

## 2006-2007 Graduate Calendar

The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2006-2007 academic years, including the Summer Semester 2006, the Fall Semester 2006, the Winter Semester 2007 and the Summer 2007.

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](#).

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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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## Animal and Poultry Science

The Department of Animal and Poultry Science offers programs of study leading to MSc and PhD degrees. Animals of significance in food production are the department's major interest and research emphasis. The graduate program encompasses four fields: animal breeding and genetics (quantitative or molecular); animal nutrition (monogastric or ruminant); animal physiology (environmental, reproductive, or behavioural); and growth and metabolism (meat science). The latter field is offered in collaboration with the Department of Food Science and all fields are enriched through interaction with faculty members from other university departments.

The major expertise of individual faculty is as follows: animal breeding and genetics (Golovan, Karrow, Miller, McMillan, Robinson, Schaeffer, Schenkel, Wilton), animal nutrition (Atkinson, Cant, de Lange, France, Leeson, McBride, Osborne, Smith, Swanson), animal physiology (Bedecarrats, Buhr, Fan, Li, Moccia, Squires, Walton), animal behaviour and ethology (Duncan, Mason, Widowski), and growth and metabolism (Mandell, Swatland).

### General Admission Requirements

Research in animal science is enriched by the interaction of scientists from diverse academic disciplines. Accordingly, there are no specific prerequisite courses expected of applicants to the graduate programs in the department. Each applicant will be considered on an individual basis, taking into account the applicant's academic background and relevant experience.

### Administrative Staff

#### Chair

Steve Leeson (146 ANNU, Ext. 53681)  
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### Graduate Faculty

\*Please see the Department's webpage at [www.aps.uoguelph.ca](http://www.aps.uoguelph.ca) for a complete listing of faculty.

#### James L. Atkinson

BSc UMIST, Manchester, MSc London, PhD Guelph - Associate Professor

#### Shai Barbut

BS Hebrew University of Jerusalem, MS, PhD Wisconsin (Madison) - Professor

#### Gregory Bedecarrats

Licence de Biochimie, MSc, Dipl. Rennes (France), PhD McGill - Assistant Professor

#### Mary M. Buhr

BSc, MSc, PhD Waterloo - Professor

#### Dominique P. Bureau

BASc, MSc Laval, PhD Guelph - Assistant Professor

#### John P. Cant

BSc (Agr) Nova Scotia, MS, PhD California - Associate Professor

#### Cornelius F.M. de Lange

BSc, MSc Wageningen, PhD Alberta - Associate Professor

#### Ming Z. Fan

BS Xinjiang, MS Harbin, PhD Alberta - Associate Professor

#### James France

BSc Wales, MSc, PhD, DSc Hull (United Kingdom), CMath, FIMA - Professor and Canada Research Chair

#### Serguei P. Golovan

BSc St. Petersburg State, PhD Guelph - Assistant Professor

#### Niel A. Karrow

BSc Guelph, MSc, PhD Waterloo - Assistant Professor

#### Steven Leeson

MPhil, PhD Nottingham - Professor and Chair

#### Julang Li

MSc Changchun Veterinary College (China), PhD Ottawa - Assistant Professor

#### Ira B. Mandell

BS, MS Ohio State, PhD Saskatchewan - Assistant Professor

#### Georgia Mason

BA, PhD Cambridge - Associate Professor

#### Brian W. McBride

BSc, MSc Guelph, PhD Alberta - Professor

#### Ian McMillan

BSc, MSc, PhD Toronto - Professor

#### Stephen P. Miller

BSc (Agr), PhD Guelph - Associate Professor

#### Richard D. Moccia

BSc, MSc Guelph - Associate Professor

#### Vern R. Osborne

BSc, MSc, PhD Guelph - Assistant Professor

#### J. Andrew B. Robinson

BSc (Agr), MSc Guelph, PhD Cornell - Assistant Professor

#### Larry R. Schaeffer

BS Purdue, MS, PhD Cornell - Professor

#### Trevor K. Smith

BSc British Columbia, MSc Manitoba, PhD Cornell - Professor

#### E. James Squires

BSc, MSc, PhD Memorial - Professor

#### Kendall C. Swanson

BS, MS North Dakota State, PhD Kentucky - Assistant Professor

#### Howard J. Swatland

BSc London, MSc, PhD Wisconsin - Professor

#### John S. Walton

BSc, PhD Reading - Professor

#### Tina M. Widowski

BS, MS, PhD Illinois - Associate Professor

#### James W. Wilton

BSA Manitoba, MSc Toronto, PhD Cornell - Professor

### MSc Program

The MSc program involves advanced courses and the completion of a research project. These are means of developing the skills and intellectual curiosity that may further qualify the student for a leadership role within the animal industry or serve as a prerequisite for doctoral studies. The MSc degree may be completed via two routes: by thesis or by course work and major paper. The MSc by course work and major paper is offered in two areas of specialization: animal breeding & genetics and animal nutrition & metabolism.

