

2020-2021 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2020-2021 academic year, including the Summer Semester 2020, Fall Semester 2020 and the Winter Semester 2021.

For your convenience the Graduate Calendar is available in PDF format.

If you wish to link to the Graduate Calendar please refer to the [Linking Guidelines](#).

The University is a full member of:

- Universities of Canada

Contact Information:

University of Guelph
Guelph, Ontario, Canada
N1G 2W1
520-824-4121

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The logo for the University of Guelph, featuring the text "UNIVERSITY of GUELPH" in a stylized font.The tagline "CHANGING LIVES IMPROVING LIFE" in a bold, sans-serif font, positioned below the university logo.

Disclaimer

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2020-2021 academic year, including the Summer Semester 2020, the Fall Semester 2020 and the Winter Semester 2021

The University reserves the right to change without notice any information contained in this calendar, including but not limited to that related to tuition and other fees, standards of admission, course delivery or format, continuation of study, and the offering or requirements for the granting of, degrees or diplomas in any or all of its programs. The publication of this calendar does not bind the University to the provision of courses, programs, schedules of study, or facilities as listed herein.

The University will not be liable for any failure or delay in performance arising out of any cause or causes beyond its reasonable control. Such causes may include but are not limited to fire, strike, lock-out, inability to procure materials or trades, war, mass-casualty event, flood, local, regional or global outbreak of disease or other public health emergency, social distancing or quarantine restriction, legislative or regulatory requirements, unusually severe weather, failure of public utility or common carrier, or attacks or other malicious act, including but not limited to attacks on or through the internet, or any internet service, telecommunications provider or hosting facility.

In March 2020 the World Health Organization declared a global pandemic of the virus leading to COVID-19. The Governments of Canada, the Province of Ontario, and local Governments responded to the pandemic with legislative amendments, controls, orders, by-laws, requests and requirements (collectively, the "Governmental Response"). It is uncertain how long the pandemic, and the related Governmental Response, will continue, and it is unknown whether there may be a resurgence of the virus leading to COVID-19 or any mutation thereof (collectively, the "Virus") and resulting or supplementary renewed Government Response. Without limiting the foregoing paragraph, the University shall not be liable for costs associated with any failure or delay in performance arising out of:

- a. the continued spread of the Virus;
- b. the continuation of or renewed Governmental Response to control the spread of the Virus; and
- c. a University decision, made on an organization-wide basis and in good faith, to control the spread of the Virus, even if exceeding the then current specific Government Response.

In particular, the COVID-19 pandemic may necessitate a revision of the format of course offerings such that courses are offered in whole or in part on an alternate delivery model to in-person classes. Tuition and mandatory fees have been set regardless of the method of instruction and will not be refunded in the event instruction occurs remotely for any part of the academic year.

Dates or times of performance including the Schedule of Dates may be extended as appropriate and the University will notify students promptly of the existence and nature of such delay and shall, so far as practicable, use reasonable efforts to minimize and mitigate any such delay or non-performance.

In the event of a discrepancy between a print version (downloaded) and the Web version, the Web version will apply.

The University of Guelph reaffirms section 1 of the Ontario Human Rights Code, 1981, which prohibits discrimination on the grounds of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, handicap, age, marital status or family status.

The university encourages applications from women, aboriginal peoples, visible minorities, persons with disabilities, and members of other under-represented groups.

Introduction

Collection, Use and Disclosure of Personal Information

Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31_e.htm. This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes. Certain personal information is disclosed to external agencies, including the Ontario Universities Application Centre, the Ministry of Advanced Education and Skills Development, and Statistics Canada, for statistical and planning purposes, and is disclosed to other individuals or organizations in accordance with the Office of Registrarial Services Departmental Policy on the Release of Student Information. For details on the use and disclosure of this information call the Office of Registrarial Services at the University at (519) 824-4120 or see <https://www.uoguelph.ca/registrar/>

Statistics Canada - Notification of Disclosure

For further information, please see Statistics Canada's web site at <http://www.statcan.gc.ca> and Section XIV Statistics Canada.

Address for University Communication

Depending on the nature and timing of the communication, the University may use one of these addresses to communicate with students. Students are, therefore, responsible for checking all of the following on a regular basis:

Email Address

The University issued email address is considered an official means of communication with the student and will be used for correspondence from the University. Students are responsible for monitoring their University-issued email account regularly.

Home Address

Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through Registrarial Services.

Name Changes

The University of Guelph is committed to the integrity of its student records, therefore, each student is required to provide either on application for admission or on personal data forms required for registration, their complete, legal name. Any requests to change a name, by means of alteration, deletion, substitution or addition, must be accompanied by appropriate supporting documentation.

Student Confidentiality and Release of Student Information Policy Excerpt

The University undertakes to protect the privacy of each student and the confidentiality of their record. To this end the University shall refuse to disclose personal information to any person other than the individual to whom the information relates where disclosure would constitute an unjustified invasion of the personal privacy of that person or of any other individual. All members of the University community must respect the confidential nature of the student information which they acquire in the course of their work.

Complete policy at <https://www.uoguelph.ca/secretariat/office-services/university-secretariat/university-policies>.

Learning Outcomes

Graduate Degree Learning Outcomes

On May 27, 2013, the University of Guelph Senate approved the following five University-wide Learning Outcomes as the basis from which to guide the development of graduate degree programs, specializations and courses:

1. Critical and Creative Thinking
2. Literacy
3. Global Understanding
4. Communication
5. Professional and Ethical Behaviour

These learning outcomes are also intended to serve as a framework through which our educational expectations are clear to students and the broader public; and to inform the process of outcomes assessment through the quality assurance process (regular reviews) of programs and departments.

An on-line guide to the learning outcomes, links to the associated skills, and detailed rubrics designed to support the development and assessment of additional program and discipline-specific outcomes, are available for reference on the [Learning Outcomes website](#)

Critical and Creative Thinking

Critical and creative thinking is a concept in which one applies logical principles, after much inquiry and analysis, to solve problems with a high degree of innovation, divergent thinking and risk taking. Those mastering this outcome show evidence of integrating knowledge and applying this knowledge across disciplinary boundaries. Depth and breadth of understanding of disciplines is essential to this outcome. At the graduate level, originality in the application of knowledge (master's) and undertaking of research (doctoral) is expected.

In addition, Critical and Creative Thinking includes, but is not limited to, the following outcomes: Independent Inquiry and Analysis; Problem Solving; Creativity; and Depth and Breadth of Understanding.

Literacy

Literacy is the ability to extract information from a variety of resources, assess the quality and validity of the material, and use it to discover new knowledge. The comfort in using quantitative literacy also exists in this definition, as does using technology effectively and developing visual literacy.

In addition, Literacy includes, but is not limited to, the following outcomes: Information Literacy, Quantitative Literacy, Technological Literacy, and Visual Literacy.

Global Understanding

Global understanding encompasses the knowledge of cultural similarities and differences, the context (historical, geographical, political and environmental) from which these arise, and how they are manifest in modern society. Global understanding is exercised as civic engagement, intercultural competence and the ability to understand an academic discipline outside of the domestic context.

In addition, Global Understanding includes, but is not limited to, the following outcomes: Global Understanding, Sense of Historical Development, Civic Knowledge and Engagement, and Intercultural Competence.

Communication

Communication is the ability to interact effectively with a variety of individuals and groups, and convey information successfully in a variety of formats including oral and written communication. Communication also comprises attentiveness and listening, as well as reading comprehension. It includes the ability to communicate and synthesize information, arguments, and analyses accurately and reliably.

In addition, Communication includes, but is not limited to, the following outcomes: Oral Communication, Written Communication, Reading Comprehension, and Integrative Communication.

Professional and Ethical Behaviour

Professional and ethical behaviour requires the ability to accomplish the tasks at hand with proficient skills in teamwork and leadership, while remembering ethical reasoning behind all decisions. The ability for organizational and time management skills is essential in bringing together all aspects of managing self and others. Academic integrity is central to mastery in this outcome. At the graduate level, intellectual independence is needed for professional and academic development and engagement.

In addition, Professional and Ethical Behaviour includes, but is not limited to, the following outcomes: Teamwork, Ethical Reasoning, Leadership, Personal Organization and Time Management, and Intellectual Independence.

