

# 2015-2016 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2015-2016 academic years, including the Summer Semester 2015, Fall Semester 2015 and the Winter Semester 2016.

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:

- The Association of Universities and Colleges of Canada

Contact Information:

University of Guelph  
Guelph, Ontario, Canada  
N1G 2W1  
519-824-4120

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UNIVERSITY  
of GUELPH

CHANGING LIVES  
IMPROVING LIFE

## **Disclaimer**

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The Office of Graduate Studies has attempted to ensure the accuracy of this on-line Graduate Calendar. However, the publication of information in this document does not bind the university to the provision of courses, programs, schedules of studies, fees, or facilities as listed herein.

## **Limitations**

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The University of Guelph reserves the right to change without notice any information contained in this calendar, including any rule or regulation pertaining to the standards for admission to, the requirements for the continuation of study in, and the requirements for the granting of degrees or diplomas in any or all of its programs.

The university will not be liable for any interruption in, or cancellation of, any academic activities as set forth in this calendar and related information where such interruption is caused by fire, strike, lock-out, inability to procure materials or trades, restrictive laws or governmental regulations, actions taken by the faculty, staff or students of the university or by others, civil unrest or disobedience, Public Health Emergencies, or any other cause of any kind beyond the reasonable control of the university.

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**

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### **Collection, Use and Disclosure of Personal Information**

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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](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 Training, Colleges and Universities, 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**

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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**

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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**

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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**

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Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through the Office of Graduate Studies.

### **Name Changes**

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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, his/her 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**

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The University undertakes to protect the privacy of each student and the confidentiality of his or her 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 <http://www.uoguelph.ca/policies>.



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## Biomedical Sciences

The Department specializes in scientific disciplines which are basic to human and veterinary medicine. Within this context, the research activities of the faculty are focused under the general umbrella of biomedical science and biotechnology. The MBS, MSc and PhD programs provide emphasis in one of the department's three major fields:

- Reproductive Biology and Development
- Cellular and Molecular Basis of Disease
- Biomedical Toxicology and Pharmacology

The department also participates in the Doctor of Veterinary Science (DVSc) program.

### Administrative Staff

#### Chair

Neil MacLusky (2633 Ontario Veterinary College, Ext. 54700)  
nmaclusk@ovc.uoguelph.ca

#### Graduate Coordinator

Jonathan LaMarre (3606 Biomedical Science, Ext. 54935)  
jlamarre@ovc.uoguelph.ca

#### Graduate Program Assistant

Christina Voll (102 Population Medicine, Ext. 54780)  
bmsgrad@uoguelph.ca

### Graduate Faculty

#### Craig Bailey

BSc, PhD Queen's - Assistant Professor

#### Pawel M. Bartlewski

DVM Poland, MSc, PhD Saskatchewan - Associate Professor

#### Shane Bateman

BSc Alberta, DVM Saskatchewan, DVSc Guelph - Associate Professor

#### Peter D. Conlon

BSc (Agr), MSc McGill, DVM, PhD Guelph - Associate Professor and Associate Dean of Students, Ontario Veterinary College

#### Brenda L. Coomber

BSc, MSc Guelph, PhD Toronto - Professor

#### W.J. Brad Hanna

BSc, DVM, MSc, PhD Guelph - Associate Professor

#### Ronald Johnson

BSc, DVM Guelph, PhD Michigan State, ACVCP - Associate Professor

#### Bettina E. Kalisch

BSc, MSc, PhD Queen's - Associate Professor

#### W. Allan King

BSc, MSc Guelph, PhD Uppsala - Professor and Canada Research Chair, Tier 1

#### Gordon Kirby

DVM Guelph, MSc Surrey, PhD Guelph - Professor and Associate Dean, Research and Innovation

