



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

1. **Course: CMMB 527 – IMMUNOLOGY**

WINTER 2020

Lecture Section:	L01	MWF	15:00-15:50	ST 127
Lab Sections:	B01	Thursday	9:00-11:50	BI 123
	B02	Thursday	12:00-2:50	BI 123
	B03	Thursday	3:00-5:50	BI 123
Coordinator:	C.J. Hooley		BI 471	cjhooley@ucalgary.ca
Instructors:	C.J. Hooley		BI 471	cjhooley@ucalgary.ca
	C. Mody		--	cmody@ucalgary.ca
LAB STAFF:	Heidi Gibson		EEEL 301B/BI 175	
TAs:	Anupama Ariyaratne			maharambaenderagesas@ucalgary.ca
	Breton Fougere			breton.fougere@ucalgary.ca

D2L Course Website: CMMB527 Winter 2020  
Biological Sciences Department BI 186; (403) 220-3140; [biosci@ucalgary.ca](mailto:biosci@ucalgary.ca)

Students are expected to be familiar with Section SC.4.1 of the University Calendar.

2. **PREREQUISITE(S):** Biology 311 and 331 and CMMB 343 and one of BCEM 401 or 443  
See section 3.5.C in the Faculty of Science section of the online Calendar  
(<http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html>)
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>Quizzes</b>	<b>12 %</b>	<b>Ongoing, see course schedule below and on D2L</b>
<b>Midterm Exam</b>	<b>18 %</b>	<b>Monday March 2<sup>ND</sup> (in class)</b>
<b>Lab</b>	<b>32 %</b>	<b>Quizzes (3.5%), Lab reports (13.5%), Lab Exam (15%)</b>
<b>Final Exam</b>	<b>38 %</b>	<b>Set by Registrar</b>

(There will be a final exam scheduled by the Registrar's office.)

Each piece of work (quiz, 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.

The student cannot pass the course as a whole unless they have passed (>50%) at least one component of the lab-based examinations (reports or exam) and one component of the lecture based examinations (midterm or final exam).

Letter Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Min. Percent Required	92	88	84	80	76	72	68	64	60	56	50

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 themselves with these regulations. See also Section E.3 of the University Calendar

5. **Scheduled out-of-class activities:** For **Lab 6 during the week of March 12**, there is an open lab session where at least one member of each pair of students will need to come to the lab outside of the regular lab times. A sign-up sheet will be available with multiple time slots to allow students the greatest flexibility.

**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a clash with this out-of-class-time activity, please inform your instructor as soon as possible so that alternative arrangements may be made for you.

6. **Course Materials:** TEXT: Required: CMMB 527 Lab Manual (posted on D2L)

Recommended: Owen, et al. Kuby Immunology. 8th Edition 2013. W.H. Freeman & Co.

Online Course Components: Some teamwork resources are provided by ITP Metrics, a University of Calgary-based system of secure web-based tools for forming teams and doing peer evaluations. These tools are free to all students and are not dependent on prior access.

7. **Examination Policy:** All examinations are closed book. The use of camera devices, MP3 Players and headphones, or wireless access devices such as cell phones, Blackberries, etc., during the examination will not be allowed. Calculators are not allowed for this examination. 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 in laboratory reports will be a factor in the evaluation of those reports. See also Section E.2 of the University Calendar.

9. **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 fieldwork 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. 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.

## 11. 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 counseling, 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 counseling 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.
- 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.
- 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 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.
- l. **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.

Department Approval \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_

Associate Dean Approval  
For out of class activity: \_\_\_\_\_ ORIGINAL SIGNED \_\_\_\_\_ Date \_\_\_\_\_  
M527 W20 co; 2019-12-12 9:36 AM

**Course Outcomes:**

- Compare and contrast components of the immune system
- Illustrate how the immune system evolved, and how it develops within vertebrates
- Distinguish innate from adaptive immune responses
- Demonstrate proficiency in basic immunological laboratory techniques such as the ELISA assay
- Differentiate between immune assays and defend the use of a particular assay in a given situation
- Relate immune responses to real-world examples, such as infectious disease, transplants and allergies

**CMMB 527 Immunology**  
**Winter 2020 Lecture Breakdown**  
**C.J. Hooy [cjhooy@ucalgary.ca](mailto:cjhooy@ucalgary.ca) BI 471**