Table of Contents

| | |
|--|-----------|
| X. Collaborative Specializations | 1 |
| Artificial Intelligence | 2 |
| Administrative Staff | 2 |
| Graduate Faculty | 2 |
| Associated Graduate Faculty | 2 |
| MSc/MASc Collaborative Specialization | 2 |
| Courses | 3 |
| International Development Studies | 5 |
| Administrative Staff | 5 |
| Master's Collaborative Specialization | 5 |
| PhD Collaborative Specialization | 7 |
| Courses | 7 |
| Neuroscience | 9 |
| Administrative Staff | 9 |
| Graduate Faculty | 9 |
| Associated Graduate Faculty | 9 |
| MSc/MBS Collaborative Specialization | 9 |
| PhD Collaborative Specialization | 9 |
| Courses | 10 |
| One Health | 11 |
| Administrative Staff | 11 |
| Graduate Faculty | 11 |
| Associated Graduate Faculty | 11 |
| Masters Collaborative Specialization | 11 |
| Doctoral Collaborative Specialization | 12 |
| Courses | 12 |
| Toxicology | 13 |
| Administrative Staff | 13 |
| Graduate Faculty | 13 |
| Masters Collaborative Specialization | 13 |
| Doctoral Collaborative Specialization | 13 |
| Courses | 13 |
| Other courses | 13 |

X. Collaborative Specializations

Collaborative specializations are intra-university graduate fields of study that provide additional multidisciplinary experiences for students enrolled in and completing the degree requirements of an approved masters or doctoral program.

Artificial Intelligence

The Collaborative Specialization in Artificial Intelligence (AI) provides thesis-based masters students in Computer Science, Engineering, Mathematics and Statistics, and Bioinformatics with a diverse and comprehensive knowledge base in AI. Students wishing to undertake graduate studies at the masters level with emphasis on artificial intelligence will be admitted by a participating department and will register in both the participating department and in the collaborative specialization.

Students will learn from a multidisciplinary team of faculty with expertise in fundamental and applied deep learning and machine learning, while conducting AI-related research guided by a faculty advisor. By the end of this program, graduates will have comprehensive understanding of leading-edge AI techniques and will be able to apply this knowledge to solve real-world problems.

Administrative Staff

Graduate Program Coordinator

Dr. Graham Taylor (3515 Thornbrough, Ext. 53644)

gwtaylor@uoguelph.ca

TBD

Graduate Program Assistant (, Ext.)

Graduate Faculty

Sarah J. Adamowicz

Associate Professor, Integrative Biology

R. Ayesha Ali

Associate Professor, Mathematics and Statistics

Luiza Antonie

Assistant Professor, Computer Science

Shawki Areibi

Professor, Engineering

Dan Ashlock

Professor, Mathematics and Statistics

Christine Baes

Assistant Professor, Animal Biosciences

Mohammad Biglarbegian

Associate Professor, Engineering

Scott Brandon

Assistant Professor, Engineering

Neil Bruce

Associate Professor, Computer Science

David Calvert

Associate Professor, Computer Science

Monica Cojocaru

Professor, Mathematics

Christopher Collier

Assistant Professor, Engineering

Rozita Dara

Assistant Professor, Computer Science

Fantahun Defersha

Associate Professor, Engineering

Ali Deghantaha

Assistant Professor, Computer Science

Ibrahim Deiab

Associate Professor, Engineering

Robert Dony

Associate Professor, Engineering

Hermann Josef Eberl

Professor, Mathematics and Statistics

Zeny Feng

Associate Professor, Mathematics and Statistics

David Flatla

Associate Professor, Computer Science

Andrew Gadsden

Assistant Professor, Engineering

Bahram Gharabaghi

Professor, Engineering

Karen Gordon

Associate Professor, Engineering

Gary Grewal

Associate Professor, Computer Science

Andrew Hamilton-Wright

Associate Professor, Computer Science

Julie Horrocks

Professor, Mathematics and Statistics

Hadis Karimipour

Assistant Professor, Engineering

Stefan Kremer

Professor, Computer Science

Anna Lawniczak

Professor, Mathematics and Statistics

Lei Lei

Assistant Professor, Engineering

William Lubitz

Associate Professor, Engineering

Lewis Lukens

Associate Professor, Plant Agriculture

Pascal Matsakis

Professor, Computer Science

Edward McBean

Professor, Engineering

Medhat Moussa

Professor, Engineering

Khurram Nadeem

Assistant Professor, Mathematics and Statistics

Mihai Nica

Assistant Professor, Mathematics and Statistics

Charlie Obimbo

Associate Professor, Computer Science

Michele Oliver

Professor, Engineering

Stacey Scott

Associate Professor, Computer Science

Fei Song

Associate Professor, Computer Science

Petros Spachos

Assistant Professor, Engineering

Deborah Stacey

Associate Professor, Computer Science

Graham Taylor

Associate Professor, Engineering

Dan Tulpan

Assistant Professor, Animal Biosciences

Fangju Wang

Professor, Computer Science

Mark Wineberg

Associate Professor, Computer Science

Simon Yang

Professor, Engineering

Yang Xiang

Professor, Computer Science

Associated Graduated Faculty

Dirk Steinke

Associate Director Centre for Biodiversity and Adjunct Professor Integrative Biology

MSc/MASc Collaborative Specialization

Admission Requirements

Masters students in the Collaborative Specialization in Artificial Intelligence must meet the admission requirements of the participating department in which they are enrolled. The application process has two stages. First, prospective students will apply to their primary program of interest, identifying interest in the collaborative specialization as a focus. If the student is admitted to the primary program as a thesis student, the second stage is then admission to the collaborative specialization. All applications to participate in the Collaborative Specialization in Artificial Intelligence will be vetted by the specialization's Graduate Program Coordinator.

Program Requirements

Masters students in the collaborative specialization in artificial intelligence must complete:

| | | |
|-----------|--------|--|
| UNIV*6080 | [0.25] | Computational Thinking for Artificial Intelligence |
| UNIV*6090 | [0.50] | Artificial Intelligence Applications and Society |

One of the following Elective Core courses:

| | | |
|-----------|--------|----------------------------------|
| CIS*6020 | [0.50] | Artificial Intelligence |
| ENGG*6500 | [0.50] | Introduction to Machine Learning |
| STAT*6801 | [0.50] | Statistical Learning |

Two of the following Complementary AI-related courses:

| | | |
|-----------|--------|----------------------------|
| BINF*6970 | [0.50] | Statistical Bioinformatics |
|-----------|--------|----------------------------|

| | | |
|-----------|--------|---|
| CIS*6050 | [0.50] | Neural Networks |
| CIS*6060 | [0.50] | Bioinformatics |
| CIS*6070 | [0.50] | Discrete Optimization |
| CIS*6080 | [0.50] | Genetic Algorithms |
| CIS*6100 | [0.50] | Parallel Processing Architectures |
| CIS*6120 | [0.50] | Uncertainty Reasoning in Knowledge Representation |
| CIS*6140 | [0.50] | Software Engineering |
| CIS*6160 | [0.50] | Multiagent Systems |
| CIS*6320 | [0.50] | Image Processing Algorithms and Applications |
| CIS*6420 | [0.50] | Soft Computing |
| ENGG*6100 | [0.50] | Machine Vision |
| ENGG*6140 | [0.50] | Optimization Techniques for Engineering |
| ENGG*6570 | [0.50] | Advanced Soft Computing |
| MATH*6020 | [0.50] | Scientific Computing |
| MATH*6021 | [0.50] | Optimization I |
| MATH*6051 | [0.50] | Mathematical Modelling |
| PHIL*6760 | [0.50] | Science and Ethics |
| STAT*6821 | [0.50] | Multivariate Analysis |
| STAT*6841 | [0.50] | Computational Statistical Inference |
| ENGG*4460 | [0.50] | Robotic Systems |
| STAT*4000 | [0.50] | Statistical Computing |

And an acceptable AI-related thesis. Requirements of this collaborative specialization may also serve as core and/or elective requirements in the student's home program.

