

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

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

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

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 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

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 the Office of Graduate Studies.

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, 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

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>.

Table of Contents

Molecular and Cellular Biology	133
Administrative Staff	133
Graduate Faculty	133
MSc Program	133
PhD Program	134
Collaborative Programs	134
Interdepartmental Programs	134
Courses	134

Molecular and Cellular Biology

The MCB graduate program offers opportunities for interdisciplinary studies in molecular and cellular biology leading to the MSc and PhD degrees in the following five fields:

- **Biochemistry**
- **Cell Biology**
- **Microbiology**
- **Molecular Biology and Genetics**
- **Plant Biology**

The research groups directed by the faculty pursue fundamental and applied research questions involving diverse biological systems (plants, humans and other animals, prokaryotic and eukaryotic microbes). In general, they follow lines of scientific enquiry at the level of molecules to cells. See the [department website](#) for additional information.

Administrative Staff

Chair

Robert Mullen (4477 Science Complex, Ext. 56479)
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Graduate Coordinator

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Graduate Faculty

Tariq Akhtar

BSc, MSc Waterloo, PhD Florida - Assistant Professor

Emma Allen-Vercoe

BSc London UK, PhD Open UK - Associate Professor

Jnanankur Bag

BSc, MSc, PhD Calcutta - Professor

Mark D. Baker

BSc Laurentian, MSc, PhD Waterloo - Professor

Andrew J. Bendall

BSc Australian National, PhD Macquarie - Associate Professor and Graduate Coordinator

Manfred Brauer

BSc Calgary, MSc, PhD Wisconsin - Associate Professor

Anthony J. Clarke

BSc, MSc, PhD Waterloo - Professor

Joseph L. Colasanti

BSc, PhD Western Ontario - Associate Professor

Marc Coppolino

BSc Waterloo, MSc, PhD Toronto - Associate Professor

John Dawson

BSc Wilfrid Laurier, PhD Alberta - Associate Professor

Michael J. Emes

BSc, PhD Sheffield - Professor and Dean of the College of Biological Science

Steffen P. Graether

BSc, MSc, PhD Queen's - Associate Professor

George Harauz

BASc, MSc, PhD Toronto - Professor

Nina Jones

BSc Guelph, PhD Toronto - Associate Professor

David Josephy

BSc Toronto, PhD British Columbia - Professor

Azad Kaushik

BVSc, MVSc Haryana, DSc Inst. Pasteur - Associate Professor

Cezar Khursigara

BSc Ryerson, PhD McGill - Assistant Professor

Matthew S. Kimber

BSc, PhD Toronto - Associate Professor

Peter J. Krell

BSc, MSc Carleton, PhD Dalhousie - Professor

Joseph S.L. Lam

BSc, PhD Calgary - Professor

Ray Lu

BSc Wuhan (China), MSc Beijing Medical, PhD Saskatchewan - Associate Professor

Jaideep Mathur

BSc, MSc Lucknow (India), PhD Gorakhpur (India) - Associate Professor

Baozhong Meng

BSc, MSc Hebei Agricultural Univ. (China) - Associate Professor

Rod Merrill

BSc Lethbridge, PhD Ottawa - Professor

Richard D. Mosser

BSc, PhD Waterloo - Associate Professor

Robert T. Mullen

BSc, PhD Alberta - Professor and Chair

Lucy M. Mutharia

BSc, MSc Nairobi, PhD British Columbia - Associate Professor

Annette Nassuth

BSc, MSc Free University, Amsterdam, PhD Leiden - Associate Professor

Steven Rothstein

BA Swarthmore College, PhD Wisconsin - Professor

Scott Ryan

BSc Memorial, PhD Ottawa - Assistant Professor

Stephen Y.K. Seah

BSc, MSc National University of Singapore, PhD Sheffield - Associate Professor

Roselynn M.W. Stevenson

BSc, PhD Manitoba - Professor

Ian Tetlow

BSc Newcastle (UK), PhD North Wales - Associate Professor

James Uniacke

BSc, PhD Concordia University - Assistant Professor

George van der Merwe

BSc, MSc, PhD Stellenbosch (South Africa) - Associate Professor

Terry Van Raay

BSc Windsor, MSc Guelph, PhD Utah - Assistant Professor

John Vessey

BSc, MSc Dalhousie, PhD Eberhard Karls University of Tübingen - Assistant Professor

