



UNIVERSITY OF
CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: CMMB 421 - VIROLOGY

Lecture Section(s) L01 MWF 10:00 PF 118 Fall 2015

Instructor(s): Dr. D.G. Storey BI 196 220-5274 storey@ucalgary.ca
 Dr. K.E. Sanderson BI 429D 220-6792 kesander@ucalgary.ca
 Dr. M.F. Hynes BI 429C 220-8473 hynes@ucalgary.ca
 Dr. D. Morck BI 444 210-7275 dmorck@ucalgary.ca

Course website: <http://homepages.ucalgary.ca/~ceri/cmmb421prot/virusanimation/index.html>
 Also D2L under CMMB 421

Biological Sciences Department BI 186 403-220-3140 biosci@ucalgary.ca

2. Prerequisites: Biochemistry 393 and Cellular Molecular and Microbial Biology 343; and one of Biology 311 or Medical Sciences 341; as well as one of Biology 331 or Medical Sciences 351.

See section 3.5.C in the Faculty of Science section of the online Calendar

www.ucalgary.ca/pubs/calendar/current/sc-3-5.html

NOTE: Prior completion of or concurrent registration in BCEM 401 or 443 is strongly recommended.

3. Grading: The University policy on grading and related matters is described sections 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 Exams	30 % (2x 15%)	In Class (Oct 9 and Nov 9)
Term Paper	20 %	
Seminar, abstract	20 %	
Final Exam	30%	

* There will be a cumulative 3 hour final exam scheduled by the Registrar's office

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components 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, bearing in mind that an F grade will result if the student does not pass the overall lecture component (i.e. grade of 30/60 or better on combined marks from two midterms plus final exam).

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 with these regulations. See also Section E.6 of the University Calendar

5. Scheduled out-of-class activities: Dates and times of approved class activities held outside of class hours. N/A

6. Course Materials: Acheson, N.H. Fundamentals of Molecular Virology. Wiley & Sons, 2nd Edition

Online Course Components: Course Website

["http://homepages.ucalgary.ca/~ceri/cmmb421prot/virusanimation/index.html"](http://homepages.ucalgary.ca/~ceri/cmmb421prot/virusanimation/index.html)

Contains animations of the Viral life cycles.

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. Students should also read the Calendar, Section G, on Examinations.

8. Writing across the curriculum statement: In this course, the quality of the student's writing on Exams, the Term paper, and Abstract will be a major factor in the evaluation of those course components. See also Section E.2 of the University Calendar.

9. Human studies statement: Not applicable

ETHICS IN THE BIOLOGICAL SCIENCES

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.

10. OTHER IMPORTANT INFORMATION FOR STUDENTS:

(a) 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

(b) Assembly Points: In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.

(c) Student Accommodations: 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* http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.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, preferably in writing, to the Associate Head of Biological Sciences, Dr. H. Addy by email addy@ucalgary.ca or phone 403 220-3140.

(d) Safewalk: Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.

(e) Freedom of Information and Privacy: This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, 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 also

(f) <http://www.ucalgary.ca/secretariat/privacy>.

(g) Student Union Information: VP Academic Phone: 403 220-3911 Email: suvpaca@ucalgary.ca
SU Faculty Rep. Phone: 403 220-3913 Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca;
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca;
<http://ucalgary.ca/provost/students/ombuds>

(h) Internet and Electronic Device Information: You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.

(i) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

Department Approval _____ ORIGINAL SIGNED _____ Date _____
M421 F15; 9/2/2015 11:32 AM

COURSE OUTLINE

CMMB 421 - VIROLOGY

TERM: Fall 2015 SECTION NO: 01

PREREQUISITES: BCEM 393 and CMMB 343 and Biology 311 or Medical Science 341 and Biology 331 or Medical Science 351

NOTE: Prior completion of or concurrent registration in BCEM 401 or 443 is strongly recommended. Students may not register in a course unless they have a grade of at least C- in each prerequisite course.

COURSE COORDINATOR: D.G. Storey BI 196A 220-5274 storey@ucalgary.ca

Note: during Dr. Storey's absence until October, Dr. M.F. Hynes will function as course coordinator.