Courses

Required Courses

UNIV*6080 Computational Thinking for Artificial Intelligence U [0.25]

This course will provide students with an overview of the mathematical and computational foundation that is required to undertake artificial intelligence and machine learning research. Students will also gain an understanding of the historical context, breadth, and current state of the field. Students are expected to have already taken undergraduate courses in probability & statistics, calculus, linear algebra, and data structures & algorithms (STAT*2120, MATH*1210, ENGG*1500, and CIS*2520, or equivalents).

Offering(s): Offered through Distance Education format only.

Department(s): Dean's Office, College of Engineering and Physical Sciences

UNIV*6090 Artificial Intelligence Applications and Society U [0.50]

This multidisciplinary, team-taught course provides an in-depth study of how artificial intelligence methodologies can be applied to solve real-world problems in different fields. Students will work in groups to propose solutions whilst considering social and ethical implications of artificial intelligence technologies.

Prerequisite(s): UNIV*6080

Restriction(s): Restricted to students in the collaborative specialization in Artificial Intelligence

Department(s): Dean's Office, College of Engineering and Physical Sciences

Elective Core

CIS*6020 Artificial Intelligence U [0.50]

An examination of Artificial Intelligence principles and techniques such as: logic and rule based systems; forward and backward chaining; frames, scripts, semantic nets and the object-oriented approach; the evaluation of intelligent systems and knowledge acquisition. A sizeable project is required and applications in other areas are encouraged.

Department(s): School of Computer Science

ENGG*6500 Introduction to Machine Learning U [0.50]

The aim of this course is to provide students with an introduction to algorithms and techniques of machine learning particularly in engineering applications. The emphasis will be on the fundamentals and not specific approach or software tool. Class discussions will cover and compare all current major approaches and their applicability to various engineering problems, while assignments and project will provide hands-on experience with some of the tools.

Department(s): School of Engineering

STAT*6801 Statistical Learning U [0.50]

Topics include: nonparametric and semiparametric regression; kernel methods; regression splines; local polynomial models; generalized additive models; classification and regression trees; neural networks. This course deals with both the methodology and its application with appropriate software. Areas of application include biology, economics, engineering and medicine.

Department(s): Department of Mathematics and Statistics

Complementary AI-related

BINF*6970 Statistical Bioinformatics W [0.50]

This course presents a selection of advanced approaches for the statistical analysis of data that arise in bioinformatics, especially genomic data. A central theme to this course is the modelling of complex, often high-dimensional, data structures.

Restriction(s): Restricted to students in Bioinformatics programs.

Department(s): Dean's Office, College of Biological Science

CIS*6050 Neural Networks U [0.50]

Artificial neural networks, dynamical recurrent networks, dynamic input/output sequences, communications signal identification, syntactic pattern recognition.

Department(s): School of Computer Science

CIS*6060 Bioinformatics U [0.50]

Data mining and bioinformatics, molecular biology databases, taxonomic groupings, sequences, feature extraction, Bayesian inference, cluster analysis, information theory, machine learning, feature selection.

Department(s): School of Computer Science

CIS*6070 Discrete Optimization U [0.50]

This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and genetic algorithms.

Department(s): School of Computer Science

CIS*6080 Genetic Algorithms U [0.50]

This course introduces the student to basic genetic algorithms, which are based on the process of natural evolution. It is explored in terms of its mathematical foundation and applications to optimization in various domains.

Department(s): School of Computer Science

CIS*6100 Parallel Processing Architectures U [0.50]

Parallelism in uniprocessor systems, parallel architectures, memory structures, pipelined architectures, performance issues, multiprocessor architectures.

Department(s): School of Computer Science

CIS*6120 Uncertainty Reasoning in Knowledge Representation U [0.50]

Representation of uncertainty, Dempster-Schafer theory, fuzzy logic, Bayesian belief networks, decision networks, dynamic networks, probabilistic models, utility theory.

Department(s): School of Computer Science

CIS*6140 Software Engineering U [0.50]

This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and meta-heuristics.

Department(s): School of Computer Science

CIS*6160 Multiagent Systems U [0.50]

Intelligent systems consisting of multiple autonomous and interacting subsystems with emphasis on distributed reasoning and decision making. Deductive reasoning agents, practical reasoning agents, probabilistic reasoning agents, reactive and hybrid agents, negotiation and agreement, cooperation and coordination, multiagent search, distributed MDP, game theory, and modal logics.

Department(s): School of Computer Science

CIS*6320 Image Processing Algorithms and Applications U [0.50]

Brightness transformation, image smoothing, image enhancement, thresholding, segmentation, morphology, texture analysis, shape analysis, applications in medicine and biology.

Department(s): School of Computer Science

CIS*6420 Soft Computing U [0.50]

Neural networks, artificial intelligence, connectionist model, back propagation, resonance theory, sequence processing, software engineering concepts.

Department(s): School of Computer Science

ENGG*6100 Machine Vision U [0.50]

Computer vision studies how computers can analyze and perceive the world using input from imaging devices. Topics covered include image pre-processing, segmentation, shape analysis, object recognition, image understanding, 3D vision, motion and stereo analysis, as well as case studies.

Department(s): School of Engineering

| |
|---|
| ENGG*6140 Optimization Techniques for Engineering U [0.50] |
| This course serves as a graduate introduction into combinatorics and optimization. Optimization is the main pillar of Engineering and the performance of most systems can be improved through intelligent use of optimization algorithms. Topics to be covered: Complexity theory, Linear/Integer Programming techniques, Constrained/Unconstrained optimization and Nonlinear programming, Heuristic Search Techniques such as Tabu Search, Genetic Algorithms, Simulated Annealing and GRASP. |
| <i>Department(s):</i> School of Engineering |
| ENGG*6570 Advanced Soft Computing U [0.50] |
| Neural dynamics and computation from a single neuron to a neural network architecture. Advanced neural networks and applications. Soft computing approaches to uncertainty representation, multi-agents and optimization. |
| <i>Prerequisite(s):</i> ENGG*4430 |
| <i>Department(s):</i> School of Engineering |
| MATH*6020 Scientific Computing U [0.50] |
| This course covers the fundamentals of algorithms and computer programming. This may include computer arithmetic, complexity, error analysis, linear and nonlinear equations, least squares, interpolation, numerical differentiation and integration, optimization, random number generators, Monte Carlo simulation; case studies will be undertaken using modern software. |
| <i>Department(s):</i> Department of Mathematics and Statistics |
| MATH*6021 Optimization I U [0.50] |
| A study of the basic concepts in: linear programming, convex programming, non-convex programming, geometric programming and related numerical methods. |
| <i>Department(s):</i> Department of Mathematics and Statistics |
| MATH*6051 Mathematical Modelling U [0.50] |
| The process of phenomena and systems model development, techniques of model analysis, model verification, and interpretation of results are presented. The examples of continuous or discrete, deterministic or probabilistic models may include differential equations, difference equations, cellular automata, agent based models, network models, stochastic processes. |
| <i>Department(s):</i> Department of Mathematics and Statistics |
| PHIL*6760 Science and Ethics U [0.50] |
| A consideration of the problems which arise in the conjunction of science and ethics. |
| <i>Department(s):</i> Department of Philosophy |
| STAT*6841 Computational Statistical Inference U [0.50] |
| This course covers Bayesian and likelihood methods, large sample theory, nuisance parameters, profile, conditional and marginal likelihoods, EM algorithms and other optimization methods, estimating functions, Monte Carlo methods for exploring posterior distributions and likelihoods, data augmentation, importance sampling and MCMC methods. |
| <i>Department(s):</i> Department of Mathematics and Statistics |

Undergraduate Complementary AI-related Courses

| | | |
|-----------|--------|-----------------------|
| ENGG*4460 | [0.50] | Robotic Systems |
| STAT*4000 | [0.50] | Statistical Computing |

International Development Studies

The International Development Studies (IDS) collaborative specialization provides a focal point for graduate teaching and research in the area of international development. The collaborative specialization combines training in a particular discipline with exposure to a broad range of social science perspectives. Faculty expertise encompasses various aspects of development in Asia, Africa, Eastern and Western Europe and the Americas. Students wishing to pursue a Master's or PhD degree with the designation "International Development Studies" must enter the collaborative specialization in International Development through a participating department.

