



MICR*4330 Molecular Virology

Winter 2024

Section(s): 01

Department of Molecular and Cellular Biology

Credit Weight: 0.50

Version 1.00 - January 05, 2024

1 Course Details

1.1 Calendar Description

This course will focus on molecular aspects of virus replication cycles and the diverse strategies used for replication of select RNA and DNA viruses. Virus-host interactions including tumour virology and host antiviral responses such as interferon and apoptosis will be discussed. Viral anti host-defence responses as well as recent advances in molecular virology and evolution will be also be covered.

Pre-Requisites: MICR*3330, (MICR*2430 is recommended)

1.2 Course Description

The overarching objective of this course is to provide students with a more in-depth understanding and appreciation of viruses and virus-host interactions at the molecular and cellular level. As a fourth-year level course, MICR4330 will place greater emphasis on student-oriented active learning and skill development in scientific inquiry and communication through participation in presentations (both oral and written) and a peer-review process. Building upon the World of Viruses (MICR*3330) in the previous semester, this advanced course focuses on select topics concerning the molecular biology of virology, virus-host interactions, metagenomics, phylogenetics, as well as key experimental systems and methods commonly used in virology research. The laboratory component will provide students the opportunities for hands-on learning and practice of some of the most essential experimental systems and methods related to virology research.

1.3 Timetable

Lectures:

Mondays and Wednesdays 12:30 - 13:20 pm, CRSC (Crop Science) Rm 116

Labs:

Section 101: Friday 8:30 – 11:20, SSC Rm 4109

Section 102: Friday 2:30 – 5:20, SSC Rm 4109

1.4 Final Exam

Time: April 16th, 2024. 8:30-10:30AM

Location: TBA

Final exam will be cumulative and covers all lectures including guest lectures, lab components, and students' in-class presentations.

2 Instructional Support

2.1 Instructional Support Team

Instructor: Baozhong Meng Dr.
Email: bmeng@uoguelph.ca
Telephone: 519-824-4120 Ext 53876
Office: SSC 4205

Office Hours: Wednesdays 4:00 – 5:00 pm

Lab Co-ordinator: Kelsey Pannunzio
Email: kpannunz@uoguelph.ca
Telephone: +1-519-8244120 Ext 56349
Office: SSC 3253
Office Hours: Send me an email to arrange a time.

2.2 Teaching Assistants

Teaching Assistant (GTA): Catherine Fust
Email: cfust@uoguelph.ca
Office: SSC 4602

Teaching Assistant (GTA): Patrick Lameront
Email: plameron@uoguelph.ca
Office: SSC 4602

3 Learning Resources

3.1 Additional Resources

Information on Textbooks and Resources (Notes)

There is no textbook required for this course. Lecture materials will be derived from a range of sources including chapters from textbooks, review articles and primary research papers that are published in peer-reviewed scientific journals. *Principles of Virology* (4th and 5th editions by Flint et al., ASM Press) and *Fields Virology* (6th edition by Knipe and Howley, Wolters Kluwer/Lippincott Williams and Wilkins, 2013) are two very useful general references in virology and will be on reserve in the library, either in hardcopy or electronic form. In addition, materials pertaining to lectures, labs, the group research project (term paper and in-class presentation), assigned reading materials, as well as announcements will be made available on CourseLink.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Gain deeper understanding and appreciation of the various strategies viruses use to express and replicate their genomes.
2. Garner an appreciation of the intricate interactions between a virus and its host at the molecular and cellular levels.
3. Learn about host defense mechanisms against viruses and viral infections
4. Obtain a basic understanding of virus evolution, phylogenetics and HTS for deducing evolutionary relationships among viruses and viral groups and for discovery of novel viruses.
5. Learn and practice some of the key experimental approaches and methodologies commonly used in virology research.
6. Refine and bolster skills in active learning, scientific inquiry through critical reading, analysis, and synthesis of the literature.

- 7). Enhance scientific communication skills through group mini-review project, in-class presentation, and peer review
- 8) Develop and enhance interpersonal cooperation and communication skills as well as leadership skills involved in group project.
- 9). Practice and further improve skills in prioritization, time management, and resilience.
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5 Teaching and Learning Activities

5.1 Lecture

Topics:

SCHEDULE OF LECTURES:

Due to technical issues in incorporating tables into the Course Outline Manager, the schedule of lectures will not be included here but will be made available on CourseLink under "Course Outline".

