



UNIVERSITY OF CALGARY  
FACULTY OF SCIENCE  
DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

1. **Course:** CMMB 421, Virology -- Fall 2018

Instructor Name	Email	Phone	Office	Hours
<i>L01:</i> ( MWF 10:00 - 10:50 in SA 129)				
Douglas Storey	storey@ucalgary.ca	403-220-8151	Main Office Bio Science 186hh	Office hours by appointment only.
Michael Hynes	hynes@ucalgary.ca	403-220-8473	BioSci 429C	By appointment only

**Course Site:**

D2L: CMMB 421 L01-(Fall 2018)-Virology

**Department of Biological Sciences:**

Office: BIO 186  
Phone: 403 220-3140  
Email: biosci@ucalgary.ca

**Note:**

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

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 one of Biology 311 or Medical Science 341; as well as one of Biology 331 or Medical Science 351.

**Notes:** Prior completion of or concurrent registration in Biochemistry 401 or 443 is strongly recommended.

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:

Midterm 1 (in class)	October 3, 2018	15 %
Midterm 2 (in class)	November 7, 2018	15 %
Term Paper	Due October 22, 2018	20 %
Student Presentation	Title and Description due November 1, 2018; Talks scheduled in Tutorial sessions November 22, 29, December 6.	10 %
Final Exam	Registrar Scheduled	40 %

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 has a registrar scheduled final exam.

There will be a 3 hour, **CUMULATIVE**, final examination scheduled by the registrar.

#### 4. **Missed Components of Term Work:**

The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself/themself with these regulations. See also [Section E.3](#) of the University Calendar.

#### 5. **Scheduled out-of-class activities:**

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

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

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

No aids (electronic, written notes, or textbooks) will be permitted during exams except non-programmable calculators if required to answer mathematical questions. Permission to use calculators will be clearly indicated on the exams. Some questions on midterm and final exams **may** be assigned ahead of the exam; in this case the student may prepare an answer before the exam (research, reading, discussion with experts), but will be required to write the answer without notes or aids during the exam period. Such questions, if present, will always be optional (i.e. students can choose to answer other questions instead). Students opting not to answer pre-assigned questions will always still have some choice on exams.

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

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

There are no supplementary 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.

Students are expected to write clearly, logically and concisely on longer answer questions on exams, and in their term papers. Quality of writing, including grammar, spelling, and appropriate use of vocabulary, will be a **major** factor in the assessment of these course elements.

#### 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.

1. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **15 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 immediately submit the Reappraisal of Graded Term work form to the department in which the course is offered. The department will arrange for a re-assessment of the work if, and only if, the student has sufficient academic grounds. See sections [1.1](#) and [1.2](#) of the University Calendar
2. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section 1.3](#) of the University Calendar.

I will be happy to correct any mathematical errors in computing marks, and to correct mistakes I have made in marking, if students can provide clear factual proof that their answer is correct. I will not change marks on longer answer questions or term papers just because students think their answer deserves more. There is a strong comparative element to the marking of such papers or questions, and full marks are reserved for truly outstanding answers that go well beyond the expectations of the course.

## 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 Center:** The Students Union Wellness Centre provides health and wellness support for students including information and counselling on physical health, mental health and nutrition. For more information, see [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel:403-210-9355).
- c. **Sexual Violence:** The University of Calgary is committed to fostering a safe, productive learning environment. The Sexual Violence Policy (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>) is a fundamental element in creating and sustaining a safer campus environment for all community members. We understand that sexual violence can undermine students' academic success and we encourage students who have experienced some form of sexual misconduct to talk to someone about their experience, so they can get the support they need. 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 ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208).
- d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. **These are only examples.**
- e. **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- f. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head, Undergraduate of the Department of Biological Sciences, Heather Addy by email [addy@ucalgary.ca](mailto:addy@ucalgary.ca) or phone 403 220-6979. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- g. **Safewalk:** Campus Security will escort individuals day or night (See the [Campus Safewalk](#) website). Call [403-220-5333](tel:403-220-5333) for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

- h. **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.
- i. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](#) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](#) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). Student Ombudsman, Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca).
- j. **Internet and Electronic Device Information:** Unless instructed otherwise, cell phones should be turned off during class. All communication with other individuals via laptop, tablet, smart phone or other device is prohibited during class unless specifically permitted by the instructor. Students that violate this policy may be asked to leave the classroom. Repeated violations may result in a charge of misconduct.
- k. **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.