Administrative Staff

Director

Craig Johnson (805 MacKinnon, Ext. 53134)
cjohns06@uoguelph.ca

Graduate Program Coordinator

Adam Sneyd (535 MacKinnon, Ext. 53568)
asneyd@uoguelph.ca

Graduate Program Assistant

TBD (046 MacKinnon, Ext. 53461)
ids@uoguelph.ca

From Capacity Development and Extension

Graduate Program Coordinator

Al Lauzon (145 Landscape Architecture, Ext. 53379)

Graduate Program Assistant

Lorena Barker (104 Landscape Architecture, Ext. 56780)

From Economics

Graduate Program Coordinator

Thanasis Stengos (715 MacKinnon, Ext. 53917)

Graduate Program Assistant

Stephanie Juhasz (726 MacKinnon, Ext. 56341)

From Engineering

Associate Director, Graduate Studies

Bahram Gharabaghi (2417 Thornbrough, Ext. 58451)

Graduate Program Assistant

Jacqueline Floyd (1405 Thornbrough, Ext. 56187)

Graduate Program Assistant

Lauren Fyke (1407 Thornbrough, Ext. 52404)

From English

Graduate Program Coordinator

Jade Ferguson (415 MacKinnon, Ext. 56726)
jfergu05@uoguelph.ca

Graduate Program Assistant

Olga Petrik (427 MacKinnon, Ext. 56315)

From Environmental Sciences

Program Coordinator

Emmanuelle Arnaud (126 Alexander Hall, Ext. 58087)

Graduate Program Assistant

TBD (275 Alexander Hall, Ext. 53937)

From Food, Agricultural and Resource Economics

Graduate Program Coordinator (MSc/MFARE)

Alfons Weersink (312 MacLachlan, Ext. 53236)

Graduate Program Coordinator (PhD)

Alan Ker (222 MacLachlan, Ext. 52766)

Graduate Program Assistant

Kathryn Selves (311 MacLachlan, Ext. 52771)

From Geography

Graduate Program Coordinator

Noella Gray (121 Hutt, Ext. 58155)

Graduate Program Assistant

Nance Grieve (123a Hutt, Ext. 56721)

From History

Graduate Program Coordinator

Susan Nance (2008 MacKinnon, Ext. 56327)

Graduate Program Assistant

TBD (2010 MacKinnon, Ext. 56847)

From Latin American and Caribbean Studies

Graduate Program Coordinator

Gordana Yovanovich (277 MacKinnon, Ext. 53180)

Graduate Program Assistant

January 28, 2020

Bethany Presley (267 MacKinnon, Ext. 56887)

From Philosophy

Graduate Program Coordinator

Don Dedrick (329 MacKinnon, Ext. 53203)

Graduate Program Assistant

Janet Thackray (348 MacKinnon, Ext. 56265)

From Plant Agriculture

Graduate Program Coordinator

Istvan Rajcan (317 Crop Science Building, Ext. 53564)

Graduate Program Assistant

Tara Israel (1105 Bovey, Ext. 56077)

From Political Science

Graduate Program Coordinator

Candace Johnson (551 MacKinnon Ext., Ext. 52179)

Graduate Program Assistant

Renee Tavascia (533 MacKinnon, Ext. 53469)

From Population Medicine

Graduate Program Coordinator

David Pearl (207B CLRE, Ext. 54748)

Graduate Program Assistant

Ariah Easley (102 CLRE, Ext. 54005)

From Public Health

Graduate Program Coordinator

Andrew Papadopoulos (110 FVMI, Ext. 53894)

Graduate Program Assistant

Ariah Easley (102 CLRE, Ext. 54005)

From Rural Planning and Development

Graduate Program Coordinator

Wayne Caldwell (LA Rm 110A, Ext. 56420)

Graduate Program Assistant

Lorena Barker (104 Landscape Architecture, Ext. 56780)

From Sociology and Anthropology

Sociology Graduate Program Coordinator

Jeji Varghese (634 MacKinnon Ext., Ext. 56333)

Public Issues Anthropology Graduate Program Coordinator

Thomas McIlwraith (616 MacKinnon, Ext. 53545)

tad.mcilwraith@uoguelph.ca

Graduate Program Assistant

Shelagh Daly (624 MacKinnon, Ext. 53895)

Master's Collaborative Specialization

Students wishing to pursue a Master's degree with the designation "International Development Studies" must enter the collaborative specialization in International Development through a participating department.

Admission Requirements

Students must meet the University's general requirement a four-year Honours degree, or equivalent, from a recognized post-secondary institution with a B- average over the last two years of full-time equivalent study. Note that some departments set their admission requirement higher than B-.

Students must have completed the following:

- One undergraduate course in economics.
- One undergraduate course in a social science discipline
- One course in social science research methods or equivalent.

Program Requirements

Students complete International Development Studies core requirements and the requirements of their home department. The following are requirements for select departments; consult the IDS Graduate website for other departments.

IDS Master's Core Courses*

| | | |
|-----------|--------|--|
| IDEV*6200 | [1.00] | Development Theory, Issues and Process |
| IDEV*6300 | [0.50] | Research and Analysis in a Development Context |

Optional IDS Courses

Students in the collaborative specialization may undertake two optional interdisciplinary courses:

| | | |
|-----------|--------|--|
| IDEV*6000 | [0.50] | Regional Context |
| IDEV*6500 | [0.50] | Fieldwork in International Development Studies |

Departmental or Program Requirements

Programs not listed below are designed by special arrangements. All departmental requirements are subject to change. Students should confirm the departmental course requirements with the respective Graduate Program Coordinator.

Capacity Development and Extension (MSc)

CDE*6070 [0.50] Foundations of Capacity Building and Extension
 CDE*6260 [0.50] Research Design
 One of:
 RPD*6380 [0.50] Application of Quantitative Techniques in Rural Planning and Development

EDRD*6000 [0.50] Qualitative Analysis in Rural Development

Two additional courses from the following CDE restricted electives group:

CDE*6290 [0.50] Special Topics in Capacity Building and Extension
 CDE*6311 [0.50] Community Engagement and Public Participation
 CDE*6320 [0.50] Capacity Building for Sustainable Development
 CDE*6330 [0.50] Facilitation and Conflict Management
 CDE*6410 [0.50] Readings in Capacity Building and Extension
 CDE*6420 [0.50] Communication for Social and Environmental Change
 CDE*6690 [0.50] Community Environmental Leadership

One open elective [0.50] (one IDS Master's Core Course will fulfill this requirement)

A thesis OR

CDE*6900 [1.00] Major Research Paper
 plus two more courses from the restricted electives group (see course list above)

Economics (MA)

ECON*6000 [0.50] Microeconomic Theory I
 ECON*6020 [0.50] Macroeconomic Theory I
 ECON*6940 [1.00] Research Project

One of:

ECON*6050 [0.50] Introduction to Econometric Methods

AND

ECON*6180 [0.50] Econometric Methods

OR

ECON*6140 [0.50] Econometrics I

Engineering (MEng in Environmental Engineering or Water Resources Engineering)

Six courses from the list of required graduate courses in Engineering (to be selected in consultation with advisor)

Plus one of:

ENGG*6950 [1.00] Final Project in Environmental Engineering

ENGG*6900 [1.00] Final Project in Water Resources Engineering

Engineering (MAsc in Environmental Engineering or Water Resources Engineering)

Three courses from the list of required graduate courses in Engineering (to be selected in consultation with advisor)

Plus:

Thesis

English (MA)

Four English courses and a thesis

OR

Six English courses and

ENGL*6803 [1.00] Research Project

Environmental Sciences (MSc)

ENVS*6900 [0.50] Research Seminar in Environmental Sciences

Two other courses in consultation with the department.

Plus:

Thesis

Family Relations and Applied Nutrition (MSc)

Applied Human Nutrition

For all students in the MSc program in the field of Applied Human Nutrition, a minimum of 2.25 graduate credits will be chosen in consultation with the student's advisor and advisory committee including:

FRAN*6000 [0.50] Quantitative Research Methods

FRAN*6010 [0.50] Applied Statistics

FRAN*6020 [0.50] Qualitative Research Methods

FRAN*6550 [0.25] Research Seminar

One additional [0.5] graduate elective course such as FRAN*6610, FRAN*6510 or another graduate level elective course related to the student's research specialization. It can be taken within Family Relations and Applied Nutrition or in other academic units of the university.

