, our mission is to help people, organizations and communities direct and/or adapt to change. As researchers, we are interested in investigating the nature and processes of change, how individuals, organizations and communities adapt to and/or direct change, and to determine the efficacy of various strategies of intervention in terms of assisting individuals, communities and organizations with meeting the challenges of change.

### Chemistry MSc, PhD
Graduate opportunities in Environmental Chemistry revolve around Analytical Chemistry. Researchers in this field develop new methods to detect and quantitate natural and unnatural compounds of environmental concern.

### Computer Science MSc
From sensor webs to supercomputing, Computer Science amplifies and in some cases makes feasible, the modelling and monitoring of the environment. Since models are typically crude approximations to reality, great care is needed to make them work; algorithms borrowed from mainstream Computer Science help to accomplish this.

### Economics MA, PhD
Many environmental issues have economic aspects. Economists seek to understand how the growth and development of human societies gives rise to pollution, resource depletion and other environmental stresses, as well as how policies can be developed to minimize these stresses in the most affordable way.

### Engineering MEng, MASc, PhD, GDip.
Engineering is the application of Environmental Science to the solutions of complex problems facing local to global communities. Engineers design, create and optimize the physical process to solve environmental problems related to ecology and human health. Engineers also assist law makers in developing appropriate policies that address environmental issues.

### Environmental Sciences MSc, MES, PhD.
In the School of Environmental Sciences (SES) we teach, study, and conduct research, in the life and physical sciences to address critical environmental issues and processes related to the lithosphere, atmosphere, hydrosphere, and biosphere. SES provides and fosters academic excellence in a diverse suite of undergraduate and graduate programs focused on the comprehensive study of biotic and abiotic interactions and environmental issues in natural and managed ecosystems. SES is a highly respected, research-intensive community that promotes communication and collaboration among academics, industry and government at the provincial, national and international levels. We also provide a portal for your exploration of the University of Guelph's extraordinary strength in environmental sciences.

### Family Relations & Applied Nutrition MSc, PhD
Family Relations and Applied Nutrition addresses social and physical environments that influence nutritional health, physical activity, and human and family relationships. A social-ecological approach is taken to understand the multiple forces that impact health and well-being as well as human interactions.

### Food, Agricultural & Resource Economics MSc, MFARE, PhD
Food, Agricultural and Resource Economics provides students with the theoretical and applied skills needed to examine how humans within society influence environmental quality. The effect of environmental quality on humans and human decision making is also examined. Graduate courses cover a variety of topics which include: agricultural production, land use, fisheries, forestry and water quality.

### Food Safety & Quality Assurance MSc, GDip.
A Food Scientist requires a broad range of expertise encompassing Engineering, Chemistry, Economics, Food, Law, Management, Epidemiology and Microbiology. The Food Safety and Quality Assurance program (MSc or Graduate Diploma) provides experience and knowledge in all the aforementioned areas through a combination of class and distance education formats. Upon graduation, students can follow career paths in industry, academia or government.

### Geography MA, MSc, PhD
Geography brings a distinctive holistic perspective to Environmental Science. Graduate students study biophysical systems and processes, environmental management and governance, as well as interactions between people and their environments.

### History MA, PhD
Environmental issues are historical in nature. Environmental historians study changes in how people interact with the natural world, seeking to understand how human behaviour and the environment have adapted to one another, for better or worse. In the Tri-University program, historians are examining the ways that these adaptations have shaped our world today.

### Integrative Biology MSc, PhD
Ecology is one area of emphasis in this graduate program and faculty associated with it have an extensive range of interests including theoretical, applied, population, community, physiological and evolutionary ecology, as well as wildlife biology and management in both aquatic and terrestrial ecosystems.

### International Development Studies* MA, MSc, PhD
The collaborative International Development Studies (IDS) Master's and Doctoral programs permit students to combine development studies with training in a selected academic discipline. Added to the Master's (MA, MSc, MEng) or Doctoral transcripts is the designation, "International Development Studies" which provides disciplinary specialization required for Doctoral studies and academic careers.

### Landscape Architecture MLA
Landscape Architecture applies ecological, social, aesthetic and perceptual theories combined with technical skills to the solution of complex problems facing individuals, communities and regions. Landscape Architects contribute to sustainable development through analysis, design, development and management of the natural and built environment.