### Admission Requirements

An honours baccalaureate, with a minimum average grade of 'B' during the last four semesters of study, will normally be required.

### Degree Requirements

#### MSc by Thesis

Candidates for the thesis-based MSc degree must successfully complete a prescribed series of courses, conduct a research project, prepare a thesis based on their results and defend this in a final examination. The number of course credits required in this option will be decided by the student's advisory committee in consultation with the student, and may exceed the minimum 1.5 credits required by the Faculty of Graduate Studies. Generally, 4 or 5 courses (1.5-2.0 credits) will be taken, including the mandatory Seminar course, ANSC\*6600 (0.0 credit).

#### MSc by Course Work and Major Paper

Candidates for the MSc degree by course work and major paper option must complete a minimum of 4.0 credits (9 courses). Of these courses, one will be the departmental Seminar course, ANSC\*6600 (0.0 credit), and another will be Major Paper in Animal and Poultry Science, ANSC\*6900 (1.0 credit). The major paper will be a detailed, critical review of an area of study related to the specialization chosen by the student and should include analyses and interpretations of relevant data. The content of the major paper will be presented to the department in the Seminar course.

At the beginning of the program, the student and student's advisory committee will design the course-work program according to the program guidelines and the aspirations and background of the student. Students will normally choose a minimum of 4 courses in the area of specialization, one of which will be ANSC\*6900, Major Paper in Animal and Poultry Science, and a minimum of two courses outside the area of specialization. These latter courses can be offered by departments other than Animal and Poultry Science.

A maximum of one approved senior-level undergraduate course can be included in the list of prescribed courses. Recommended graduate courses in the two areas of specialization are as follows: Animal Breeding & Genetics (ANSC\*6900, ANSC\*6210, ANSC\*6240, ANSC\*6370, ANSC\*6380, ANSC\*6390, ANSC\*6450); Animal Nutrition & Metabolism (ANSC\*6900, ANSC\*6010, ANSC\*6020, ANSC\*6030, ANSC\*6250, ANSC\*6260, ANSC\*6360, ANSC\*6450).

The MSc by course work and major paper degree will require a minimum of three semesters of full-time study (or the equivalent).

### PhD Program

The PhD program is research oriented and provides instruction and experiences that develop the student's ability to independently formulate hypotheses and design and execute experiments or conduct observational studies to reach definitive conclusions.

## Admission Requirements

Students entering a PhD program should show potential for independent, productive, and original research. A PhD program can be entered by three routes: following completion of an MSc program; following transfer prior to completion of an MSc program; and directly from a bachelor degree.

In general, a minimum average grade of 'B' for a completed MSc program plus strong letters of reference are required. Students wishing to be considered for transfer to a PhD program prior to completion of the MSc program must request the transfer before the end of the fourth semester and have an excellent academic record as well as a strong aptitude for research.

Direct admission to the PhD program may be permitted for applicants who hold a bachelor's degree and have an excellent academic history and strong indications of research potential.

## Degree Requirements

Satisfactory completion of a PhD program requires a comprehensive knowledge of the area of emphasis and the ability to conduct original research in this area, plus a sound general background in two related areas of study. This competence is demonstrated in a qualifying examination and through the design and execution of a substantial and original research project. Based on this research, a thesis is prepared and defended in a final examination.

The number of courses required for a PhD program will be decided by the student's advisory committee in consultation with the student. The minimum requirement is the Seminar course, ANSC\*6600.

## Interdepartmental Programs

### MSc (Aquaculture) Interdepartmental Program

The Department of Animal and Poultry Science participates in the master of science in aquaculture program. Professors Atkinson, Cho, McMillan and Moccia are members of the Aquaculture Interdepartmental Group. These faculty members' expertise includes aspects of aquaculture; they may serve as advisors for MSc (Aquaculture) students. Please consult the Aquaculture listing for a detailed description of the MSc (Aquaculture) interdepartmental program.

### Toxicology MSc/PhD Collaborative Program

The Department of Animal and Poultry Science participates in the MSc/PhD program in toxicology. Professor Karrow, Smith, and Squires are members of the Toxicology Interdepartmental Group. The research and teaching expertise of these faculty include aspects of toxicology; they may serve as advisors for MSc and PhD students in Toxicology. Students choosing this option must meet the requirements of the Toxicology Collaborative Program, as well as those of their home department. Please consult the Toxicology listing for a detailed description of the MSc/PhD collaborative program. Toxicology MSc, PhD

## Courses

Although the courses offered are listed by field, several are relevant to more than one field. Some courses are only offered when there is a certain minimum enrolment.