Students who enter the MSc-AHN program from a non-nutrition undergraduate program will also be required to take those undergraduate and/or graduate courses necessary to meet foundational knowledge in applied human nutrition. In addition, students must complete a research thesis.

Food, Agricultural and Resource Economics (MSc or MFARE)

Thesis based MSc

FARE*6380 [0.50] Applied Microeconomics for Agricultural Economists
 FARE*6970 [0.50] Applied Quantitative Methods for Agricultural Economists
 FARE*6910 [0.50] Applied Policy Analysis I
 FARE*6100 [0.50] The Methodologies of Economics
 FARE*6600 [0.50] Food Security and the Economics of Agri-Food Systems in Developing Countries

FARE*6800 [0.00] Seminar in Agricultural Economics

One additional course

A thesis

Course Work and Major Research Paper MFARE

FARE*6380 [0.50] Applied Microeconomics for Agricultural Economists
 FARE*6910 [0.50] Applied Policy Analysis I
 FARE*6970 [0.50] Applied Quantitative Methods for Agricultural Economists
 FARE*6100 [0.50] The Methodologies of Economics
 FARE*6600 [0.50] Food Security and the Economics of Agri-Food Systems in Developing Countries

FARE*6400 [0.50] Advanced Topics in Agricultural Economics

FARE*6800 [0.00] Seminar in Agricultural Economics

FARE*6140 [1.00] Major Paper in Food, Agricultural and Resource Economics

One additional course

Course Work MFARE

In order to satisfy the degree requirements of the course work option, students will complete successfully the following courses:

FARE*6380 [0.50] Applied Microeconomics for Agricultural Economists
 FARE*6910 [0.50] Applied Policy Analysis I
 FARE*6970 [0.50] Applied Quantitative Methods for Agricultural Economists
 FARE*6100 [0.50] The Methodologies of Economics
 FARE*6600 [0.50] Food Security and the Economics of Agri-Food Systems in Developing Countries

FARE*6800 [0.00] Seminar in Agricultural Economics

along with three additional graduate courses approved by the student's advisory committee. Students in this option are restricted from taking FARE*6140

Geography (MA or MSc)

GEOG*6090 [0.50] Geographical Research Methods I

GEOG*6091 [0.50] Geographical Research Methods II

One other Geography course (which can be taken from the IDS core)

Either a thesis OR

GEOG*6180 [1.00] Research Project in Geography
 plus one other Geography course not taken as part of the IDS core

History (MA)

Three History courses

One of:

Thesis

HIST*6400 [1.00] Major Paper

Latin American and Caribbean Studies (MA)

LACS*6010 [0.50] Latin American Identity and Culture

LACS*6020 [0.50] Re-Imagining Latin American, Latino and Caribbean Communities

LACS*6030 [0.50] Globalization and Insecurity in the Americas

Plus:

Thesis

Or:

LACS*6100 [1.00] Research Project

One other LACS course

Management (MA)

Degree Requirements

Students are required to take 8 courses (4.0 credits) plus the major research project (1.0 credit).

Core Courses:

MGMT*6100 [0.50] Evidence Based Management Research

MGMT*6200 [0.50] Leadership Assessment and Development

Fields:

Management Research

MGMT*6300 [0.50] Business Consulting

MGMT*6400 [0.50] Project Management

BUS*6800 [0.50] Readings in Leadership I

BUS*6810 [0.50] Readings in Leadership II

BUS*6820 [0.50] Readings in Management

BUS*6840 [0.50] Foundational Theories of Management

Accounting

ACCT*6100 [0.50] Integrated Cases I

| | | |
|-----------|--------|------------------------|
| ACCT*6200 | [0.50] | Integrated Cases II |
| ACCT*6300 | [0.50] | Taxation |
| ACCT*6400 | [0.50] | Performance Management |
| ACCT*6500 | [0.50] | Assurance |
| ACCT*6600 | [0.50] | Financial Management |

Other courses from the Department of Management with permission from the Graduate Program Coordinator.

Restricted Electives:

One quantitative or qualitative research methods course (0.5 credits) with permission:

| | | |
|-----------|--------|--|
| ANTH*6140 | [0.50] | Qualitative Research Methods |
| FRAN*6020 | [0.50] | Qualitative Research Methods |
| MGMT*6120 | [0.50] | Quantitative Methods for Evidence Based Management |
| MGMT*6830 | [0.50] | Applied Univariate Statistical Analysis for Management |
| MGMT*6840 | [0.50] | Quantitative Research Methods: Multivariate Techniques |
| MGMT*6850 | [0.50] | Qualitative Research Methods |
| PSYC*6060 | [0.50] | Research Design and Statistics |
| SOC*6130 | [0.50] | Quantitative Research Methods |
| SOC*6140 | [0.50] | Qualitative Research Methods |

Major Research Paper:

| | | |
|-----------|--------|------------------------|
| MGMT*6500 | [1.00] | Major Research Project |
|-----------|--------|------------------------|

Philosophy (MA)

| | | |
|-----------|--------|------------|
| PHIL*6950 | [0.50] | MA Seminar |
|-----------|--------|------------|

Additional philosophy courses in consultation with the department
Either a thesis or research paper (in conjunction with)

| | | |
|-----------|--------|------------------------|
| PHIL*6990 | [1.00] | Major Research Project |
|-----------|--------|------------------------|

Political Science (MA)

IDS Requirements:

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|-----------|--------|--------------------------------|
| POLS*6900 | [0.25] | Communications |
| POLS*6940 | [0.75] | Research Design and Methods |
| POLS*6730 | [0.50] | Development and Global Justice |

One of:

Thesis

OR

| | | |
|-----------|--------|-------------|
| POLS*6970 | [1.00] | Major Paper |
|-----------|--------|-------------|

plus one additional course from the Political Science Department (elective)

Population Medicine (MSc course work)

| | | |
|-----------|--------|--------------------------------|
| POPM*6200 | [0.50] | Epidemiology I |
| POPM*6210 | [0.50] | Epidemiology II |
| POPM*6250 | [1.00] | Project in Population Medicine |

Note

*NB: A student's Population Medicine advisor may require a student to take POPM*6100, Seminar.

Public Health (MPH)

| | | |
|-----------|--------|---|
| PABI*6500 | [0.50] | Infectious Diseases and Public Health |
| POPM*6200 | [0.50] | Epidemiology I |
| POPM*6510 | [0.50] | Health Promotion |
| POPM*6520 | [0.50] | Introduction to Epidemiological and Statistical Methods |
| POPM*6530 | [0.50] | Health Communication |
| POPM*6540 | [0.50] | Concepts in Environmental Public Health |
| POPM*6550 | [0.50] | Public Health Policy and Systems |
| POPM*6560 | [1.00] | Public Health Practicum |
| POPM*6570 | [0.00] | Public Health Capstone |
| POPM*6580 | [0.50] | Public Health Leadership and Administration |

Public Issues in Anthropology (MA)

IDS Requirements:

| | | |
|-----------|--------|------------------------------|
| ANTH*6080 | [0.50] | Anthropological Theory |
| ANTH*6140 | [0.50] | Qualitative Research Methods |
| ANTH*6000 | [0.50] | Public Issues Anthropology |

Either a Thesis and one additional course or

| | | |
|-----------|--------|-------------|
| ANTH*6660 | [1.00] | Major Paper |
|-----------|--------|-------------|

and three additional courses

Rural Planning and Development (MSc Planning)

Departmental Requirements

| | | |
|----------|--------|--|
| RPD*6030 | [0.50] | International Rural Development Planning: Principles and Practices |
| RPD*6170 | [0.50] | Rural Research Methods |
| RPD*6240 | [0.50] | Planning and Development Theory |
| RPD*6291 | [0.50] | Rural Development Administration |
| RPD*6380 | [0.50] | Application of Quantitative Techniques in Rural Planning and Development |

