Introductory Virology Syllabus

Department of Microbiology & Immunology

MICI3114 Fall 2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor(s)

Name	Email	Office
Dr. Craig McCormick	craig.mccormick@dal.ca	Tupper 7P
Dr. Roy Duncan	roy.duncan@dal.ca	Tupper 7S
Dr. Denys Khaperskyy	d.khaperskyy@dal.ca	Tupper 1-A9
Taylor Caddell (TA)	taylor.caddell@dal.ca	Tupper 7P
Jack Case (TA)	Jack.case@dal.ca	Tupper 10G

Course Description

Viruses play important roles in infectious diseases and cancer and are model systems for gene regulation, molecular evolution and gene therapy. Topics include: virus replication, assays, classification, gene organization and expression, virus-host interactions, cell transformation, viral vaccines and molecular mechanisms of pathogenesis. (3 credit hours)

Course Prerequisites

Grade of B- or better in MICI 2100.03, BIOC 2300.03, BIOL 2020.03, and BIOL 2030.03.

BIOC 3400.03 should be taken either prior to or concurrent with this course (the same grade requirement applies).

Student Resources

Course instructors will have office hours to provide students with additional opportunities for discussion of course content. Times and locations for in-person office hours will be posted for each instructor at the beginning of their section. Some instructors may choose to hold office hours via Collaborate Ultra.

Course Structure

Course content will be delivered in-person. Lectures will be recorded and will be made available to students 1 week before midterm or final exam assessments.

Tutorials: There are two tutorial sessions per week. Students should attend one of these sessions –Thursday 5:35 pm – 6:25 pm in Tupper 3H1, or Tuesday at 6:35 pm – 7:25 pm in Theatre C.

Course Materials

1. Brightspace Course Website MICI 3114 Fall 2024. Lecture notes / Powerpoint slides for each lecture will be posted in advance of the lectures so that you can print and bring to class to facilitate notetaking.

2. Flint's Principles of Virology, 5th Edition. *Recommended but not Required*.

3. Tutorials and Tutorial Study Questions

These questions are designed to focus on the key concepts that you will be tested on in exams. Participation in tutorials and completion of the study questions will improve your understanding of the material.

Assessment

Component	***Weight (% of final grade)***	***Date***
Midterm 1	***20%***	***Friday October 11, 2024***
Midterm 2	***20%***	***Monday November 18, 2024***
Final Exam	***35%***	***TBD***
Design-a-virus assignments	***15% (5% each)***	***See table below***
Tutorial Quizzes	***10%***	***weekly***
Midterms		

Midterms will comprise a combination of fill in the blank, matching, and short answer questions and will take 50 minutes. Both midterms will be written during class time.

Midterm 1 Friday October 11, 2024

Midterm 2 Friday November 18, 2024

Final exam

The final exam will comprise a combination of multiple choice and short answer questions and will take 3 hours. The final exam will also contain two 'design a virus questions' designed to help you apply your knowledge of virology.

Design-a-virus assignments

Students will complete three 'Design-a-virus' assignments on Brightspace during the semester. Students will synthesize detailed information about a viral infection to make conclusions about the fundamental properties of an unknown virus. The assignment will be open for seven days, starting on a Tuesday. You may attempt this assignment as many times as you like; only your final submission will be counted and graded. The objective is to contextualize concepts in virology and encourage integration of course material. Each assignment will be worth a total of 5% of a student's grade. Students are free to discuss these assignments with their classmates, but each submission must uniquely be the work of the individual. Each student submits their assignment individually and any written sections must be provided in a students' own words. The correct answers to questions will not be revealed until after the assignment has closed.

	Assignment open	Assignment due
Assignment 1	Tuesday, Oct 15	Tuesday, Oct 22
Assignment 2	Tuesday, Oct 29	Tuesday, Nov. 5
Assignment 3	Tuesday, Nov 19	Tuesday, Nov. 26

Tutorial Quizzes: Every Friday in class (starting on Friday September 6th), your TAs will distribute a list of study questions based on the material taught in class that week. These questions should be completed prior to attending the tutorial the following week. Tutorials will also be used to discuss the assignment questions, and TAs will conduct a quiz via the TopHat student response system (www.tophat.com). You will be able to submit answers to quiz questions using Apple or Android smartphones and tablets, laptops, or through text message. Top Hat will be integrated into the course Brightspace site, and more information will be available during the first week of classes. These tutorial quizzes will comprise 10% of the final grade.

Conversion of numerical grades to final letter grades follows the
Dalhousie Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

MICI3114 will NOT be using Student Declaration of Absence (SDA) Forms. The student must inform the Course Coordinator by e-mail of the missed midterm PRIOR to its writing. If a student does not write a scheduled midterm, they will be given an opportunity to shift the weight of the midterm to the final exam. Students are allowed to shift the weight of both midterms to the final if necessary, but this is not recommended.

