

# 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

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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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## Plant Agriculture

The MSc and PhD programs in the Department of Plant Agriculture offer specialization in four broad fields of the Plant Sciences: 1) plant breeding and genetics; 2) plant biochemistry and physiology; 3) crop production systems and 4) bioproducts.

- **Plant Breeding and Genetics** has long been a key focus of our faculty and students. Through breeding and biotechnology, Guelph researchers help society by developing new field-crop, fruit, ornamental and vegetable cultivars that are grown in Canada and worldwide. Also, Plant Agriculture faculty and students seek both to understand the fundamental mechanisms that enable plant improvements and to discover novel methodologies and technologies that will be the foundation for future advances.
- **Plant Biochemistry and Physiology** is a broad discipline. Faculty and students in this area study the response of plants to environmental change and plant development at the ecosystem, whole plant, and molecular levels. Students investigate ecologically friendly management strategies, study underlying molecular and biochemical mechanisms that regulate plant development, investigate how plant performance can be optimized in the field or closed environments, and contribute to cultivar development
- **Crop Production Systems** research seeks to develop or test agricultural management strategies for yield improvement and economically and environmentally sound production practices in field and horticultural crops such as ornamentals and turf. Students assist producers and industry in the control of weeds, insects and plant diseases, and investigate new management protocols for production of high quality crops.
- **Bioproducts** is a multi-disciplinary field and will deal with background sciences ranging from chemical engineering to plant science. Students deal with products and materials made from cellulose, oil, protein, starch and other compounds derived from various plant parts such as seeds, stalks/stovers, hulls and cobs of crop plants. Students will develop their expertise in analytical methods, factors affecting quality of plant-derived raw materials, engineering (including bioengineering of bioproducts) biomaterials and biocomposites.

### Administrative Staff

#### Chair

Hugh Earl (310 Crop Science Building, Ext. 53386)  
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#### Graduate Coordinator

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#### Graduate Program Assistant

Jean G. Wolting (1105 Bovey Building, Ext. 56077)  
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### Graduate Faculty

#### Stephen R. Bowley

BS, MSc Guelph, PhD Kentucky - Associate Professor

#### Gale G. Bozzo

BSc, MSc York, PhD Queen's - Assistant Professor

#### John A. Cline

BSc Guelph, MSc Michigan State, PhD London UK - Associate Professor

#### William Deen

BSc, MSc, PhD Guelph - Associate Professor

#### Hugh J. Earl

BSc, MSc Guelph, PhD Western Ontario - Associate Professor

#### Mehrzad Eskandari

BSc, Arsenjan Azad Univ., MSc, Karaj Azad Univ., PhD Guelph - Assistant Professor

#### Christopher L. Gillard

BSc, MSc, Guelph - Assistant Professor

#### Bernard Grodzinski

BSc Toronto, MSc, PhD York, MA Cambridge - Professor

#### David C. Hooker

BSc Agr, MSc, PhD Guelph - Assistant Professor

#### A. Maxwell P. Jones

BSc, MSc Guelph, PhD British Columbia - Assistant Professor

#### Katerina S. Jordan

BS, MS Maryland, PhD Rhode Island - Associate Professor

#### Elizabeth A. Lee

BSc Minnesota, MSc Iowa State, PhD Missouri - Professor

#### Lewis N. Lukens

BSc Carleton College, PhD Minnesota - Associate Professor

#### Eric M. Lyons

BSc Northern Iowa, PhD Pennsylvania State - Associate Professor

#### Ralph C. Martin

BA, MSc Carleton, PhD McGill - Professor and Loblaw Chair Sustainable Food Production

#### Mary Ruth McDonald

BSc, MSc, PhD Guelph - Professor and Associate Chair

#### Barry J. Micallef

BSc, MSc Guelph, PhD Wisconsin-Madison - Associate Professor

#### Amar K. Mohanty

BSc, MSc, PhD Utkal - Professor and Premier's Research Chair in Biomaterials & Transportation