Plus a thesis and one additional RPD course

OR

| | | |
|----------|--------|----------------------|
| RPD*6360 | [1.00] | Major Research Paper |
|----------|--------|----------------------|

plus three additional RPD courses

Sociology (MA)

| | | |
|----------|--------|---------------------|
| SOC*6070 | [0.50] | Sociological Theory |
| SOC*6700 | [0.00] | Pro-seminar |

One of:

| | | |
|----------|--------|-------------------------------|
| SOC*6130 | [0.50] | Quantitative Research Methods |
| SOC*6140 | [0.50] | Qualitative Research Methods |

Plus a thesis and one additional Sociology course OR

| | | |
|----------|--------|-------------|
| SOC*6660 | [1.00] | Major Paper |
|----------|--------|-------------|

Plus three additional Sociology courses

PhD Collaborative Specialization

The collaborative specialization in International Development Studies (IDS) in a PhD program provides an opportunity for advanced students to engage with interdisciplinary development theories and to conduct research on international development issues based on approaches of selected academic disciplines. The collaborative specialization in IDS is undertaken jointly with a discipline-based degree. Students enter IDS through a participating department with a PhD program. At present these include Sociology; Plant Agriculture, Philosophy, Political Science; Population Medicine, Geography; Food, Agricultural and Resource Economics; Economics; History; Engineering; Environmental Sciences.

Based on the experience of faculty advisors in key participating departments, the program focuses on issues such as international political economy, food security, environmental dynamics and governance, gender inequality, rural development, long-term economic change, and other interdisciplinary cutting-edge topics in international development.

Admission Requirements

To be considered for admission, an applicant must have a recognized Bachelor's degree and a Master's degree in a relevant discipline or related interdisciplinary field. Applicants to the IDS collaborative specialization must meet the specific departmental admission requirements, which vary from one department to another. For information on the admission requirements and application deadlines of your selected department, please contact the relevant department directly.

In addition to the specific departmental admission requirements, applicants are expected to have a strong background in the social sciences a demonstrable track record of experience in the course-based study of development issues, development research and/or development practice and a stated research interest relating to international development.

Program Requirements

Students complete requirements for the departmental degree as well as the IDS components which consist of two core courses, including an interdisciplinary course on theories and debates in development and a course on development research and practice. Students must obtain a minimum final grade of 75% in each of the two IDS PhD core courses to remain in the IDS collaborative specialization. While the students have to successfully complete these courses to remain in the IDS collaborative specialization, they do not have to pass a separate qualifying examination in addition to the departmental qualifying exam. Furthermore, the expectation is that the IDS students' PhD research will bridge two or more disciplines in a way that relates to the field of IDS. The departmental supervisor must have knowledge and understanding of International Development Studies as it relates to the requirements of the IDS collaborative specialization. One of the members on the student's advisory committee needs to be an appointed IDS affiliated faculty member approved by the IDS Admissions Committee.

For further information regarding course offering, please contact the IDS Graduate Program Assistant.

IDS PhD Core Courses

| | | |
|-----------|--------|-------------------------------------|
| IDEV*6800 | [0.50] | Theories and Debates in Development |
| IDEV*6850 | [0.50] | Development Research and Practice |

Departmental PhD Requirements

Departmental requirements are assigned in collaboration with the student's home department. See respective departmental web pages.

Courses

IDEV*6000 Regional Context U [0.50]

This reading course provides an opportunity for in-depth investigation about a particular region in preparation for a thesis, major paper or research project. The course normally is directed by the student's advisor.

Department(s): Dean's Office, College of Social and Applied Human Sciences

| |
|--|
| <p>IDEV*6200 Development Theory, Issues and Process F-W [1.00]</p> <p>This course will examine key issues in development, for example: social justice, poverty and inequality, sustainability, governance and inclusiveness, and how perspectives on these issues have changed over time and differ across disciplinary perspectives. The course will be writing-intensive and focus on the development of skills in oral communication of development issues.</p> <p><i>Department(s):</i> Dean's Office, College of Social and Applied Human Sciences</p> |
| <p>IDEV*6300 Research and Analysis in a Development Context S [0.50]</p> <p>Students will explore alternative approaches to development research and analysis across documentary, qualitative and quantitative methods and the ethical issues associated with research in a development context. The course involves guided readings and seminar based discussions related to development research. There will be emphasis on written and oral communication of development research and analysis to diverse audiences. The course will be taught over a two-week period at the start of the summer semester. Subsequently, students will reflect on their own positionality and the development context of their research of practicum through the remainder of the Summer semester and while engaged in this activity.</p> <p><i>Department(s):</i> Dean's Office, College of Social and Applied Human Sciences</p> |
| <p>IDEV*6500 Fieldwork in International Development Studies U [0.50]</p> <p>This course recognizes an intensive commitment to research in an archival repository, 'in the field' or at an appropriate development institution in Canada or abroad. The course normally is directed by the student's advisor in consultation with the advisory committee</p> <p><i>Department(s):</i> Dean's Office, College of Social and Applied Human Sciences</p> |
| <p>IDEV*6800 Theories and Debates in Development F [0.50]</p> <p>This course examines recent approaches in development theory explaining international inequality, poverty and long-term change. It also investigates selected current debates in international development – such as food security, trade, good governance, sustainability or gender – from various discipline-based and interdisciplinary perspectives, and analyzes selected regional experiences of development.</p> <p><i>Restriction(s):</i> Restricted to students in doctoral IDEV collaborative specializations. A minimum final grade of 75% is required to remain in the IDEV collaborative specialization.</p> <p><i>Department(s):</i> Dean's Office, College of Social and Applied Human Sciences</p> |
| <p>IDEV*6850 Development Research and Practice W [0.50]</p> <p>In this course students establish the linkages between their doctoral research topic and the wider field of development studies and practice. The course will examine development policies and projects, ethical issues related to (cross-cultural) development research, and relationships between research and development practice.</p> <p><i>Prerequisite(s):</i> IDEV*6800</p> <p><i>Restriction(s):</i> Restricted to students in doctoral IDEV collaborative specializations. A minimum final grade of 75% is required to remain in the IDEV collaborative specialization.</p> <p><i>Department(s):</i> Dean's Office, College of Social and Applied Human Sciences</p> |

Neuroscience

The Neuroscience collaborative specialization provides an opportunity for MSc/MBS/PhD students engaged in research in the rapidly expanding field of neuroscience, to combine their departmental degree program with multidisciplinary exposure to the field of neuroscience. This unique combination of multidisciplinary studies provides students with the best possible foundation for academic careers in neuroscience and related areas. The collaborative specialization includes participation from core faculty in the following departments: Animal Biosciences, Biomedical Sciences, Clinical Studies, Human Health and Nutritional Sciences, Integrative Biology, Molecular and Cellular Biology, Pathobiology, Population Medicine and Psychology. Students wishing to pursue a Master's or PhD degree with the designation Neuroscience must enter the collaborative specialization in Neuroscience through a participating department.

Administrative Staff

Boyer Winters

Director (3005 MacKinnon, Ext. 52163)
bwinters@uoguelph.ca

Mark Fenske

Graduate Program Coordinator (3020 MacKinnon Extension, Ext. 56411)
mfenske@uoguelph.ca