### CMMB 421

#### TERM PAPER AND SEMINAR PROJECT

#### 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, and will normally be 4-6 pages long, double-spaced (not including references or figures and tables (maximum 3 figures and/or tables)). See more detailed explanation given in tutorial or on **D2L**. The paper is due on **OCT 22 2018** 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.

#### Student Presentation

Students will be required to give a brief presentation of a recent scientific paper (2016 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 02, 2018. 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. The following is a **tentative** schedule, and will be confirmed on D2L by the second week of classes.

Sept 06	No tutorial
Sept 13	Writing term papers, what is a minireview ?, Referencing, citing, copyright etc.
Sept 20	No tutorial
Sept 27	Exam preparation/Review Session for Midterm 1
Oct 4	No tutorial
Oct 11	No tutorial
Oct 18	Optional; Help with term paper
Oct 25	Instructions for student presentations and demonstration
Nov 1	Presentation titles due, Schedule talks. Midterm 2 review
Nov 8	No tutorial (MAY be used to accommodate some presentations by volunteers)
Nov 15	READING WEEK
Nov 22	Student presentations
Nov 29	Student presentations
Dec 6	Student presentations, Final exam review

**Tentative** Schedule of Lectures for CMMB 421. Topics and dates of guests may yet be subject to small changes.

(MFH = Michael Hynes DGS= Doug Storey, MC= Markus Czub CC = Carla Coffin GvM = Guido van Marle  
SG = Sabine Gilch , MBC = Maria Bautista Chavarriaga)

Sept	7	F	Introduction to Virology	MFH	
	10	M	Virus morphology	MFH	
	12	W	Virus morphology	MFH	
	14	F	Isolation, purification, enumeration of viruses	MFH	
	17	M	Molecular analysis of viruses	MFH	
	19	W	Viral growth, infection and replication strategies	MFH	
	21	F	Bacteriophages -History, Importance, Classification	MFH	
	24	M	Single stranded RNA phages	MFH	
	26	W	Single stranded DNA phages -Inoviruses and Microviruses	MFH	
Sept	28	F	Podoviruses: T7 and relatives	MFH	
Oct	01	M	Myoviruses: T even phages and relatives	MFH	
<b>October 3</b>		W	<b>MIDTERM 1 (in class)</b>		
	05	F	Temperate phages, Lysogeny, and Biology of Lambda,	MFH	
<b>October 8 is Thanksgiving Monday (No Classes)</b>					
	10	W	Viruses of Archaea	MBC	
	12	F	Abortive infection, CRISPRs and other defenses	MFH	
	15	M	Giant viruses, virophages and evolution of viruses	MFH	
	17	W	Plant viruses and viroids	MFH	
	19	F	Plant viruses and viroids	MFH	
	22	M	Viruses of insects and other invertebrates	MFH	
	24	W	+ strand RNA viruses of mammals: Picornaviruses,	MFH	
	26	F	+ strand RNA viruses: Coronaviruses and Flaviviruses	MFH	
	29	M	- Strand RNA viruses (Paramyxo and Rhabdoviruses)	MFH	
	31	W	Prions	SG	
Nov	02	F	Parvoviruses and Circoviruses	MC	
MC	05	M	Papillomaviruses or Ebolavirus ???		MC
<b>Nov</b>	<b>07</b>	<b>W</b>	<b>MIDTERM 2 (in class)</b>		MFH
	09	F	Animal virus-host interaction	DGS	
<b>November 12-16 are Reading Week (Remembrance Day) (No Classes)</b>					
	19	M	Orthomyxoviruses, Influenza	DGS	
	21	W	Retroviruses	GvM	

	23	F	HIV	GvM
	26	M	Adenoviruses	DGS
	28	W	Herpes viruses and latency	DGS
	30	F	Virus immunology and vaccines	DGS
Dec	03	M	Virus immunology and vaccines, antiviral drugs	DGS
	05	W	Epidemiology of virus diseases	DGS
	07	F	Hepatitis virus B and infectious hepatitis	CC

**Department Approval:**

Electronically Approved

**Date:** 2018-08-31 15:27

### 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