#### Alireza Navabi

BSc Shiraz Univ.(Iran), MSc Azad Univ.(Iran), PhD Alberta - Associate Professor

#### Gopinadhan Paliyath

BScEd Mysore, MSc Calicut, PhD Indian Institute of Science - Professor

#### K. Peter Pauls

BSc, MSc, PhD Waterloo - Professor and Chair

#### Manish N. Raizada

BSc Western, PhD Stanford - Associate Professor

#### Istvan Rajcan

BSc Novi Sad, Yugoslavia, PhD Guelph - Professor and Associate Graduate Coordinator

#### Darren E. Robinson

BSc Winnipeg, MSc Manitoba, PhD Guelph - Associate Professor

#### Praveen K. Saxena

BSc Meerut, MSc Lucknow, PhD Delhi - Professor

#### Arthur W. Schaafsma

BSc, MSc, PhD Guelph - Professor

#### Barry J. Shelp

BSc, MSc Brock, PhD Queen's - Professor and Graduate Coordinator

#### Peter H. Sikkema

BSc, MSc Guelph, PhD Western Ontario - Professor

#### Jayasankar Subramanian

BSc, MSc TamilNadu Agricultural (India), PhD Florida - Associate Professor

#### J. Alan Sullivan

BSc, MSc, PhD Guelph - Professor

#### Clarence J. Swanton

BSc Toronto, MSc Guelph, PhD Western Ontario - Professor

#### Francois Tardif

BSc, MSc, PhD Laval - Associate Professor

#### Rene C. Van Acker

BSc, MSc Guelph, PhD Reading - Professor and Associate Dean, OAC

#### David J. Wolyn

BS Rutgers, MS, PhD Wisconsin - Professor

### MSc Program

The Department of Plant Agriculture offers an MSc program in four broad fields of the Plant Sciences: 1) plant breeding and genetics; 2) plant biochemistry and physiology; 3) crop production systems and 4) bioproducts. Students conduct basic and/or applied research on topics within these fields.

### Admission Requirements

Applicants should have a baccalaureate degree in an honours plant science/biology program, or the equivalent, from a recognized university or college with an average academic standing of at least 'B' during the last two years of full-time study (or equivalent). To assist in identifying a suitable thesis advisor(s), applicants should submit a short statement of research interests. Supportive letters of reference are essential and should outline the applicant's strengths and weaknesses. Students may be admitted in the Fall, Winter or Summer semesters. The University of Guelph requires that applicants from some foreign institutions have a MSc (or equivalent) degree before they are considered for admission to the University of Guelph's MSc program.

### Degree Requirements

A program of prescribed courses (at least 1.50 credits of 6000 level courses) and additional courses is established with the student's advisory committee. All MSc candidates must complete a thesis and present a seminar in conjunction with the final oral examination. Students are required to participate in the Seminar PLNT\*6400 and in a Departmental Colloquium course dealing with current topics. Students are expected to participate in Departmental events, with particular emphasis on seminar series.

### PhD Program

The Department of Plant Agriculture offers a PhD program in four broad fields of the Plant Sciences: 1) plant breeding and genetics; 2) plant biochemistry and physiology; 3) crop production systems and 4) bioproducts. Students conduct research on topics within these fields.

## Admission Requirements

The usual requirement for admission into the PhD program is a MSc degree by thesis in a field appropriate to their proposed area of specialization with a minimum 'B' average and supportive letters of reference. Direct admission to the PhD program is permitted to applicants holding an honours baccalaureate degree and demonstrating extraordinary academic and research capabilities. It is also possible for a student to transfer from the MSc without completing the requirements for that degree if the student has an excellent academic record and has strong research progress that can be expanded to the doctoral level. The request for transfer must be initiated by the student and must be done no earlier than the end of the second semester and no later than the end of the fourth semester. Applicants should submit a statement of research interests, background experiences, and career goals to assist in the identification of an appropriate faculty adviser with the resources necessary to support the thesis research. Students may be admitted in the Fall, Winter or Spring semesters. In some instances, applicants who already hold a MSc may be required to initially register in the MSc program.