## Animal Breeding and Genetics

### ANSC\*6210 Principles of Selection in Animal Breeding W [0.50]

Definition of selection goals, prediction of genetic progress and breeding values, and the comparison of selection programs.

### ANSC\*6240 Topics in Quantitative Genetics and Animal Breeding F [0.50]

Current literature and classical papers pertaining to quantitative genetics and breeding are reviewed in detail.

### ANSC\*6370 Quantitative Genetics and Animal Models F [0.50]

The course covers quantitative genetics theory associated with animal models; linear models applied to genetic evaluation of animals; estimation of genetic parameters for animal models; and computing algorithms for large datasets.

### ANSC\*6380 Estimation of Genetic Parameters W [0.50]

The course covers Bayesian approaches to analysis of data; categorical data analysis; accounting for selection bias; major gene analyses; models for handling marker genes; and recent developments in statistical methodology related to animal breeding applications.

### ANSC\*6390 QTL's and Markers (offered all years pending demand) W [0.50]

Advanced training in the mathematical aspects of quantitative genetic theory as applied to animal breeding.

### ANSC\*6450 Topics in Animal Biotechnology W [0.50]

The impact of recombinant DNA techniques on present and future research in animal science and on the livestock industry is critically appraised.

## Animal Nutrition

### ANSC\*6010 Topics in Comparative Animal Nutrition F [0.50]

Current topics in the feeding and nutrition of agricultural, companion and captive animal species. Emphasis is placed on the influence of nutrients on metabolic integration at tissue, organ and whole-animal levels.

### ANSC\*6020 Poultry and Swine Nutrition W [0.50]

A discussion of current topics in the feeding and nutrition of domestic fowl and swine based on the critical appraisal of selected journal readings.

### ANSC\*6030 Modelling Metabolic Processes F [0.50]

Building and testing of mathematical models of metabolic processes using continuous simulation software to assist in weekly assignments. Choice of model based on students' research interests (e.g. protein synthesis, nutrient uptake, rumen fermentation). Term project to reproduce model from scientific knowledge.

### ANSC\*6360 Techniques in Animal Nutrition Research (even years only) F [0.50]

Theory and/or practices of techniques to evaluate feedstuffs and determine nutrient utilization in poultry, swine and ruminants is covered through lectures, short laboratories and a major project.

### ANSC\*6470 Advanced Animal Nutrition and Metabolism I F [0.50]

A systematic review of key aspects of energy, protein, amino acid and carbohydrate utilization and metabolism in farm animals.

### ANSC\*6480 Advanced Animal Nutrition and Metabolism II W [0.50]

A systematic review of key aspects of lipid, vitamin and mineral utilization and metabolism in farm animals.

*Prerequisite(s):* Advanced Animal Nutrition and Metabolism I ANSC\*6470

## Animal Physiology

### ANSC\*6400 Mammalian Reproduction (odd years only) W [0.50]

Discussions and applications of methodology for collection and examination of gametes and embryos and for measurements of hormones in biological fluids.

### ANSC\*6440 Advanced Concepts and Methods in Applied Ethology W [0.50]

An in-depth review of classic papers and current topics in applied ethology. Discussions will include applications of methodologies and analyses used to conduct animal behaviour research.

### ANSC\*6460 Lactation Biology F [0.50]

An in-depth systems analysis of lactation, comparing the cow, pig, rat, human and seal. Mammary development from conception through to lactogenesis, lactation and involution will be covered. Hypotheses of regulation of the biochemical pathways of milk synthesis will be tested in relation to experimental observations.

## Growth and Metabolism

### ANSC\*6250 Growth and Metabolism W [0.50]

Animal growth and metabolism are considered at the cellular level in a manner that extends beyond the basic disciplines of biometrics and biochemistry with attention focused on the main carcass components — muscle, fat and bone.

## General

### ANSC\*6100 Special Project F,W,S [0.50]

Supervised program of study in some aspect of animal and poultry science that can involve an experimental project and/or detailed analysis of the literature.

### ANSC\*6600 Seminar F,W [0.00]

This course is required for successful completion of MSc and PhD programs. The major findings of the thesis or major paper are presented to the department.

### ANSC\*6900 Major Paper in Animal and Poultry Science F,W,S [1.00]

A detailed, critical review of an area of study related to the specialization of students in the MSc by course work and major paper option that includes analysis and interpretation of relevant data.