#### Thomas Koch

DVM Royal Vet & Agr Univ., PhD Guelph - Assistant Professor

#### Jonathan LaMarre

DVM, PhD Guelph - Professor

#### Neil J. MacLusky

BSc Leeds, PhD London - Professor and Chair

#### Pavneesh Madan

BVSc & AH, MVSc Haryana, PhD British Columbia - Associate Professor

#### Tami Martino

BSc McMaster, MSc PhD Toronto - Associate Professor

#### Roger A. Moorehead

BSc, PhD McMaster - Professor

#### Anthony Mutsaers

DVM Guelph, PhD Toronto, ACVIM (Oncology) - Assistant Professor

#### James J. Petrik

BA, MA, PhD Western Ontario - Professor

#### W. Glen Pyle

BSc Guelph, PhD Tennessee - Associate Professor

#### Alastair J.S. Summerlee

BSc, BVSc, PhD, MRCVS Bristol - Professor

#### Jeffrey J. Thomason

BA Cambridge, MSc, PhD Toronto - Professor

#### Matthew Vickaryous

BSc, MSc Calgary, PhD Dalhousie - Associate Professor

#### Alicia Vilorio-Petit

BSc, MSc Venezuela, PhD Toronto - Assistant Professor

## MBS program

Students may focus their Master of Biomedical Sciences in one of the three major fields: 1) reproductive biology and development; 2) cellular and molecular basis of disease; and 3) biomedical toxicology and pharmacology. The research project may involve: molecular, cellular or developmental aspects of tissue or animal differentiation and growth, physiological, morphological or biomechanical investigations of normal function or disease processes in a variety of organs and tissues, or pharmacological mechanisms related to therapy and drug toxicity.

### Admission Requirements

Applicants should have an Honours baccalaureate degree in the Biological Sciences or a Doctor of Veterinary Medicine degree (or the equivalent) with a minimum 'B+' standing in the final two years of study. Letters of reference from two individuals who can adequately evaluate the academic and research capabilities of the applicant must be provided with the application. In addition, a short statement of the applicant's research interests and career goals, is required to assist in the selection of faculty advisors. Students may be admitted into the Fall, Winter or Summer semester. Provisional acceptance may be granted to students who do not meet this 'B+' standard if there is additional evidence that the applicant is capable of successfully completing the graduate program (e.g., outstanding letters of recommendation, or evidence of prior relevant work or research experience). Transfer to regular status will normally be recommended when the student obtains a minimum grade of 'A-' in their first two graduate course and displays current research ability to his/her advisory committee. These courses will be credited to the degree program.

### Degree Requirements

Students must obtain at least an overall weighted average of 'B-' in prescribed courses. The number of course credits prescribed will not be fewer than 4.0 credits with BIOM\*6900 being a required course (the 1.0 credit for BIOM\*6900 is included in the total required credits of 4.0). The courses selected will depend on the student's prior experience and the nature of the research project. All students are required to present one departmental seminar as a component of BIOM\*6900. The program is completed when the written research report for BIOM\*6900 is deemed appropriate by the Student's Supervisory Committee.

### MSc Program

Students may focus their MSc degree in one of the three major fields: 1) reproductive biology and development; 2) cellular and molecular basis of disease; and 3) biomedical toxicology and pharmacology. The research project may involve: molecular, cellular or developmental aspects of tissue or animal differentiation and growth, physiological, morphological or biomechanical investigations of normal function or disease processes in a variety of organs and tissues, or pharmacological mechanisms related to therapy and drug toxicity.

### Admission Requirements

Applicants should have an Honours baccalaureate degree in the Biological Sciences or a Doctor of Veterinary Medicine degree (or the equivalent) with a minimum 'B+' standing in the final two years of study. Letters of reference from two individuals who can adequately evaluate the academic and research capabilities of the applicant must be provided with the application. In addition, a short statement of the applicant's research interests and career goals, is required to assist in the selection of faculty advisors. Students may be admitted into the Fall, Winter or Summer semester. Provisional acceptance may be granted to students who do not meet this 'B+' standard if there is additional evidence that the applicant is capable of successfully completing the graduate program (e.g., outstanding letters of recommendation, or evidence of prior relevant work or research experience). Transfer to regular status will normally be recommended when the student obtains a minimum grade of 'A-' in their first two graduate course and displays current research ability to his/her advisory committee. These courses will be credited to the degree program.

## Degree Requirements

Students must obtain at least an overall weighted average of 'B-' in prescribed courses. The number of graduate course credits prescribed will not be fewer than 1.5 credits. Prescribed and additional courses are selected by the student in consultation with the student's advisory committee. The courses selected will depend on the student's prior experience and the nature of the research project. The student must also prepare and defend an acceptable thesis and meet the Department's minimum scientific communication requirement. The minimum scientific communication requirement is one conference presentation (oral or poster) at a suitable Regional, National or International scientific conference. If this requirement has not been achieved, written justification must be provided to the Department of Biomedical Sciences Graduate Program Committee outlining the reasons why these requirements have not been achieved. The Chair of the Department of Biomedical Sciences Graduate Program Committee will provide a written response outlining the decision of the Graduate Program Committee to either grant or reject the request that the defence proceed even though the minimum scientific communication requirement has not been completed. All students are required to present two departmental seminars during their program. The thesis research proposal, developed by the student in consultation with the advisor, must receive approval from the supervisory committee no later than the end of the second semester of the program. The program is completed by the successful oral defence of a written thesis.