### Management MA, PhD
The MA Management emphasizes evidence-based decision making. The PhD in Management is a thesis-based program aimed at people who wish to develop a long range research program in a topic of interest offered through the College of Business and Economics at the University of Guelph. For any policies to be successful, including Environmental Policy, we need to study whether the market is ready to adopt such policies and under what circumstances and at what cost. The PhD Management program can prepare students who understand the interplay and synergies between scientific advancement and market adoption.

### Marketing & Consumer Studies MSc
Marketing and Consumer Studies aims to understand consumer decision making and choice in a variety of traditional and emerging areas (e.g. new product adoption, renewable energy, ethical and socially responsible consumptions, healthy food choices) to help stakeholders (i.e., consumers, businesses, and policy makers) make informed decisions, formulate effective strategies, improve economic welfare, and facilitate sustainable development. Our thesis based program takes a multidisciplinary approach in research and takes advantage of related work being done in a number of seemingly disparate streams of work, whether that is in economics and econometrics, communications, sociology, psychology, mathematical statistics, and other cognate statistical areas.

### Mathematics & Statistics MSc, PhD
The Department of Mathematics and Statistics offers MSc and PhD degrees that present the opportunity to specialize in a variety of areas. A number of faculty within the department are working in areas like infectious disease modelling and food safety. Students have the opportunity to pursue a thesis (MSc or PhD) or a major research paper (MSc).

### Molecular & Cellular Biology MSc, PhD
Scientists in Molecular and Cellular Biology pursue interdisciplinary, fundamental and applied research involving diverse biological systems (plants, humans and other animals, prokaryotic and eukaryotic microbes). Our experimental systems extend from molecules to whole organisms; our studies are based in biochemistry, cell biology, microbiology, molecular biology and genetics. Our interests include bacterial and viral diseases, the stress responses of bacterial, plant and animal cells, water and foodborne infections, biochemical toxicology, as well as bioremediation.

### Pathobiology MSc, PhD, GDip.
A diverse range of graduate programs, ranging from bench-top to patient and field work, involving animals, humans, the interface between them, and the environment await graduate students in the department of pathobiology. Our programs offer the opportunity to work with experts in environmental and ecosystem health, pathogenesis, clinical and anatomic pathology, cancer biology, infectious diseases, immunology, molecular epidemiology, and antimicrobial resistance.

### Philosophy MA, PhD
The Philosophy department teaches courses that are directly related to Environmental Science, such as: philosophy of the environment, philosophy of science, philosophy of biology/ecology, and philosophy of law. These courses provide the student with a detailed conceptual perspective on the environment and environmental issues.

### Physics MSc, PhD
The problem-solving skills and interdisciplinary approach of a Physicist are ideally suited to tackle challenging environmental issues at a quantitative level. Relevant research areas in the department include: the analysis of environmental samples via ion beam analysis, planetary science, the study of bacterial physics and the formation of biofilms and the emerging field of nanoscience.

### Plant Agriculture MSc, PhD
Students in the Department of Plant Agriculture engage in the genetics, physiology and production of ornamental, traditional and emerging horticultural and field crops. Research projects may include developing sustainable agriculture practices with minimal environmental impact through altered fertilizer, disease, weed and insect control strategies or other management practices, as well as the development of plants tolerant to various biotic and abiotic stresses in their environment.

### Political Science MA, PhD
The Department of Political Science offers MA and PhD degrees, and both programs include a specialization in the study of public policy and governance. Several faculty members involved in this stream are active researchers in environmental issues. Students may pursue a thesis (MA or PhD) or major research paper (MA) in this area.

### Population Medicine MSc, PhD
A healthy human population needs a healthy environment and safe supplies of food and water. Population Medicine focuses on the challenges of health and disease at the intersection of human, animal and environmental health.

### Public Health MPH
This 5-semester professional degree with concentrations in Epidemiology, Environmental Public Health, Infectious Diseases, Zoonotic Foodborne and Waterborne Diseases and Public Health Policy and Administration will prepare students for careers that address the present and future needs of Public Health. Graduates of this program will emerge as influential leaders at the local, national, and international level committed to improving quality of life by protecting and promoting community health, and by anticipating and preventing the spread of disease from both a policy and a science perspective. A summer practicum placement complements classroom learning.