Dr. M.F. Hynes	BI 429C	220-8473	hynes@ucalgary.ca
Dr. K.E. Sanderson	BI 429D	220-6792	kesander@ucalgary.ca
Dr. D. Morck	BI 444	210-7275	dmorck@ucalgary.ca

Animations: <http://homepages.ucalgary.ca/~ceri/cmmb421prot/virusanimation/index.html>

LECTURES: MWF 10:00 PF 118

TUTORIALS:

TUT 01	R	09:00	SA 125
TUT 02	R	12:00	SA 123
TUT 03	R	15:00	EDC 152

TEXT: Required: Acheson, N.H. Fundamentals of Molecular Virology. Wiley & Sons, 2nd Edition

RESERVE READING ROOM: See attached

MARK DISTRIBUTION:A. Composition of Final Grade

*Midterm Exams (2)	30	(Oct 9 and Nov 9 in class)
Term Paper	20	
Seminar, abstract	20	
Final Exam	<u>30</u>	
	100	

B. Final Exam

There will be a 3 hour **cumulative** Final Examination scheduled by the Registrar's Office.

Letter Grade Mark Cut-off

A+	≥90	D+	≥55
A	≥85	D	≥50
A-	≥80	F	<50
B+	≥77		
B	≥73		
B-	≥70		
C+	≥67		
C	≥63		
C-	≥60		

CMMB 421
TERM PAPER AND SEMINAR PROJECT

Term Paper:

The topics of this year's term paper will be announced in the first tutorial and posted to D2L before that. You may cover the development of methods or their application in either a broad sense or with regard to a specific virus and anything within the context of the topic that is of interest to you and you need not clear the topic with me in advance. The paper is to be a research paper therefore your points must be supported with data in the form of figures or tables. All data must be referenced to the original articles using a consistent style that corresponds to the style of a major virology journal.

The paper must be a minimum of 5 and maximum of 7 double-spaced typed pages (min. font size of 12 with 1" margins), not including cover page, figures, tables, and references. The figures and tables should appear at the end of the paper and not be incorporated into the text. The paper is due in class on **OCT 23 2015 and will be accepted until 4.30pm on October 23rd. (5%/day late penalty)**.

Seminar and Abstract:

Each student will present a seminar complete with an abstract as part of the course's objectives. The seminar/abstract serves two functions in your development as students. First, it allows you to become familiar with the Virology literature by requiring you to delve into the primary source journals of this field. Secondly, it affords you an opportunity to develop communications skills in a relatively friendly and low pressure format. Some people find it difficult to speak before an audience. However, this is an important skill for science graduates to develop. The objective of the seminar is provide you with an opportunity to practice and develop this skill. By allowing you to present before a small group of your friends, the pressure level is reduced, and it can be quite informal. To make this as pressure free as possible you may choose the topic of your seminar; this way you are able to speak on a subject that interests you and that you feel comfortable discussing. There are 3 restrictions that apply to the selection of your topic; 1) **You can pick only one paper that you cited in your term paper**, 2) The 2-3 papers that you use as your primary source must be research papers in virology (reviews are not acceptable) from 2011-2015, and 3) only a limited number of presentations will be allowed on any research topic. The topics can be claimed on a first come-first serve basis by **sending me a PDF** or the citation of the papers you wish to use for your talk.

In your seminar you should 1] give an introduction to the topic (what you are going to talk about and why you are interested in the area); 2] describe basically how the experiments were done (don't go into too much detail but make the study comprehensible), 3] present the results from the study showing the key figures and graphs presented in the paper) and interpret these for the audience, 4] summarize the findings of the paper(s) with your critique of the studies presented, and 5] relate the findings of the papers presented to the state of knowledge in the field (is what they did important in understanding the basics of the virus or its activity?). We will mark the seminar on presentation first and content second. We will meet with the students, at their request, to discuss how they did and how they might be able to improve their presentation, within the context of their own style (I don't believe there is only one way to give a seminar). You will have 12 min. to talk and 5 min of questions. The day before your presentation you must send me the final version of your powerpoint presentation so I can put all the student presentations together on one computer. You will not be able to use your own computer for the presentation. You must hand in an abstract to me during your tutorial on **October 29th and the schedule of talks will be set up that day based on topics**. Abstracts are to be no more than 250 words and divided into sections labeled A) introduction, B) methods C) Results and D) conclusions. The seminars will be organized into similar topics and time slots will be allocated at the Oct 29th tutorial.