## PhD Program

Students may undertake a PhD degree in aspects of 1) reproductive biology and development; 2) cellular and molecular basis of disease; and 3) biomedical toxicology and pharmacology. Wherever appropriate, students are encouraged to incorporate the methodologies of more than one of these fields into their research project. The PhD program is research based and provides instructional opportunities and experiences that are intended to develop the student's ability to formulate hypotheses and design and execute experiments or to conduct observational studies.

## Admission Requirements

Students entering the PhD program must show evidence of potential for independent, productive and original research. Admission to the PhD program generally requires completion of an MSc program with a research component, a minimum 'B+' average in the prescribed courses taken during the master's degree program, and strong recommendations from referees who have a sound knowledge of the student's strengths and weaknesses. In addition, a short statement of the applicant's research interests and career goals is required. In exceptional cases, where a candidate has demonstrated excellence in academic work and extraordinary ability to plan and initiate original research, transfer to the PhD program without completion of the MSc program may be recommended. This transfer must take place before the end of the fourth semester in accordance with university regulations. In all cases, students who do not hold an approved research-based MSc degree must register as MSc students regardless of their ultimate goals. Students may be admitted into the Fall, Winter or Summer semester. In those cases where the student is continuing her or his MSc research program into the PhD program, the student must clearly explain how the PhD research program represents a significant advance over that of the MSc.

## Degree Requirements

The PhD program offers opportunities for students to become investigators in veterinary and human-health-related sciences. Students will be expected to demonstrate the originality and skill needed to contribute to the knowledge base in a manner that transcends the mere acquisition of data. All students are required to present departmental seminars (one per annum). Students must also successfully complete a qualifying examination. Details of the qualifying examination which includes written and oral components can be found on the [Department's website](#). Successful completion of the qualifying examination is a prerequisite for continuation in the PhD program. The advisory committee is required to evaluate the student's research productivity periodically and to report on the student's progress to the Department Graduate Program Committee each semester in which the student is registered.

The PhD program culminates in the preparation, presentation and defence of the thesis, which contains a substantial component of original research. Preparation and defence of an acceptable thesis based on research data and hypotheses generated during the duration of the study are the main criteria used to assess the satisfactory completion of the PhD program. In addition the student must meet the Department's minimum scientific communication requirements. The minimum scientific communication requirements are two manuscripts which **must** at least have been submitted to a scientific journal prior to the student graduating with their PhD degree. One of these manuscripts **must** be based on the student's PhD research project and the student **must** be the first or senior author on this manuscript. The second manuscript may be either an original research manuscript or a review manuscript. The student is not required to be the first author on this manuscript but the manuscript must be generated during the student's tenure as a PhD candidate (i.e. the manuscript cannot be based on work performed while an undergraduate student or work presented in an MSc thesis). Students transferring from the MSc program to the PhD program can use any publications generated while enrolled in the graduate program of the Department of Biomedical Sciences. If these requirements have not been achieved, written justification must be provided to the Department of Biomedical Sciences Graduate Program Committee outlining the reasons why these requirements have not been achieved. The Chair of the Department of Biomedical Sciences Graduate Program Committee will provide a written response outlining the decision of the Graduate Program Committee to either grant or reject the request that the defence proceed even though the minimum scientific communication requirements have not been completed.

## DVSc Program

The Department of Biomedical Sciences participates in the DVSc program offering specialization in clinical science. This program provides a balance between advanced training in the discipline, in-service training and a thesis-research project.

## Interdepartmental Programs

### Biophysics MSc/PhD

The Department of Biomedical Sciences participates in the MSc/PhD program in biophysics. Please consult the Biophysics listing for a detailed description of the MSc/PhD program.

### Collaborative Programs

#### Neuroscience MSc/MBS/PhD

The Department of Biomedical Sciences participates in the MSc/PhD program in neuroscience. Please consult the Neuroscience listing for a detailed description of the MA/MSc/PhD collaborative program.

#### Toxicology MSc/PhD

The Department of Biomedical Sciences participates in the MSc/PhD program in toxicology. The research and teaching expertise of these faculty include aspects of toxicology; they may serve as advisors for MSc and PhD students. Please consult the Toxicology listing for a detailed description of the MSc/PhD collaborative program.

## Courses

### BIOM\*6060 Functional Neuroanatomy U [0.50]

A course emphasizing the structure and function of the mammalian nervous system and organs of special sense.

*Department(s):* Department of Biomedical Sciences

### BIOM\*6070 Pregnancy, Birth and Perinatal Adaptations S [0.50]

This course promotes understanding of the physiology of the placenta, and its role in fetal, perinatal and adult health. It is offered through videoconference involving University of Guelph, Queen's University and University of Waterloo. Parts are customized to student's interests within pregnancy physiology.

