

## 2004-2006 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2004-2006 academic years, including the Summer Semester 2005, the Fall Semester 2005 and the Winter Semester 2006.

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

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## **Disclaimer**

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The Office of Graduate Program Services 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, 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.

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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 MSc and PhD programs provide emphasis in one of the department's three major fields: Reproductive Biology, Developmental, Cell and Tissue Morphology, and Biomedical Toxicology/Pharmacology. The department also participates in the Doctor of Veterinary Science (DVM) program, co-ordinated by an interdepartmental committee chaired by the assistant dean (graduate studies and research) of the Ontario Veterinary College.

### Administrative Staff

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### Graduate Faculty

#### Carol L. Armstrong

BSc Calgary, MSc Dalhousie, PhD Calgary - Assistant Professor

#### Pawel M. Bartlewski

DVM Poland and UK, MSc, PhD Saskatchewan - Assistant Professor

#### Dean H. Betts

BSc, MSc Western Ontario, PhD Guelph - Assistant Professor

#### Herman J. Boermans

DVM, MSc, PhD Guelph - Associate Professor

#### Peter D. Conlon

BSc (Agr), MSc McGill, DVM, PhD Guelph - Associate Professor

#### Brenda L. Coomber

BSc, MSc Guelph, PhD Toronto - Associate Professor

#### W. Larry Grovum

BSA Saskatchewan, PhD New England - Professor

#### Ann C. Hahnel

BA, BSc, PhD Washington - Associate Professor

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BSc, DVM, MSc, PhD Guelph - Assistant Professor

#### Ronald Johnson

BSc, DVM Guelph, PhD Michigan State - Associate Professor

#### Bettina E. Kalisch

BSc, MSc, PhD Queen's - Associate Professor

#### W. Allan King

BSc, MSc Guelph, PhD Uppsala - Professor

#### Gordon Kirby

DVM Guelph, MSc Surrey, PhD Guelph - Associate Professor

#### Jonathan LaMarre

DVM, PhD Guelph - Associate Professor

#### John F. Leatherland

BSc Sheffield, PhD Leeds, DSc Sheffield - Professor

#### Neil J. MacLusky

BSc Leeds, PhD London - Professor and Chair

#### Roger A. Moorehead

BSc, PhD McMaster - Assistant Professor

#### Gary D. Partlow

BSc Guelph, MSc Western Ontario, PhD Ottawa - Associate Professor

#### James J. Petrik

BA, MA, PhD Western Ontario - Assistant Professor

#### W. Glen Pyle

BSc Guelph, PhD Tennessee - Assistant Professor

#### Ioana M. Sonea

BSc College Marie de France (Montreal), DVM Montreal, PhD Michigan State - Associate Professor

#### Alastair J.S. Summerlee

BSc, BVSc, PhD Bristol, MRCVS - University President

#### Jeffrey J. Thomason

BA Cambridge, MSc, PhD Toronto - Professor

#### Shigeto Yamashiro

DVM Kagoshima, MVSc Hokkaido, MSc Guelph, PhD Hokkaido - Associate Professor

### MSc Program

Students may take an MSc degree in Reproductive Biology, Developmental, Cell and Tissue Morphology, and Biomedical Toxicology/Pharmacology. The thesis 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 of the applicant's professors 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 spring semester. Students who do not meet this 'B+' standard may be admitted into a provisional category 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 category will normally be recommended when the student obtains a minimum 'B+' in two courses that have been approved by the department's graduate program committee in consultation with the student's advisory committee 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 1.5 credits. The student must also prepare and defend an acceptable thesis. 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. 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 advisory 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 Reproductive Biology, Developmental Cell and Tissue Morphology or Biomedical Toxicology/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 oriented 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 the potential for independent, productive and original research. Admission to the PhD program generally requires completion of a research-based MSc program, 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 spring 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. The element of critical thinking is expected and it is fostered through appraisal of the literature of the student's research field, presentation of three departmental seminars during the program, and interaction with graduate faculty and visiting senior scientists. All students are required to present three departmental seminars during their program.

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. However, the student's advisory committee may require the student to successfully complete specified graduate courses before she

or he undertakes the qualifying examination. The qualifying examination, which includes written and oral components, must be completed before the end of the third semester of the PhD program, or before the end of the fifth semester for those students who transfer directly from the MSc program. 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.

### Interdepartmental Programs

#### Biophysics MSc/PhD Collaborative Program

The Department of Biomedical Sciences participates in the MSc/PhD program in biophysics. Professor Thomason is a member of this group. He may serve as an advisor for MSc and PhD students. Please consult the Biophysics listing for a detailed description of the MSc/PhD collaborative program.

#### Toxicology MSc/PhD Collaborative Program

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.

#### 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.

### 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.

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

A multidisciplinary seminar course to promote understanding of physiological processes occurring during mammalian pregnancy, from implantation to the perinatal period. Regulation of homeostasis and growth as well as both maternal and fetal factors that contribute to suboptimal gestational outcomes are covered.

#### 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.

#### 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.

#### 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.

#### 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.

#### 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.

#### 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.

#### 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.

#### 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.

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

See BIOM\*6601 above.

#### 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.

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

Permits further in depth study of developmental and morphological sciences.

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

See BIOM\*6701 above.

#### 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.

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

See BIOM\*6711 above.

#### 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 of Biomedical Sciences

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

See BIOM\*6721 above.