Christopher Whitfield

BSc Newcastle, PhD Edinburgh - Professor

Janet M. Wood

BSc Victoria, PhD Edinburgh - Professor

Krassimir (Joseph) Yankulov

BSc Sophia, PhD ICRF London - Associate Professor

MSc Program

The MCB MSc program is offered in five fields: 1) biochemistry; 2) cell biology; 3) microbiology; 4) molecular biology and genetics; and 5) plant biology. The objective of the program is to provide graduate students with a high level of relevant knowledge and expertise in contemporary molecular and cellular biology, including experimental techniques, library research, writing and communication skills. Graduates will have the knowledge and skills needed to carry out high quality scientific research and will be prepared for employment in positions with some responsibility in the research and teaching enterprises of academic institutions (as instructors and technical staff), in science-related positions in the broad biotechnology sector (e.g. food and beverage industries, pharmaceuticals, biomedical, and agriculture-related industries), or in government sector institutes and laboratories. They will be well prepared to continue their graduate education at the PhD level. Alternatively they may opt to complete a professional degree (such as law, medicine, or business) or a teaching certificate.

Admission Requirements

To be considered, applicants must have completed a four-year honours undergraduate science degree (or its equivalent) in a relevant discipline. Normally, the applicant must have achieved a "B" (75%) average or higher during the last two years of full-time study. In exceptional circumstances, students with a "B-minus" average (70%) will be considered provided there is strong supporting evidence of research aptitude and potential.

Each applicant must obtain the support of a faculty member willing to serve as his/her thesis advisor.

Applications for the program will be considered at any time and admission may be granted for entry in January, May or September.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest, and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Admission Process

Graduate student applications to programs in the College of Biological Science are handled by the Office of the Associate Dean, Research (ADR). Before submitting an application, applicants are strongly encouraged to view the "[Before you Apply](#)" and "[Admission Process](#)" webpages on the ADR Future Student's site.

Complete application instructions may also be found on the [Office of Graduate Studies](#) webpage or in the Graduate Calendar

Degree Requirements

Students in the MSc program must complete a minimum of 3 courses (1.5 credits) at the graduate level. The course MCB*6500 MSc Research Topics in Molecular & Cellular Biology (1.0) is mandatory. This two-semester should be completed in the first year of study and normally in the first two semesters. Senior undergraduate courses may be taken on the recommendation of the Advisory Committee but these will not count towards the 1.5 credit requirement. An average of "B-minus" (70%) must be achieved in the prescribed courses.

The MSc thesis research must involve original enquiry into a well-defined question in the molecular biosciences. It is expected that the research will not have been previously reported in the literature and, wherever possible, the research should yield publishable data.

All students beyond year 1 in the program are required to participate annually in the CBS Graduate Student Symposium by presenting a poster or giving a short talk describing their research progress.

PhD Program

The MCB PhD program is offered in five fields: 1) biochemistry; 2) cell biology; 3) microbiology; 4) molecular biology and genetics; and 5) plant biology. The objective of the program is to develop independent and creative scientists specializing in molecular and cellular biology. Graduates will be prepared for positions as scholars in academic institutions, as leaders in the research and development sector of the biomedical and other industries or government agencies, and in social institutions.

Admission Requirements

There are three pathways for admission to the PhD program:

1. Students who have achieved an "A-minus" (80%) average or higher during the last two years of full-time study while completing a four-year honours BSc program (or its equivalent) and who provide evidence of research aptitude and potential based on laboratory research experience may apply to enter the PhD program directly, or
2. An MSc student may apply to transfer to the PhD program before completing the MSc degree. To be eligible for transfer, the student must have completed a high quality undergraduate degree with a grade average of B+ or higher. Before applying for transfer to the PhD program students must complete courses MCB*6100 (Research Topics in Molecular and Cellular Biology) and MCB*6200 (Scientific Communication in Molecular and Cellular Biology) plus an additional course with at least 0.5 graduate course credit, attaining an overall A minus average (at least 80%). Applications for transfer must be approved by the end of the fourth semester in the MSc program.
3. Applicants may have completed a recognized Masters degree in a relevant discipline with a minimum academic standing of "A-minus" (80%).

Each applicant must obtain the support of a faculty member willing to serve as his/her thesis advisor.

All components of the application, including transcript(s), graduate certificate(s), grading scale(s), language test results, assessment forms, a statement of interest, and the name of the faculty advisor must be uploaded no later than two months after an application is submitted through the OUAC portal. Applications that are incomplete after this time period will be closed.

Applications for the program will be considered at any time and admission may be granted for entry in January, May or September.

Admission Process

Graduate student applications to programs in the College of Biological Science are handled by the Office of the Associate Dean, Research (ADR). Before submitting an application, applicants are strongly encouraged to view the "[Before you Apply](#)" and "[Admission Process](#)" webpages on the ADR Future Student's site.

Completed application instructions may also be found on the [Office of Graduate Studies](#) webpage or in the Graduate Calendar.

