



## COURSE OUTLINE

### 1. **Course:** CMMB 421, Virology - Fall 2022

#### **Coordinator(s)**

<b>Name</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Michael Hynes	hynes@ucalgary.ca	403 220-8473	BI 429C	By Appointment only

#### **Section(s)**

Lecture 01 : MWF 10:00 - 10:50 in SB 105

<b>Instructor</b>	<b>Email</b>	<b>Phone</b>	<b>Office</b>	<b>Hours</b>
Dr Michael Hynes	hynes@ucalgary.ca	403 220-8473	BI 429C	By Appointment only
Dr Jennifer Corcoran	jennifer.corcoran@ucalgary.ca	403 210-9129	HRIC 2A-08	TBA

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

#### **In Person Delivery Details:**

All lectures will be delivered in person, as scheduled. Midterm exams will be during scheduled class time (in person). Tutorials will be delivered in person, and students who elect to do a presentation will be required to do their presentation during scheduled tutorial times. Every effort will be made to assign presentation slots based on student availability and preference.

#### **Re-Entry Protocol for Labs and Classrooms:**

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

#### **Course Site:**

D2L: CMMB 421 L01-(Fall 2022)-Virology

**Note:** Students must use their U of C account for all course correspondence.

#### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

The Biological Sciences Equity Committee acknowledges there are persistent barriers that prevent such accessibility and hinder our progress towards EDI. Our representatives (faculty, staff, postdocs, graduate and undergraduate students) are committed to addressing any concerns and work towards proactive solutions that enact necessary change within the department. To submit anonymous questions, comments or concerns regarding EDI related issues, please reach out to our Chair, Constance Finney ([constance.finney@ucalgary.ca](mailto:constance.finney@ucalgary.ca)), or a committee representative of your choice at <https://science.ucalgary.ca/biological-sciences/about/equity-diversity-and-inclusion>

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### **Prerequisite(s):**

Biochemistry 393 and Cellular, Molecular and Microbial Biology 343; and Biology 311 or Medical Science 341; and

### 3. Grading:

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Quizzes <sup>1</sup>	10%	Ongoing		
Participation (tutorials)	5%	Ongoing		
Midterm 1	15%	Oct 03 2022 at 10:00 am (50 Minutes)	in-person	In Class, SB 105
Midterm 2	15%	Oct 31 2022 at 10:00 am (50 Minutes)	in-person	In Class, SB 105
Major term assignment <sup>2</sup>	15%	Nov 14 2022		
Registrar Scheduled Final Exam	40%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

<sup>1</sup> There will be a minimum of six and a maximum of eight quizzes spaced fairly evenly throughout the term. Only the best three marks for each student will be counted towards their final average. Quizzes will be administered through D2L. Students will have 5 days to complete each quiz, with due dates clearly stated on D2L and announced in class.

<sup>2</sup> Students will have the choice of writing a term paper or giving a presentation during the tutorial sessions on one of November 17, 24, or December 1. Full instructions for both assignments will be available on D2L. November 14 deadline is for the term paper.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	90 %	85 %	80 %	77%	73%	70 %	66 %	63%	60%	55 %	50 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 3 hours.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

### 4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

Attendance at lectures is encouraged, but not mandatory. Students who miss lectures due to illness or other exigency will have access to powerpoint slides and reading lists pertaining to those lectures on D2L. Students in lecture may record lectures in an unobtrusive way, provided they sign the standard waiver provided through D2L, and may record lectures, or make notes, on behalf of students unable to attend through illness. Students who miss a midterm exam due to illness will be offered the option of transferring the value of the test proportionately to the other examination components of the course, or of writing a makeup exam that will be different in content,

and slightly different in format, than the one that the other students wrote. Students who choose to do a presentation as their term assignment, and who miss their assigned presentation slot through illness will be able to make this up in extra slots reserved on the last presentation day. Students in prolonged quarantine will be allowed to do presentations by ZOOM.