## Degree Requirements

The major emphasis in the PhD program is on research and the preparation and defense of an acceptable thesis. All PhD candidates must complete a thesis and present a seminar in conjunction with the final oral examination. Students are required to participate in the Seminar PLNT\*6400 and in a Departmental Colloquium course dealing with current topics. There are no other specific course requirements. It is usual for most students, in consultation with their advisory committee, to select some appropriate courses in preparation for the qualifying examination and thesis research. The qualifying examination is in two parts (written and oral) and evaluates the student's knowledge of their field of specialization and related topics. The qualifying examination is taken no later than the fifth semester. For students who have transferred from the MSc program or have been admitted directly to the PhD program from a BSc, the qualifying examination is taken no later than the seventh semester. The advisory committee is required to submit a written evaluation of the student's performance in research and the student's potential as a researcher. Upon completion of the qualifying examination, the student becomes a candidate for the PhD degree.

All students are expected to participate in Departmental events, with particular emphasis on seminar series.

## Collaborative Programs

### Toxicology MSc/PhD

The Department of Plant Agriculture participates in the MSc/PhD program in toxicology. Please consult the Toxicology listing for a detailed description of the MSc/PhD collaborative program.

### Interdepartmental Programs

#### Bioinformatics MBNF

The Department of Plant Agriculture participates in the Master of Bioinformatics Program. Please consult the Bioinformatics listing for a detailed description of the [Master of Bioinformatics Program](#)

## Courses

### Plant Breeding and Genetics

#### PLNT\*6100 Advanced Plant Breeding I W [0.50]

The practical consideration of genetic theory and biological limitations to improving plant populations and developing cultivars are discussed. Current and emerging breeding methodologies and sources of variation used to achieve plant breeding goals are examined through lectures, paper discussion, site visits and invited talks.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6160 Advanced Plant Breeding II W [0.50]

Fundamentals of quantitative genetics. Topics include gene and genotype frequencies means, variances, covariances and resemblance among relatives. Lecture topics are expanded through discussion of classic and current papers.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6250 Colloquium in Plant Genetics and Breeding U [0.25]

An open discussion course designed to review and critically analyse contemporary issues in plant genetics and breeding.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6260 Advanced Plant Genetics I F [0.50]

A lecture and discussion course examining the underlying principles of genetics and the recent advances in plant genetics. Topics include: structure of the genome, experiments to measure and experimentally describe phenotypes, population structures, and molecular basis of inheritance of a phenotype.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6290 Advanced Plant Genetics II W [0.50]

A lecture and discussion course examining classical and molecular genetic investigations for understanding the genetic basis and regulation of physiological processes in plants.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6340 Plant Breeding F [0.50]

This course examines principles of plant breeding in self- and cross-pollinated crops. Additional topics include crop domestication, mating systems, heritability, gain from selection, disease resistance, polyploidy, marker assisted selection and government regulations.

*Restriction(s):* MBG\*4160

*Department(s):* Department of Plant Agriculture

#### PLNT\*6500 Applied Bioinformatics W [0.50]

The goal of this course is to provide an introductory understanding of the databases and methods used in computational molecular biology research. Topics include: reviewing major molecular databases and their structures, constructing sequence alignments, constructing phylogenies, and finding motifs and genes in biological sequences. Lab sessions include an introduction to Unix and Perl for the biologist and hands-on use of several molecular data analysis programs.

*Prerequisite(s):* Undergraduate level statistics class (such as STAT\*2040 or STAT\*2100) and undergraduate level molecular biology class (such as MBG\*2020).

*Department(s):* Department of Plant Agriculture

## Plant Biochemistry and Physiology

#### PLNT\*6010 Physiology of Crop Yield W [0.50]

This course covers factors affecting biomass production and yield, with primary focus on phenomena measured at the whole canopy scale. Yield-limiting abiotic stresses (temperature, water deficit, nutrient deficiency) are considered in detail, as are technical aspects of instrumentation used in crop physiology research. (Offered annually)

*Prerequisite(s):* PBIO\*3110 or permission of instructor

*Department(s):* Department of Plant Agriculture

#### PLNT\*6110 Fruit and Vegetable Technology F [0.50]

The course is primarily intended to address science and technology aspects of fruits and vegetables, with specific reference to storage, packaging, quality, processing, products and ingredients, health regulatory properties and biotechnology issues. Methods of instruction include lectures and seminars. Students are evaluated during their seminar presentations, term papers and participation in discussions.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6230 Colloquium in Plant Physiology and Biochemistry U [0.25]