Course Policies related to Academic Integrity

Students are prohibited from using generative AI to complete assignments. They are poor tools for communication of advanced scientific concepts anyway, and their use is easily detected by instructors.

Learning Objectives

- Identify the basic components and structure of viruses
- Demonstrate understanding of essential aspects of viral replication cycles
- Demonstrate understanding of how diverse virus replication strategies arise to enable replication and spread in diverse hosts and environments
- Identify how viruses can outcompete host cells for access to macromolecular synthesis machinery
- Demonstrate how viruses can elude or subvert host immune responses
- Identify the modes of action of antiviral drugs and vaccines
- Distinguish between mechanisms controlling macromolecular synthesis for important RNA and DNA virus families
- Apply knowledge of viral macromolecular synthesis and immune evasion mechanisms to design novel viruses

Course Content

Lecture/Date		Topic	Lecturer
1	W Sep 4	Introduction to molecular virology	McCormick

2	F Sep 6	Virus assays	McCormick
3	M Sep 9	Viral evolution and emerging viruses	McCormick
4	W Sep 11	Principles of virus replication cycles	McCormick
5	F Sep 13	Virus replication cycle (DNA virus MMS)	McCormick
6	M Sep 16	DNA viruses - Polyomaviruses	McCormick
7	W Sep 18	DNA viruses – Polyomaviruses	McCormick
8	F Sep 20	DNA viruses – Papillomaviruses	McCormick
9	M Sep 23	DNA viruses – Herpes	McCormick
10	W Sep 25	DNA viruses – Herpes	McCormick
11	F Sep 27	DNA viruses – Herpes	McCormick
12	M Sep 30	National Day for Truth and Reconciliation	*University Closed*
13	W Oct 2	DNA viruses – Adenoviruses	McCormick
14	F Oct 4	DNA viruses – Adenoviruses	McCormick
15	M Oct 7	DNA viruses – Adenoviruses	McCormick
16	W Oct 9	in-class tutorial – "*DNA Design-a-virus*"	McCormick
	F Oct 11	**Midterm #1 Lectures 1-15 (20% of Final Mark)**	
	M Oct 14	*Thanksgiving*	*University Closed*
17	W Oct 16	Virus replication cycle (RNA virus MMS)	Duncan
18	F Oct 18	RNA viruses – (+)strand (Picornaviruses)	Duncan
19	M Oct 21	RNA viruses – (+)strand (Togaviruses)	Duncan
20	W Oct 23	RNA viruses – (+)strand (Flaviruses)	Duncan
19	F Oct 25	RNA viruses – (+)strand (Flaviruses)	Duncan
20	M Oct 28	RNA viruses – (-)strand (Rhabdo & Paramyxovirus)	Duncan
21	W Oct 30	RNA viruses – (-)strand (Filovirus)	Duncan
22	F Nov 1	RNA viruses – (-)strand (Filovirus)	Duncan
23	M Nov 4	RNA viruses – (+)strand (Coronavirus)	McCormick
24	W Nov 6	RNA viruses – (+)strand (Coronavirus)	McCormick

25	F Nov 8	in-class tutorial – "*RNA Design-a-virus*"	McCormick
	Nov 11-15	*Study Break*	*University Closed*
26	**M Nov 18**	**Midterm #2 Lectures 17-25 (20% of Final Mark)**	
27	W Nov 20	RNA viruses – (-)strand (Orthomyxovirus)	Khaperskyy
28	F Nov 22	RNA viruses – (-)strand (Orthomyxovirus)	Khaperskyy
29	M Nov 25	RNA viruses – (-)strand (Orthomyxovirus)	Khaperskyy
30	W Nov 27	RNA viruses – (-)strand (Orthomyxovirus)	Khaperskyy
31	F Nov 29	RNA viruses – Retroviruses	Khaperskyy
32	M Dec 2	RNA viruses – Retroviruses	Khaperskyy
33	T Dec 3	RNA viruses – Retroviruses	Khaperskyy
34	W Dec 4	RNA viruses – Retroviruses	Khaperskyy
TBD	**Final Exam (cumulative) Lectures 27-34 (focus) and Design-a-Virus (35% of Final Mark)**		

Note: To help with studying, groups of lecture recordings will be released to students 1 week before each midterm or final exam.

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: https://www.dal.ca/about-dal/internationalization.html

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: http://www.dal.ca/cultureofrespect.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: https://www.dal.ca/about/leadership-governance/academic-integrity/faculty-resources/ouriginal-plagiarism-detection.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.