Degree Requirements

Students in the PhD program must complete MCB*7500 PhD Research Topics in Molecular & Cellular Biology. This two-semester should be completed in the first year of study and normally within the first two semesters. Students without an MSc degree in Molecular and Cellular Biology or the equivalent are required to take one additional graduate course. Other courses may be taken on the recommendation of the Advisory Committee. An average of "B-minus" (70%) must be achieved in the prescribed courses. To be a candidate for the PhD degree, each student must pass a PhD Qualifying Exam. The Qualifying Examination is completed before the end of the fifth semester (for students with an MSc) or the end of the seventh semester (for students without an MSc).

The PhD thesis research must involve original enquiry into a well-defined question in the molecular biosciences. It is expected to result in the publication of one or more papers in high-quality peer-reviewed journals. The research must represent a significant contribution to the relevant research field.

All students beyond year 1 in the program are required to participate annually in the CBS Graduate Student Symposium by presenting a poster or giving a short talk describing their research progress.

Collaborative Programs

Faculty in Molecular and Cellular Biology also participate in the collaborative programs in Neuroscience or Toxicology

Interdepartmental Programs

Faculty in Molecular and Cellular Biology also participate in the interdepartmental programs in Bioinformatics or Biophysics

Courses

MCB*6310 Advanced Topics in Developmental and Cellular Biology U [0.50]
A study of selected topics in contemporary developmental and cellular biology. Students will review recent advances in these disciplines at the molecular and cellular level, in biological systems ranging from simple eukaryotes to plants and vertebrates. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6320 Advanced Topics in Microbiology U [0.50]
A study of selected topics in contemporary microbiology. Students will review recent advances in microbial cell structure, physiology, interactions, gene expression and virulence. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6330 Molecular Biology of Viruses U [0.50]
Replication strategies of virus genomes including prototypes of different animal, plant and (some) bacterial virus families; mechanism and control of viral gene expression; tumour virology; genetically engineered virus vaccines. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6340 Advanced Topics in Molecular Genetics U [0.50]
A study of selected topics in contemporary molecular biology and molecular genetics. Students will review recent progress in gene expression and regulation in model organisms, and the application of molecular biology tools to the study of cellular and organismal physiology. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6350 Advanced Topics in Plant Biology U [0.50]
A study of selected contemporary topics in biochemistry and molecular biology. Proposed course descriptions are considered by the Department of Molecular and Cellular Biology on an <i>ad hoc</i> basis, and the course will be offered according to demand. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6360 Advanced Topics in Biochemistry and Molecular Biology U [0.50]
A study of selected contemporary topics in biochemistry and molecular biology. Proposed course descriptions are considered by the Department of Molecular and Cellular Biology on an <i>ad hoc</i> basis, and the course will be offered according to demand. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6370 Protein Structural Biology and Bioinformatics U [0.50]
This course explores structural biology from three perspectives: 1) the fundamental concepts in structural biology; 2) the methods used to determine structures (including x-ray crystallography, NMR, electron microscopy, and computational modeling); 3) the bioinformatic concepts and tools used to compare, contrast and assign biochemical function to protein structures and sequences. The course emphasizes building a conceptual and practical skill set that will be applicable to any structure related problem. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6380 Structure and Function of Biological Membranes U [0.50]
This course covers multidisciplinary investigations of the basic structure and function of membranes in relation to cell biology. Topics will include structural biology of membrane proteins, experimental approaches for studying membranes, membrane transport systems, import-export systems and/or membrane trafficking. <i>Department(s):</i> Department of Molecular and Cellular Biology
MCB*6500 MSc Research Topics in Molecular and Cellular Biology U [1.00]
This mandatory two semester course emphasizes the development and refinement of the skills of scientific communication. Students submit a written thesis proposal and present a public seminar on a contemporary subject in the molecular biosciences. MCB MSc students normally complete this course within the first two semesters of their program. Students will register in each semester and receive a grade of INP (in progress) at the end of the first semester and a grade at the end of the second semester. <i>Restriction(s):</i> MCB*6100, MCB*6200 <i>Department(s):</i> Department of Molecular and Cellular Biology

MCB*7500 PhD Research Topics in Molecular and Cellular Biology U [1.00]

This mandatory two semester course emphasizes the development and refinement of the skills of scientific communication. Students submit a written thesis proposal and present a public seminar on a contemporary subject in the molecular biosciences. MCB PhD students normally complete this course within the first two semesters of their program. Students will register in each semester and receive a grade of INP (in progress) at the end of the first semester and a grade at the end of the second semester.

Restriction(s): MCB*7100, MCB*7200

Department(s): Department of Molecular and Cellular Biology