Robin Sorbara

Graduate Program Assistant (4014 MacKinnon, Ext. 53508)
robinfra@uoguelph.ca

Graduate Faculty

Naseem Al-Aidroos

Associate Professor, Psychology

Craig D. Bailey

Assistant Professor, Biomedical Sciences

Andrew J. Bendall

Associate Professor, Molecular and Cellular Biology

Leah R. Bent

Associate Professor, Human Health and Nutritional Sciences

Nicholas J. Bernier

Professor, Integrative Biology

Elena Choleris

Professor, Psychology

Donald Dedrick

Associate Professor, Philosophy/Psychology

Mark J. Fenske

Associate Professor, Psychology

Christopher Fiacconi

Assistant Professor, Psychology

George Harauz

Professor and Canada Research Chair, Molecular and Cellular Biology

Andreas Heyland

Assistant Professor, Integrative Biology

Fiona James

Assistant Professor, Clinical Studies

Nina Jones

Associate Professor and Canada Research Chair, Molecular and Cellular Biology

Bettina E. Kalisch

Associate Professor, Biomedical Sciences

Jibran Khokhar

Assistant Professor, Biomedical Sciences

Frederic Laberge

Assistant Professor, Integrative Biology

Jasmin Lalonde

Assistant Professor, Molecular and Cellular Biology

Francesco Leri

Professor, Psychology

Ray Lu

Associate Professor, Molecular and Cellular Biology

David W.L. Ma

Associate Professor, Human Health and Nutritional Sciences

Neil J. MacLusky

Professor and Chair, Biomedical Sciences

Georgia Mason

Professor and Canada Research Chair, Animal Biosciences

Robert L. McLaughlin

Associate Professor, Integrative Biology

Daniel V. Meegan

Associate Professor, Psychology

Jennifer Murray

Assistant Professor, Psychology

Lee Niel

Assistant Professor, Population Medicine

Linda A. Parker

Professor and Canada Research Chair, Psychology

John Z. Srbley

Assistant Professor, Human Health and Nutritional Sciences

Lana M. Trick

Professor, Psychology

Lori A. Vallis

Associate Professor, Human Health and Nutritional Sciences

Terry Van Raay

Assistant Professor, Molecular and Cellular Biology

Tina Widowski

Professor, Animal Biosciences

Boyer D. Winters

Associate Professor, Psychology

John L. Zettel

Assistant Professor, Human Health and Nutritional Sciences

As a practical matter, any faculty member who is approved by the Board of Graduate Studies for graduate faculty status and is a member of a participating unit within the collaborative specialization will be able to advise a master's or doctoral student.

Associated Graduate Faculty

Geoffrey Power

Contractually Limited Faculty, Human Health and Nutritional Sciences

MSc/MBS Collaborative Specialization

The MSc/MBS collaborative specialization in Neuroscience enables students engaged in neuroscience research to combine their departmental degree program with a multidisciplinary specialization in the field of neuroscience.

Admission Requirements

MSc/MBS students in the collaborative specialization in Neuroscience must meet the admission requirements of the participating department in which they are enrolled. The application process has two stages: first, application to the primary program of interest, identifying interest in the collaborative specialization as a secondary focus. If the student is admitted to the primary program, the second stage is then admission to the collaborative specialization.

Program Requirements

In addition to coursework in their respective departments, students in the MSc/MBS collaborative specialization must complete NEUR*6000 as well as registering for NEUR*6100 each term that they are in the collaborative specialization. In NEUR*6100, students and faculty will meet once a month to discuss issues/ hear talks/ present research in neuroscience.

PhD Collaborative Specialization

The PhD collaborative specialization in Neuroscience enables students engaged in neuroscience dissertation research to combine their departmental degree program with a multidisciplinary specialization in the field of neuroscience.

Admission Requirements

PhD students in the collaborative specialization in Neuroscience must meet the PhD admission requirements for the participating department in which they are enrolled.

Program Requirements

If a student enters the PhD collaborative specialization in Neuroscience at the doctoral level, in addition, to coursework in their respective departments, students must complete NEUR*6000, or show evidence of course equivalence in prior training. Students must be engaged in neuroscience dissertation research. During each term of their program of studies, doctoral students must enroll in NEUR*6100. The seminar will meet monthly. Students must take their qualifying exams within five semesters of entering the program, as required by University graduate policies. One member on the qualifying exam committee must be a core member of the collaborative specialization in Neuroscience outside the student's home department or a faculty member from another university approved by graduate studies. As well one member of the student's advisory committee must be a core member of the neuroscience collaborative specialization outside the student's home department or a faculty member from another university approved by graduate studies.

Courses**NEUR*6000 Principles of Neuroscience U [0.50]**

This course is designed to ensure that graduate students with diverse neuroscience backgrounds registered in the collaborative specialization in Neuroscience are exposed to the fundamentals in all areas of neuroscience.

Department(s): Department of Biomedical Sciences

NEUR*6100 Seminar in Neuroscience U [0.00]

This course will expose graduate students to some of the major theories, issues and methodologies driving research in neuroscience. Students will learn to critically evaluate presentations by researchers in this field as well as to communicate the results of their own research.

Department(s): Department of Psychology

One Health

The Collaborative Specialization in One Health prepares future leaders for the complex challenges at the confluence of human, animal, and environmental health, working across disciplinary boundaries, conducting multidisciplinary research, mobilizing knowledge, and informing policy. Doctoral and Master's (thesis or course work and MRP) students wishing to undertake graduate studies with emphasis on One Health will be admitted by a participating department and will register in both the participating department and in the collaborative specialization.

The participating academic programs are Animal Biosciences (MSc, PhD), Biomedical Sciences (MBS, MSc, PhD), Computational Sciences (PhD), Computer Science (MSc), Engineering (MEng, MAsc, PhD), Environmental Sciences (MES, MSc, PhD), Food Science (MSc, PhD), Geography (MA, MSc, PhD), History (MA, PhD), Human Health and Nutritional Sciences (MSc, PhD), Integrative Biology (MSc, PhD), Molecular and Cellular Biology (MSc, PhD), Pathobiology (MSc, PhD), Political Science (MA, PhD), Population Medicine (MSc, PhD), Philosophy (MA, PhD), Public Issues Anthropology (MA), and Rural Development and Planning (MSc).

Administrative Staff

Graduate Program Coordinator

Dr. Katie Clow (2531 Stewart Building, Ext. 53944)
kclow@uoguelph.ca

Graduate Program Assistant

TBD (, Ext.)

Graduate Faculty

Tara Abraham

Associate Professor, History

Madhur Anand

Professor, Environmental Sciences

Ryan Briggs

Assistant Professor, Political Science

David Calvert

Associate Professor, Computer Science

Catherine Carstairs

Professor, History

Katie Clow

Assistant Professor, Population Medicine

Rozita Dara

Assistant Professor, Computer Science

Kari Dunfield

Associate Professor, Environmental Sciences

Elizabeth Finnis

Associate Professor, Sociology and Anthropology

Robert Friendship

Professor, Population Medicine

Karine Gagne

Assistant Professor, Sociology and Anthropology

Daniel Gillis

Associate Professor, Computer Science

Maya Goldenberg

Associate Professor, Philosophy

Larry Goodridge

Professor, Food Science

Amy Greer

Associate Professor, Population Medicine

Ryan Gregory

Associate Professor, Integrative Biology

Andrew Hamilton-Wright

Associate Professor, Computer Science

Carmen Ho

Assistant Professor, Political Science

Claire Jardine

Associate Professor, Pathobiology

Candace Johnson

Professor, Political Science

Craig Johnson

Professor, Political Science

Niel Karrow

Professor, Animal Biosciences

Satsuki Kawano

Professor, Sociology and Anthropology

David Kelton

Professor, Population Medicine

Edward Koning

Associate Professor, Political Science

Gisele LaPointe

Professor, Food Science

Leah Levac

Associate Professor, Political Science

Philip Loring

Associate Professor, Geography, Environment and Geomatics

Brittany Luby

Assistant Professor, History

Stuart McCook

Professor, History

Scott McEwen

Professor, Population Medicine

Thomas McIlwraith

Assistant Professor, Sociology and Anthropology

Faisal Moola

Associate Professor, Geography, Environment and Geomatics

Kate Parizeau

Associate Professor, Geography, Environment and Geomatics

Jane Parmley

Associate Professor, Population Medicine

David Pearl

Associate Professor, Population Medicine

Nicole Ricker

Assistant Professor, Pathobiology

John Srbely

Associate Professor, Human Health and Nutritional Sciences

Deborah Stienstra

Professor, Political Science

Eran Ukwatta

Assistant Professor, Engineering

Laura VanEerd

Associate Professor, Environmental Sciences

Keith Warriner

Professor, Food Science

J. Scott Weese

Professor, Pathobiology

Geoffrey Wood

Associate Professor, Pathobiology

Associated Graduate Faculty

Theresa Bernardo

Professor, Population Medicine

Masters Collaborative Specialization

Admission Requirements

Masters students in the Collaborative Specialization in One Health must meet the admission requirements of the participating department in which they are enrolled. The application process has two stages. First, prospective students will apply to their primary program of interest, identifying interest in the collaborative specialization as a focus. If the student is admitted to the primary program, the second stage is then admission to the collaborative specialization. Applicants will be required to submit a letter of interest (maximum 500 words) briefly outlining their interest in One Health and explaining how their area of research will align with One Health and intersect with all three pillars (animals, humans, and the environment).