### Rural Planning & Development MSc (Planning), MPlan
Rural Planning and Development contributes to the generation of knowledge and the development of plans to advance the welfare, sustainability and integrity of rural communities. Graduates work in the public and private sectors for national and international NGOs', as planners, researchers and project managers. The Rural Planning and Development program offers several areas of environmental concentration including: Water Resources Management, Environmental Impact Assessment, Disaster Planning and Management, Environment and Development, GIS, Agro-farming Systems and Planning Industrial Ecology.

### Rural Studies PhD
The PhD program in Rural Studies has a strong focus on advanced studies in environmental management theory, policy and practice with an emphasis on environmental policy, community based environmental management, environmental design and development of community capacity for environmental management. Graduates of the program are found working in Environmental Studies programs in Universities across Canada and the US, as well as in senior roles in policy and program development in government and the private sector.

### Sociology MA, PhD
Sociology seeks to understand and change our social world. The Department of Sociology and Anthropology offers MA and PhD degrees in Sociology. Different areas of specializations offer opportunities to conduct research and analysis on a broad range of topics related to policy and social change. A number of faculty are actively involved in research on the social and sociological dimensions of environmental issues.

### Toxicology* MSc, PhD
The MSc and PhD in the Collaborative Toxicology Program permit students to combine Toxicology studies with training in selected academic disciplines. Participating departments include, Animal Biosciences, Biomedical Sciences, Chemistry, Integrative Biology, Environmental Science, Human Health & Nutritional Sciences, Mathematics & Statistics, Molecular & Cellular Biology, Pathobiology, and Psychology. Added to the Master's or Doctoral departmental degree is the designation, "Toxicology". The degrees provide extra training and flexibility for an expanding job market.

# About Us www.uoguelph.ca/graduatestudies

The University of Guelph is one of Canada's most research-intensive institutions and is at the forefront of learner-centred education. Founded in 1964, Guelph strives to be Canada's leader in creating, communicating and applying knowledge to improve the social, cultural and economic quality of life of people in Canada and around the world.

With over 90 graduate program options, students have access to programs ranging from the natural and physical sciences to Engineering, Social Sciences, Humanities, Business, Art, Agriculture and Veterinary Science. Students may also choose to explore our collaborative and interdepartmental programs to tailor their graduate education to their academic interests.

Graduate studies at the University of Guelph are supported by internationally renowned faculty who are engaged in leading-edge research and practice. Students will have the opportunity to work closely with faculty members who are committed to the development of their students and will empower them to think critically, explore new realms of knowledge, and apply what they have learned, in order to develop the skills they need to be competitive in their discipline.

We invite you to explore graduate opportunities at the University of Guelph and hope you become part of the Guelph family during this exciting time here at the University!

## Contact Us

Thank you for taking the time to research the University of Guelph.
If you have any questions please do not hesitate to contact us.

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**www.uoguelph.ca/graduatestudies**

Have questions? Email our office: **gradapps@uoguelph.ca**

### Graduate Studies Preview Day – Saturday, October 22nd, 2016

Join us for Graduate Studies Preview Day between 10:00am – 1:00pm and meet with faculty, staff and current graduate students in your program of interest.

Sign up for a reminder email online at:
**www.uoguelph.ca/graduatestudies**

### Campus Tours

Learn more about what the University of Guelph has to offer by visiting us. We offer campus tours Mon-Fri at 10:00am and 1:30pm and Saturday at 1:30pm. Please visit: **admission.uoguelph.ca/tours** to reserve your spot with the date and time you would like to visit and we will arrange your tour.

### Meet our Graduate Faculty & Graduate Students

Interested in learning more about the research interests of faculty members and what our graduate students have to say about the University of Guelph? Visit us online at:
**www.uoguelph.ca/graduatestudies**

### Looking for an Advisor?

Check out the department website and contact the faculty members you are interested in working with directly. They are interested in knowing more about what research you want to do, why you want to work with them and if you have applied to or received any scholarships.