#### 5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

#### 6. **Course Materials:**

Required Textbook(s):

Nicholas Acheson, *Fundamentals of Molecular Virology, 2nd EDITION.*: WILEY.

Powerpoint presentations and links to selected readings will be posted to D2L.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

#### 7. **Examination Policy:**

No electronic aids, notes or textbooks are allowed on tests or examinations. Some questions on the final examination, and potentially on the midterm tests, will be assigned in advance (at least a week before the exam date) and students will be allowed to do their own research to come up with an answer (so in a sense these will be take-home questions). These questions will not be mandatory (i.e. there will always be a choice, including questions that were not pre-assigned), and the answers will have to be written, without aids or notes, during the examination period.

Students should also read the Calendar, [Section G](#), on Examinations.

#### 8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

#### 9. **Writing Across The Curriculum Statement:**

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

The quality of writing **WILL** be considered in the assessment of all exams and term papers and other assignments.

## 10. Human & Living Organism Studies Statements:

Students will not participate as subjects or researchers in human studies.

See also [Section E.5](#) of the University Calendar.

**STUDIES IN THE BIOLOGICAL SCIENCES INVOLVE THE USE OF LIVING AND DEAD ORGANISMS.** Students taking laboratory and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

Students are expected to be familiar with [Section SC.4.1](#) of the University Calendar.

## 11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work [form](#) to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

## 12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see their [website](#) or call [403-210-9355](#).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([syva@ucalgary.ca](mailto:syva@ucalgary.ca)) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)

Student Academic Misconduct [Policy](#) and [Procedure](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Lisa Gieg by email [imgieg@ucalgary.ca](mailto:imgieg@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.

g. **Student Union Information:** [SU contact](#), Email SU Science Rep: [sciencerep1@su.ucalgary.ca](mailto:sciencerep1@su.ucalgary.ca), [Student Ombudsman](#)

h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

## CMMB 421

### TERM PAPER OR SEMINAR/PRESENTATION PROJECT

**In Fall 2022, students will be given a choice of doing a presentation or a term paper as their major assignment.**

#### Term Paper.

A list of topics of this year's term paper will be announced in the first tutorial and posted to D2L before that. Students may also propose their own original topic provided they clear it with Dr. Hynes. The paper will take the form of a minireview, a grant proposal, or a news release. See more detailed explanation given in tutorial Sept 15th and on **D2L**. The paper is due on **November 14th** and is to be submitted electronically *and in print*. There will be a late penalty of 5 % per 12 hour period or part thereof for assignments not submitted on time unless there is a valid excuse.

#### Student Presentation

Students will give a brief presentation of a recent scientific paper (2020 or later) about a virus of their choice. A title of the presentation, a brief description of the virus, and a short summary in lay terms of what the paper means must be submitted by **November 14, 2022**. Actual talks will be given during the tutorial sessions, and will be scheduled with input from students as to their schedules. See D2L for complete details and advice.

## Tutorials

In addition to providing a time slot for students to present seminars in a small group, informal setting, the tutorial time slots will be used to give guidance on writing the term paper and doing the presentation, and to answer questions and go over material before each midterm and final exam. We will also have guest presenters who are graduate students who have volunteered to discuss their research to a small group of students. Students are expected to attend the student and guest presentations and participate in discussions. The following is a **tentative** schedule, and will be confirmed on D2L by the second week of classes.

Sept 08 No tutorial

Sept 15 Introductions. Writing term papers, content for presentation. Referencing, citing, copyright etc.

Sept 22 No tutorial

Sept 29 Exam preparation/Review Session for Midterm 1

Oct 06 No tutorial

Oct 13 Guest presentations on viral research TBA

Oct 20 Guest presentations on viral research TBA

Oct 27 Review and Q&A session for Midterm 2

Nov 05 Guest presentations on viral research TBA; Scheduling student talks.