5.2 Seminar

Topics:

GROUP RESEARCH PROJECT (MINI-REVIEW, PEER REVIEW AND IN-CLASS PRESENTATIONS)

Mini-Review by Student Groups:

To promote student-centered and active learning and to enhance skills in scientific inquiry, information gathering and data analysis, as well as communication and interpersonal skills, students will form groups to complete a mini-review and in-class presentation project. To familiarize students with the process of scientific publishing and to provide the opportunity for revision and refinement of the mini-review, draft manuscripts will undergo a quasi peer-review as used for scientific publications by peers. Student reviewers are expected to provide constructive feedback and suggested changes that would not only improve the scientific merit but also the editorial quality of the manuscripts you are assigned to review. Student authors are expected to take full advantage of the feedbacks and suggestions provided by peer reviewers and revise your draft manuscript by addressing and incorporating all comments and suggested changes as you deem appropriate. These

activities will be invaluable, as they would help you acquire essential skills that you need to become all around researchers and science communicators. For detailed instructions on the term paper project, the peer-review process and its submission, please refer Guidelines for Mini-Review that is available on CourseLink.

Submission deadline and format:

Draft submission: March 11, 2024 at 5 pm; Electronic.

Final submission: March 21, 2024 at 5 pm. Both in person submission of a hard copy and electronic submission on CourseLink.

In-class Group Presentations:

This will take place in the last several weeks of the semester. Each of the student groups will give a short PowerPoint presentation to the class where they will provide a critique on one of the primary research papers chosen for the mini-review. Student presentations will be marked by other students in class as well as by the teaching team.

5.3 Lab

Topics:

LABORATORY EXERCISES:

The lab activities offered this semester are the result of a recent restructuring of the lab component based on feedbacks from students in the past several years. These newly minted laboratory exercises include:

1) A multi-week-long project involving the inoculation of an experimental model plant *Nicotiana benthamiana* with a GFP-tagged infectious clone of potato virus X (PVX). PVX is a single-stranded, positive sense RNA virus of the family *Alphaflexiviridae* (order *Tymovirales*) and one of the best studied model systems RNA viruses. Studies using PVX made significant contributions on the molecular biology, cell biology, virus-host interactions, RNA silencing and viral suppression of RNA silencing, as well as biotechnology using PVX-based vectors.

2) The inoculation chicken eggs as host for fowl viruses;

3) Hemagglutination (HA) and hemagglutination-inhibition (HI) experiments. Hemagglutination is one of the most widely used serological tests used in virology, as they are an inexpensive and rapid method of quantifying viruses. Students will use red blood cells and the NDV virus to conduct these experiments.

Together, these experimental systems and methods will give students exposure to some of the most commonly used methods in virology research and diagnostics, both the traditional infectivity-based methods and the modern molecular methods. These methods reflect the importance of viruses as pathogens in different eukaryotic organisms, including livestock animals and food crops. Importantly, these experimental systems and methods will be readily applicable to human viruses because the animal viruses to be included in the labs are closely related to some of the highly pathogenic human viruses. Further details on these lab activities will be provided during the lab sessions.

Please see Courselink site for the lab schedule.

6 Assessments

6.1 Marking Schemes & Distributions

Components of Assessment	Weighting	Dates and due dates
Quiz on lectures	12%	February 28
Term paper:	20%	Draft submission: March 11 at 5 pm Final submission: March 21 at 5 pm
In-class presentation	7.5%	Time for presentation TBD

Peer review of term paper:	2.5%	March 18, at 5 pm
Laboratory:	28%	
Final exam:	30%	April 16, Room TBD
Total:	100%	

7 Course Statements

7.1 COURSE POLICIES

ATTENDANCE REQUIREMENT:

Due to the requirement for students' participations during in-class presentations and lab exercises, students are required to attend all lectures and labs. Under special circumstances, for example, severe illness, if a student has to miss a class due to legitimate reasons, you must inform the instructor for the lecture to be missed or the lab coordinator for the particular lab to be missed at least one day prior to the lecture or the lab. Given the complexity and the high-cost nature of laboratory activities, we will be unable to schedule for make-up labs. Any students who miss a lab session without permission will receive a grade of zero for the particular lab you will miss.

8 Department of Molecular and Cellular Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
<http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.
<http://www.selfregulationskills.ca/>

8.4 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/index.html>. 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.

For more information regarding the Collection, Use and Disclosure of Personal Information policies please see the Undergraduate Calendar.
(<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/intro/index.shtml>)

8.5 Course Offering Information Disclaimer

Please note that course delivery format (face-to-face vs online) is subject to change up to the first-class day depending on requirements placed on the University and its employees by public health bodies, and local, provincial and federal governments. Any changes to course

format prior to the first class will be posted on WebAdvisor/Student Planning as they become available.

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be

asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

9.9 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).