*Department(s):* Department of Biomedical Sciences

### BIOM\*6110 Advanced Microscopy for Biomedical Sciences U [0.50]

Routine and specialized procedures for light microscopy, and transmission and scanning electron microscopy are examined through lectures, discussions and practical exercises. Interpretation of micrographs is included.

*Department(s):* Department of Biomedical Sciences

### BIOM\*6130 Vertebrate Developmental Biology U [0.50]

The principles of vertebrate development are examined through lectures, discussions and practical exercises. Topics include aspects of gametogenesis, fertilization, implantation, embryonic and fetal development and experimental manipulation of embryos. Emphasis is on mammalian development and topics may vary depending on student needs and interests.

*Department(s):* Department of Biomedical Sciences



**BIOM\*6160 Cellular Biology U [0.50]**

An integrative course that examines aspects of cell biology in the context of recent research advancements. Topics are chosen based on student interest and faculty expertise and are explored through a combination of lectures, student seminars and group discussions.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6190 Tissue Culture Techniques in Biomedical Sciences U [0.50]**

An introduction to in vitro techniques examining aspects and principles of the culture environment, isolation methods, propagation, characterization and storage of cultured cells, gametes and embryos. Practical exercises and student assignments complement material presented in lecture and seminar format.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6440 Biomedical Toxicology U [0.50]**

The course examines chemical compounds injurious to animals and man, toxicity testing, teratogens, carcinogens, factors influencing toxicity, and toxic drug interactions. The mechanism of action, metabolism, and principles of antidotal treatment are also studied.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6480 Pharmacodynamics and Pharmacokinetics U [0.50]**

This course describes drug absorption, distribution, biotransformation and elimination in animals and human beings, and emphasizes factors which modify drug behaviour. It integrates molecular mechanisms with physiological processes and highlights the importance of receptors and second messengers in cellular responses to pharmacologic agents.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6490 Introduction to Drug Development W [0.50]**

Drug development is the process of integrating scientific data from several disciplines in order to demonstrate efficacy and safety of the new chemical entity for regulatory approval. This course will provide an overview of the drug development process including preclinical and clinical aspects of drug development.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6570 Biochemical Regulation of Physiological Processes U [0.50]**

This course focuses on the regulation of vertebrate physiological processes, such as electrolyte and water balance, temperature regulation, growth and energy metabolism, by hormones and other biological regulators that act through cellular receptors and intracellular biochemical-control pathways.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6601 Special Topics in Reproductive Biology and Biotechnology U [0.25]**

Permits in-depth exploration of interdisciplinary aspects of biomedical research. Topics such as inflammation, reproductive immunology and neoplasia have been offered.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6602 Special Topics in Reproductive Biology and Biotechnology U [0.50]**

See BIOM\*6601 above.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6610 Vascular Biology U [0.50]**

An interdisciplinary course in which the interrelationships between vascular proteins, cellular elements and the maintenance of vascular integrity are examined. Structural-functional relationships in vascular biology are explored through seminar presentations, group discussions and small group participation in problem based examples of vascular dysfunction.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6701 Special Topics in Development, Cell and Tissue Morphology U [0.25]**

Permits further in depth study of developmental and morphological sciences.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6702 Special Topics in Development, Cell and Tissue Morphology U [0.50]**

See BIOM\*6701

*Department(s):* Department of Biomedical Sciences

**BIOM\*6711 Special Topics in Physiology & Biochemistry U [0.25]**

This course involves an appropriate combination of an experimental procedure (or project), seminars, selected reading or a literature review outside the thesis subject, developed according to the student's requirements.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6712 Special Topics in Physiology & Biochemistry U [0.50]**

See BIOM\*6711

*Department(s):* Department of Biomedical Sciences

**BIOM\*6721 Special Topics in Pharmacology-Toxicology U [0.25]**

This course will comprise a combination of an experimental procedure (or project), seminars, selected reading or a literature review outside the thesis subject, developed based on the student's requirements. Topics could include clinical pharmacology/toxicology, pharmaco-epidemiology/economics, gerontological or perinatal pharmacology and toxicokinetics.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6722 Special Topics in Biomedical Pharmacology-Toxicology U [0.50]**

See BIOM\*6721

*Department(s):* Department of Biomedical Sciences

**BIOM\*6800 Gene Expression in Health and Disease W [0.50]**

This course presents the molecular concepts of gene expression and the functional consequences of abnormal expression in pathological conditions. The conceptual, methodological and applied aspects of gene expression will be illustrated through student and faculty seminars, written reports, group discussions, and debates.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Biomedical Sciences

**BIOM\*6900 Research Project in Biomedical Sciences W,S,F [1.00]**

This course will be a lab-based, two-semester research project course for students in the course-based MSc stream in Biomedical Sciences.

*Department(s):* Department of Biomedical Sciences