All applications to participate in the Collaborative Specialization in One Health will be reviewed by the specialization's Graduate Program Coordinator and a committee of 3-5 faculty from different colleges.

Program Requirements

Masters students in the Collaborative Specialization in One Health must complete:

ONEH*6000 [0.50] One Health Approaches to Research

ONEH*6100 [0.50] Master's Seminar in One Health

And an acceptable MRP or thesis that applies a One Health approach. For thesis-based master's students, at least one member of the student's advisory committee must be a core graduate faculty member of the Collaborative Specialization in One Health. Requirements of this collaborative specialization may also serve as elective requirements in the student's home program.

Doctoral Collaborative Specialization

Admission Requirements

Doctoral students in the Collaborative Specialization in One Health must meet the admission requirements of the participating department in which they are enrolled. The application process has two stages. First, prospective students will apply to their primary program of interest, identifying interest in the collaborative specialization as a focus. If the student is admitted to the primary program, the second stage is then admission to the collaborative specialization. Applicants will be required to submit a letter of interest (maximum 500 words) briefly outlining their interest in One Health and explaining how their area of research will align with One Health and intersect with all three pillars (animals, humans, and the environment).

All applications to participate in the Collaborative Specialization in One Health will be reviewed by the specialization's Graduate Program Coordinator and a committee of 3-5 faculty from different colleges.

Program Requirements

Doctoral students in the Collaborative Specialization in One Health must complete:

ONEH*6000 [0.50] One Health Approaches to Research

ONEH*6200 [0.50] Doctoral Seminar in One Health

And successfully defend a thesis that applies a One Health approach. At least one member of the student's advisory committee must be a core graduate faculty member of the Collaborative Specialization in One Health. Students that previously completed ONEH*6000 as part of the master's collaborative specialization will be exempt from retaking it as part of the doctoral collaborative specialization; however, they will still be required to complete the final Research Proposal and Presentation assignment. Requirements of this collaborative specialization may also serve as elective requirements in the student's home program.

Courses

ONEH*6000 One Health Approaches to Research W [0.50]

A multidisciplinary course for graduate students that provides in-depth knowledge on the One Health approach, exploring complex issues at the interface of human, animal, and environmental health. Active learning lessons will foster strong skill development for One Health research in collaboration, systems thinking, transdisciplinarity, critical thinking, problem solving, leadership, and communication.

Restriction(s): Instructor consent required.

Department(s): Department of Population Medicine

ONEH*6100 Master's Seminar in One Health F [0.50]

This course offers a university-wide multidisciplinary forum for discussion of One Health. Master's students will discover One Health through different disciplinary lenses, facilitate and actively engage in academic discussion about One Health, and practice leadership and networking skills necessary for success as a One Health practitioner.

Prerequisite(s): ONEH*6000

Restriction(s): Instructor consent required.

Department(s): Department of Population Medicine

ONEH*6200 Doctoral Seminar in One Health F [0.50]

This course offers a university-wide multidisciplinary forum for discussion of One Health. Doctoral students will discover One Health through different disciplinary lenses, facilitate and actively engage in academic discussion about One Health, and practice leadership and networking skills necessary for success as a One Health practitioner.

Prerequisite(s): ONEH*6000

Restriction(s): Instructor consent required.

Department(s): Department of Population Medicine

Toxicology

The collaborative specialization is the focal point for graduate teaching and research in toxicology. Students wishing to undertake graduate studies at the masters or doctoral level with emphasis on toxicology will be admitted by a participating department and will register in both the participating department and in the collaborative specialization. The participating academic units include the Departments of Animal Biosciences, Biomedical Sciences, Chemistry, Food Safety and Quality Assurance, Human Health and Nutritional Sciences, Integrative Biology, Molecular and Cellular Biology, Pathobiology, Plant Agriculture and the School of Environmental Sciences.

Administrative Staff

Director and Graduate Program Coordinator

Dr. Richard Manderville (SCIE 3243, Ext. 53963)
rmanderv@uoguelph.ca

Graduate Secretary

Lisa O'Dwyer (SCIE 2513, Ext. 53044)
chemgrad@uoguelph.ca

Graduate Faculty

Manfred Brauer

Associate Professor, Molecular and Cellular Biology

Elena Choleris

Professor, Psychology

Beverley Hale

Associate Professor, School of Environmental Sciences

Christopher J. Hall

Professor, School of Environmental Sciences

Ronald Johnson

Associate Professor, Biomedical Sciences

P. David Josephy

Professor, Molecular and Cellular Biology

Bettina E. Kalisch

Associate Professor, Biomedical Sciences

Niel A. Karrow

Assistant Professor, Animal Biosciences

Gordon M. Kirby

Assistant Professor, Biomedical Sciences

Jibran Khokhar

Assistant Professor, Biomedical Sciences

Hung Lee

Professor, School of Environmental Sciences

Francesco Leri

Professor, Psychology

Richard A. Manderville

Associate Professor, Chemistry

Linda A. Parker

Professor, Psychology and Canada Research Chair

Leonard Ritter

Professor, School of Environmental Sciences

Cynthia Scott-Dupree

Associate Professor, School of Environmental Sciences

Paul K. Sibley

Assistant Professor, School of Environmental Sciences

E. James Squires

Professor, Animal Biosciences

Glen J. Van Der Kraak

Professor, Integrative Biology and Associate Dean, Research, CBS

Masters Collaborative Specialization

Admission Requirements

Masters students in the collaborative specialization in toxicology must meet the masters admission requirements of the participating department in which they are enrolled.

Program Requirements

Masters students in the collaborative specialization in toxicology must complete a minimum of 1.50 graduate credits, which must include the toxicology courses TOX*6000 and TOX*6200 and courses required by the participating department in which they are enrolled. It is expected that students' research (MRP or Thesis) or at least 30% of the courses in a course-based program be in the area of toxicology.

Doctoral Collaborative Specialization

Admission Requirements

Doctoral students in the collaborative specialization in toxicology must meet the doctoral admission requirements of the participating department in which they are enrolled.

Program Requirements

Doctoral students in the collaborative specialization in toxicology must meet all the academic requirements specified by the participating department in which they are enrolled. They must also complete the courses TOX*6000 and TOX*6200 if they, or equivalent courses, were not taken as part of a masters program. It is expected that the students' doctoral research be in the area of toxicology.

Courses

TOX*6000 Advanced Principles of Toxicology S [0.50]

An intensive course in the principles of modern aspects of toxicology, taught in a lecture/case study format.

Department(s): Department of Chemistry

TOX*6200 Advanced Topics in Toxicology W [0.50]

Advanced topics in toxicology will include oral presentations by students, faculty members, and guest lecturers. The emphasis will be on advanced concepts and techniques in toxicology research with particular relevance to mechanistic, molecular and interpretive toxicology. Offered in conjunction with TOX*4200. Extra work is required of graduate students.

Restriction(s): Credit may be obtained for only one of TOX*6200 or TOX*4200

Department(s): Department of Chemistry

TOX*6590 Biochemical Toxicology F [0.50]

The molecular mechanisms of action of carcinogens and other toxic compounds. Enzymes of biotransformation, including a detailed study of cytochrome P-450. Interactions of reactive species with DNA and other macromolecules. Offered in conjunction with TOX*4590. Extra work is required of graduate students.

Restriction(s): Credit may be obtained for only one of TOX*4590 and TOX*6590

Department(s): Department of Chemistry

Other courses

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|-----------|--------|--|
| BIOM*6721 | [0.25] | Special Topics in Pharmacology-Toxicology |
| BIOM*6722 | [0.50] | Special Topics in Biomedical Pharmacology-Toxicology |
| CHEM*7310 | [0.50] | Selected Topics in Biochemistry |
| CHEM*7600 | [0.50] | Selected Topics in Organic Chemistry |