Books
Virology Journals

"Journal of Virology". Med Lib.
"Journal of General Virology". Med Lib.
"Virology". Med Lib.
"Archives of Virology" originally called "Archiv fur die gesamte Virusforschung". Med. Lib.
"Viruses"
"Virus Research"
"Intervirology". Med. Lib.
"Cell". Both Libs.
"Proceedings of the National Academy of Sciences USA". Both Libs.
"Journal of Molecular Biology". Both Libs.
"Microbiology and Molecular Biology Reviews", formerly "Microbiology Reviews", formerly "Bacteriological Reviews". Both Libs.
"Scientific American". Both Libs.
"Ann Rev Biochem". Both Libs.
"Ann Rev Microbiol". Both Libs.
"Ann Rev Cell Biol". Both Libs.

All of the above now available on-line and linked to Web of Science or PubMed.

Other Virology Sources not on Reserve

"Comprehensive Virology". Frankel-Conrat and Wagner, 12 volumes now available. Main Library OR 357F73
Med. Lib. QW 160724.

"Current Topics in Microbiology and Immunology". 75 volumes of review articles. Main Library.

"Progress in Medical Virology". 22 volumes of review articles. Located in Reference Section of Medical Library.

"Annual Review of Microbiology"

"Annual Review of Biochemistry"

"Annual Review of Genetics"

"Microbiology 1977", 1978, etc. A volume each year.

"Advances in Virus Research". Review articles.

"Monographs in Virology". Medical Library.

"Virology Monographs". Main Library QR 360A1V57 Med. Lib. QW 160N55

VIROLOGY 2015 TENTATIVE Schedule of lectures and topics

DGS = Dr. D.G. Storey, MFH = Dr. M.F. Hynes, KES= Dr. K.E. Sanderson, DM = Dr. D. Morck,

CC= Dr. Carla Coffin, GvM = Dr. Guido van Marle.

			Lectures	Tutorials		
Sept.	9	W	Introduction			MFH
	11	F	Virus Morphology	Sept 10 No Tutorial		MFH
	14	M	Virus Morphology	Sept 17 No Tutorial		MFH
	16	W	Isolation/Enumeration/Purification			MFH
	18	F	Virus Analysis			MFH
	21	M	Virus Growth			MFH
	23	W	Bacteriophages	Sept 24 Viral paper discussion. Group		KES
	25	F	Bacteriophages	Discussion		KES
	28	M	Bacteriophages			KES
	30	W	Bacteriophages	Oct. 1 Editorial advice on papers and research		KES
Oct.	02	F	<u>Bacteriophages</u>			KES
	05	M	Giant viruses and evolution	Oct. 8. Q & A Review for MT 1.		KES
	07	W	Giant viruses and evolution			KES
	09	F	<u>Midterm 1 in class (15%)</u>			MFH/ KES
	12	M	THANKSGIVING			
	14	W	Plant Viruses	Oct.15 Assignment Prep		MFH
	16	F	Plant Viruses			MFH
	19	M	Host-Virus Interaction	<u>Oct. 22</u> Prion Research presentation (Dr. Schaetzl)		DGS
	21	W	Host-Virus Interaction			DGS
	23	F	(-) STRAND RNA VIRUSES (Rabies and Paramyxoviruses)			DGS
	26	M	SMALL DNA VIRUSES (Parvovirus)	Oct 29 Scheduling seminars		DGS
	28	W	Influenza Virus	Review for MT2 and group		DGS
	30	F	Reovirus	discussion.		DGS
Nov	02	M	(+) STRAND RNA VIRUSES	Nov. 05 Seminars		DGS
	04	W	Picornavirus, Flavivirus			DGS
	06	F	Coronavirus			DGS
	09	M	Midterm exam II (in class)			DGS
	11	W	<u>Remembrance Day</u>	No tutorial Reading days		
	13	F	<u>Reading Day</u>			
	16	M	Viruses that use Reverse			DGS
	18	W	Transcriptase (Retrovirus) / HIV	Nov. 19 Seminars		GvM
	20	F	Hepatitis B Virus/Hepadnaviruses			CC
	23	M	LARGER DNA VIRUSES			DGS
	25	W	Adenovirus	Nov. 26 Seminars		DM
	27	F	Virus Pathogenesis			DM
			Antiviral Drugs			
	30	M	Herpesvirus and latency			DGS
Dec.	02	W	Virus Immunology & Vaccines	Dec 03 Seminars		DGS
	04	F	Virus Immunology & Vaccines			DGS
	07	M	Epidemiology			DGS