



UNIVERSITY OF  
CALGARY

DEPARTMENT OF BIOLOGICAL SCIENCES  
COURSE OUTLINE

**1. Course: CMMB 421 - VIROLOGY**

Lecture Section(s) L01 MWF 10:00 ST 127 Fall 2016

TUTORIALS: TUT 01 R 09:00 ST 125  
TUT 02 R 12:00 ST 125  
TUT 03 R 15:00 ST 125

Course Coordinator: Dr. M.F. Hynes

**Instructor(s):** Dr. M.F. Hynes BI 429C 220-8473 [hynes@ucalgary.ca](mailto:hynes@ucalgary.ca)  
Dr. D.G. Storey BI 196 220-5274 [storey@ucalgary.ca](mailto:storey@ucalgary.ca)

**Course website:** D2L under CMMB 421

Biological Sciences Department BI 186 403-220-3140 [biosci@ucalgary.ca](mailto: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](http://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:

|                          |                      |                                     |
|--------------------------|----------------------|-------------------------------------|
| <b>Midterm Exams</b>     | <b>30 % (2x 15%)</b> | <b>In Class (Oct 12 and Nov 14)</b> |
| <b>Term Paper</b>        | <b>20 %</b>          | <b>(Due October 24, 2016)</b>       |
| <b>Seminar, abstract</b> | <b>15 %</b>          | <b>(Deadlines and schedule TBA)</b> |
| <b>Final Exam</b>        | <b>35%</b>           |                                     |

\* 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.

**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.3 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, 2<sup>nd</sup> Edition

**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, 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 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](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](mailto: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 (FOIPPA). 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 <http://www.ucalgary.ca/secretariat/privacy>.

**(f) 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: [science1@su.ucalgary.ca](mailto:science1@su.ucalgary.ca), [science2@su.ucalgary.ca](mailto:science2@su.ucalgary.ca) and [science3@su.ucalgary.ca](mailto:science3@su.ucalgary.ca);  
Student Ombuds Office: 403 220-6420 Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca);  
<http://ucalgary.ca/provost/students/ombuds>

**(g) 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.

**(h) 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](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.**

Department Approval \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_  
M421 F16; 8/10/2016 10:15 AM

| <u>Letter Grade</u> | <u>Mark Cut-off</u> |
|---------------------|---------------------|
| A+                  | ≥90                 |
| A                   | ≥85                 |
| A-                  | ≥80                 |
| B+                  | ≥77                 |
| B                   | ≥73                 |
| B-                  | ≥70                 |
| C+                  | ≥67                 |
| C                   | ≥63                 |
| C-                  | ≥60                 |
| D+                  | ≥55                 |
| D                   | ≥50                 |
| F                   | <50                 |

**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. Students may also propose their own original topic provided they clear it with Dr. Hynes or Dr. Storey in advance. The paper will take the form of a mini review, and will normally be 5-10 pages long, double spaced (not including references). See more detailed explanation given in tutorial or on **D2L**. The paper is due on **OCT 24 2016** 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.

**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. Talks will normally be on a virus of your choice and must include information from recent primary research articles. More details on the abstract (which will summarize your talk) and presentation will be posted to **D2L**. Actual talks will be given during the tutorial sessions.

**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 seminar, 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 first week of classes.

|         |   |
|---------|---|
| Sept 15 | No tutorial   |
| Sept 22 | No tutorial   |
| Sept 29 | Writing term papers, what is a mini review ?, referencing |
| Oct 6   | Exam preparation/Review Session                           |
| Oct 13  | Abstracts and seminars information session                |
| Oct 20  | Optional. Help with term paper                            |
| Oct 27  | No tutorial   |
| Nov 3   | Abstracts due, Schedule talks. Midterm 2 review           |
| Nov 10  | Reading days  |
| Nov 17  | Student seminars  |
| Nov 24  | Student seminars  |
| Dec 1   | Student seminars  |
| Dec 8   | Any remaining seminars; Final exam review.                |

**Tentative** Schedule of Lectures for CMMB 421.

MFH = Michael Hynes DGS= Doug Storey DWM= Doug Morck MC= Markus Czub

CC = Carla Coffin GvM = Guido van Marle HS = Hermann Schätzl

|   |    |   |   |         |
|---|----|---|---|---------|
| Sept  | 12 | M | Introduction to Virology                            | MFH     |
|   | 14 | W | Virus morphology                                    | MFH     |
|   | 16 | F | Virus morphology                                    | MFH     |
|   | 19 | M | Isolation, purification, enumeration of viruses     | MFH     |
|   | 21 | W | Molecular analysis of viruses                       | MFH     |
|   | 23 | F | Viral growth, infection and replication strategies  | MFH     |
|   | 26 | M | Bacteriophages -History, Importance, Classification | MFH     |
|   | 28 | W | Single stranded RNA and DNA phages                  | MFH     |
|   | 30 | F | Podoviruses: T7 and relatives                       | MFH     |
| Oct   | 03 | M | Myoviruses: T even phages and relatives             | MFH     |
|   | 05 | W | Temperate phages, Lysogeny and Lambda               | MFH     |
|   | 07 | F | Archaeal viruses                                    | MFH     |
| <i>October 10 is Thanksgiving Monday (No Classes)</i> |    |   |   |         |
|   | 12 | W | <b>MIDTERM 1 (in class)</b>                         | MFH     |
|   | 14 | F | Abortive infection, CRISPRs and other defenses      | MFH     |
|   | 17 | M | Giant viruses, virophages and evolution of viruses  | MFH     |
|   | 19 | W | Plant viruses and viroids                           | MFH     |
|   | 21 | F | Plant viruses and viroids                           | MFH     |
|   | 24 | M | Animal virus-host interaction                       | DGS     |
|   | 26 | W | + Strand RNA viruses: Flaviviruses (ZIKA)           | DGS     |
|   | 28 | F | Picornaviruses,                                     | DGS     |
|   | 31 | M | Coronaviruses                                       | DGS     |
| Nov   | 02 | W | Retroviruses  | GvM     |
|   | 04 | F | HIV   | GvM     |
|   | 07 | M | - Strand RNA viruses (Paramyxo and Rhabdoviruses)   | DGS     |
|   | 09 | W | Orthomyxoviruses, Influenza                         | DGS     |
| <i>November 11 is Remembrance Day (No Classes)</i>    |    |   |   |         |
|   | 14 | M | <b>MIDTERM 2 (in class)</b>                         | MFH/DGS |
|   | 16 | W | Prions  | HS      |
|   | 18 | F | Hepatitis B virus/ Hepadnaviruses                   | CC      |
|   | 21 | M | Parvoviruses  | MC      |
|   | 23 | W | Papillomaviruses                                    | MC      |
|   | 25 | F | Ebola virus/ Filoviruses                            | MC      |
|   | 28 | M | Adenoviruses  | DGS     |
|   | 30 | W | Viral pathogenesis                                  | DWM     |
| Dec   | 02 | F | Antiviral drugs                                     | DWM     |
|   | 05 | M | Herpes viruses and latency                          | DGS     |
|   | 07 | W | Virus immunology and vaccines                       | DGS     |
|   | 09 | F | Epidemiology of virus diseases                      | DGS     |