An open discussion course designed to review and critically analyze contemporary issues in plant physiology and biochemistry.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6320 Metabolic Processes in Crop Plants F [0.50]

A comprehensive examination of the metabolic mechanisms and versatility whereby autotrophic organisms sustain themselves. Emphasis is placed on our current understanding of the regulation and integration of metabolic processes in plants and their physiological and agricultural significance including available research methodologies.

*Prerequisite(s):* one undergraduate course in biochemistry

*Restriction(s):* No auditing without permission of Instructor.

*Department(s):* Department of Plant Agriculture

#### PLNT\*6330 Metabolism of Natural Products in Plants W [0.50]

A comprehensive analysis of the metabolism and roles of natural products in plants. Emphasis is placed on the distinction between secondary and primary processes, and the composition, detection, and regulation of the biosynthesis, modification and turnover of natural products. Key research methodologies and the roles of natural products in abiotic and biotic stresses and their effects on human health are discussed.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

## Crop Production Systems

#### PLNT\*6210 Herbicide Activity, Modes-of-Action, Selectivity and Resistance F [0.50]

This course provides a comprehensive study of the major herbicide groups. The various herbicide groups will be discussed under the following topics: herbicide uptake and translocation, herbicide mode of action, herbicide selectivity, weeds controlled and crop injury.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6240 Colloquium in Crop Production and Management U [0.25]**

An open discussion course designed to review and critically analyze contemporary issues in crop production and management.

*Department(s):* Department of Plant Agriculture

**PLNT\*6270 Agroecosystem Design and Function F [0.50]**

This lecture-based course critically analyzes the agroecosystem in field crop, horticulture, turfgrass and greenhouse industries. Agroecosystem design is considered in relation to key components such as crop rotation and management of soil, nutrient and water supply. The significance of plant function, soil properties, and nutrient and water cycles to agroecosystem design are examined. Metrics of productivity and environmental sustainability serve to focus discussion on agroecosystem optimization.

*Department(s):* Department of Plant Agriculture

**PLNT\*6280 Invasive Plant Ecology in Natural and Agricultural Systems W [0.50]**

This course focuses on the ecological principles that are important in understanding the potential for a plant species to become invasive. Students are able to use this knowledge to facilitate management of these species under field conditions.

*Offering(s):* Offered in odd-numbered years.

*Prerequisite(s):* CROP\*4240 or BOT\*2100 or BOT\*3120

*Department(s):* Department of Plant Agriculture

**General****PLNT\*6080 Plant Disease Epidemiology and Management F [0.50]**

Epidemiology and management of plant diseases caused by fungi, viruses, and bacteria.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6170 Statistics in Plant Agriculture W [0.50]**

The application of statistical techniques to research in plant agriculture. SAS is the software used to perform data analysis. Emphasis is placed on statistical principles, the design of experiments, the testing of hypotheses, and communication of findings to other scientists.

*Department(s):* Department of Plant Agriculture

**PLNT\*6400 Seminar F,W [0.25]**

All graduate students present a departmental seminar on their research proposal in their second or third semester. Each student is expected to participate in the seminars of colleagues and faculty.

*Restriction(s):* Restricted to thesis-based students

*Department(s):* Department of Plant Agriculture

**PLNT\*6450 Plant Agriculture International Field Tour U [0.25]**

A field course designed to increase student's knowledge of primary field and animal agricultural production systems, to explore the environmental and political issues related to international agriculture, and to understand the role of agri-business in the rural economy.

*Restriction(s):* CROP\*4260 if PLNT\*6450 is field tour to mid-west USA

*Department(s):* Department of Plant Agriculture

**PLNT\*6800 Special Topics in Plant Science U [0.50]**

A study of selected contemporary topics in plant science. Proposed course descriptions are considered by the Department of Plant Agriculture on an ad hoc basis, and the course is offered according to demand.

*Department(s):* Department of Plant Agriculture