Nov 10 READING WEEK

Nov 17 Student presentations

Nov 24 Student presentations

Dec 01 Student presentations, Final exam review

**Tentative** Schedule of Lectures for CMMB 421 F2022. Subject to change in topics/schedule depending on guest lecturers, pandemics, acts of God, and other uncertainties. **Chapter references are to Acheson, "Fundamentals of Molecular Virology"**

MFH = Michael Hynes JC = Jennifer Corcoran, GvM = Guido van Marle , MBC= Maria Bautista Chavarriaga, SG = Sabine Gilch

Sept 7 1. Introduction to Virology MFH Ch 1

9,12 2,3. Virus morphology MFH Ch 2,3

14 4 Morphology, Envelopes, Assembly and Uncoating MFH Ch 1

16 5 Virus isolation, purification, counting, analysis and growth MFH Ch 1,4

19 6 Bacteriophages -History, Importance, Classification MFH (Ch 3)

21 7 Single stranded RNA phages MFH Ch 5

23 8 Single stranded DNA phages -Inoviruses and Microviruses MFH Ch 6

26 9 Podoviruses: T7 and relatives MFH Ch 7

28 10 Viruses of Archaea MBC Ch 9

**30 No Classes, Truth and Reconciliation Day.**

**October 3 MIDTERM 1 (in class) MFH**

Oct 5 11 Myoviruses: T even phages and relatives MFH

7 12 Temperate phages, Lysogeny, and Biology of Lambda, MFH Ch 8

**October 10, Thanksgiving Monday, No Classes**

12,14 13,14 Abortive infection, CRISPRs and other defenses MFH

17 15 Giant viruses, virophages and evolution of viruses MFH Ch 27,  
19,21 16,17 Plant viruses and viroids MFH Ch 10,31  
24 18 Viruses of insects and other invertebrates MFH Ch 25  
26 19 + strand RNA viruses of mammals: Picornaviruses, MFH Ch 11  
28 20 + strand RNA viruses: Togaviruses and Flaviviruses MFH Ch 12,13

**OCTOBER 31 MIDTERM 2 (in class) MFH**

Nov 2 21 Coronaviruses MFH Ch 14  
Nov 4 22 Paramyxoviruses and Rhabdoviruses JC Ch 15

**November 7 -11 Study Break/Reading Week (No Classes).**

N 14 23 Orthomyxoviruses, Influenza JC Ch 18  
N 16 24 Reoviruses JC Ch 19  
N 18 25 Herpes viruses and latency JC Ch 24  
N 21 26 Adenoviruses JC Ch 23  
N 23 27 Papilloma and Papova viruses; Viruses and Cancer JC Ch 21,22  
N 25 28 Retroviruses GvM Ch 28  
N 28 29 HIV GvM Ch 29  
N 30 30 Viruses of insects and other invertebrates MFH Ch 25  
Dec 02 31 Prions SG Ch 32  
Dec 05 32 Intrinsic Cellular Defences to Viruses (focus SARS-CoV-2) JC Ch 33, 34  
Dec 07 33 Antiviral Chemotherapy (focus on SARS-CoV-2 therapies) JC Ch 36  
Antiviral Vaccines (focus on SARS-CoV-2 vaccines) JC Ch 35

**Course Outcomes:**

- Explain and discuss the major principles and concepts of a wide range of viruses including i. bacteriophages ii. Plant viruses iii. Human and animal viruses
- Promote understanding of the interrelationships among fields of inquiry within biology by stressing the connection of Virology to evolution, cell biology, the environment, infectious disease, epidemiology, immunology and molecular biology.
- Make informed decisions on the benefits and drawbacks of vaccination against human viruses.
- Explain and present ideas effectively in an oral presentation, to different groups of people (scientific and nonscientific audiences).
- Communicate scientific information by writing a scientific literature review (with an appropriate bibliography) and in particular be able to recognize and present primary scientific literature.
- Assess, in the field of virology, scientifically based information and critically evaluate the information.
- Recognize members of the U of C community carrying out research on bacteriophages, viruses and prions and be able to describe their findings

Electronically Approved - Aug 29 2022 17:13

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**Department Approval**