M-Jan 13 <sup>th</sup>	Lec-1: Introduction to course
W-Jan 15 <sup>th</sup>	Lec-2: Compare & Contrast Innate Vs. Adaptive Responses
<b>TH-JAN 16<sup>TH</sup></b>	<b>LAB #1: Organs &amp; cells of the immune system</b>
F-Jan 17 <sup>th</sup>	Lec-3: C&C Immune Cell Description & Function (WS#1)
M-Jan 20 <sup>th</sup>	Lec-4: Organs & Tissues of the Immune System
W-Jan 22 <sup>nd</sup>	Lec-5: Innate Immunity: Pattern Recognition & Signalling (PRR)
<b>TH-JAN 23<sup>RD</sup></b>	<b>LAB#2: Antibody purification</b>
F-Jan 24 <sup>th</sup>	Lec-6: Innate Effectors: The Complement System (WS#2)
M-Jan 27 <sup>th</sup>	Lec-7: Innate Effector Mechanisms
W-Jan 29 <sup>th</sup>	Lec-8: Leukocyte Migration
<b>TH-JAN 30<sup>TH</sup></b>	<b>LAB#3: Electrophoresis</b>
F-Jan 31 <sup>st</sup>	Lec-9: Acute & Chronic Inflammation
M-Feb 3 <sup>rd</sup>	Lec-10: Antigens
W-Feb 5 <sup>th</sup>	Lec-11: Antibodies: Structure & Function I
F-Feb 7 <sup>th</sup>	Lec-12: Antibodies: Structure & Function II
M-Feb 10 <sup>th</sup>	Lec-13: Antigen-Antibody Interactions (WS#3)
W-Feb 12 <sup>th</sup>	Lec-14: Ig Genetics
<b>TH-FEB 13<sup>TH</sup></b>	<b>LAB#4: ELISA</b>
F- Feb 14 <sup>th</sup>	Lec-15: T-cell Receptor Genetics (WS#4)

**FEBRUARY 16<sup>TH</sup> - 22<sup>ND</sup> WINTER BREAK**

M-Feb 24 <sup>th</sup>	Lec-16: MHC Genetics- Structure
W-Feb 26 <sup>th</sup>	Lec-17: Antigen Processing & Presentation (WS#5)
<b>TH-FEB 27<sup>TH</sup></b>	<b>LAB#5: Immunofluorescence</b>
F-Feb 28 <sup>th</sup>	Lec-18: Immune Assays I (CH-20)
M-Mar 2 <sup>nd</sup>	<b><u>MIDTERM (LEC 1-17)</u></b>
W-Mar 4 <sup>th</sup>	Lec-19: Immune Assays II (CH-20)
F-Mar 6 <sup>th</sup>	Lec-20: Immune Assays III (CH-20)

**Guest Lecturer C. Mody**

<i>M-Mar 9<sup>th</sup></i>	<i>Lec-21: Cell Mediated Immunity- T-cell Ontogeny</i>
<i>W-Mar 11<sup>th</sup></i>	<i>Lec-22: Cell Mediated Immunity- TCR</i>
<b>TH-MAR 12<sup>TH</sup></b>	<b>LAB#6: Gel diffusion</b>
<i>F-Mar 13<sup>th</sup></i>	<i>Lec-23: Cell Mediated Immunity- TCR Signalling</i>
M-Mar 16 <sup>th</sup>	Lec-24: Cell Mediated Immunity- Cytokines
W-Mar 18 <sup>th</sup>	Lec-25: Cell Mediated Immunity- Cytokine Signalling
<b>TH-MAR 19<sup>TH</sup></b>	<b>LAB#7: Lymphocyte purification</b>
F-Mar 20 <sup>th</sup>	Lec-26: Cell Mediated Immunity- Effector Responses
M-Mar 23 <sup>rd</sup>	Lec-27: Hypersensitivity
W-Mar 25 <sup>th</sup>	Lec-28: Tolerance & Autoimmunity
F-Mar 27 <sup>th</sup>	Lec-29: Immunodeficiency

M-Mar 30 <sup>th</sup>	Lec-30: Transplantation ( <b>WS#6</b> )
W-Apr 1 <sup>st</sup>	Lec-31: Pathogens & the Immune System (Leishmania)
<b>TH-APR-2<sup>nd</sup></b>	<b>LAB#8: REVIEW SESSION</b>
F-Apr 3 <sup>rd</sup>	Lec-32: Pathogens & the Immune System (Intestinal)
M-Apr 6 <sup>th</sup>	Lec-33: Vaccines
W-Apr 8 <sup>th</sup>	Lec-34: Immunology & Society (Anti-vax)
<b>TH-APR 9<sup>th</sup></b>	<b>LAB FINAL</b>
F-Apr 10 <sup>th</sup>	<b>HOLIDAY</b>
M-Apr 13 <sup>th</sup>	Non-Instructional Day
W-Apr 15 <sup>th</sup>	Lec-35: <b>REVIEW- LAST DAY OF CLASSES</b>

**Final exam date scheduled by the REGISTRAR**

**CMMB527 LAB SCHEDULE 2020**

Lab	Date	Title	Graded Material	Due	%
1	Jan-16	Organs & cells of the immune system	Technique	Day of - Jan 16 <sup>th</sup>	<b>0.5</b>
2	Jan-23	Antibody purification	Assignment 1a		
3	Jan-30	Electrophoresis	Assignment 1b	Feb 6 <sup>th</sup> – 3pm <b>IN CLASS</b>	<b>2</b>
4	Feb-13	ELISA	ELISA Sheet Assignment 2	Feb 14 <sup>th</sup> – lab start March 14 <sup>th</sup> – lab start	<b>1</b> <b>3</b>
5	Feb-27	Immunofluorescence	Technique	Day of – Feb 28th	<b>0.5</b>
6	Mar-12	Gel Diffusion	Assignment 3	March 27 <sup>th</sup> – 3pm <b>IN CLASS</b>	<b>6</b>
7	Mar-19	Lymphocyte purification	Technique	Day of - March 19th	<b>0.5</b>
8	Apr-02	Review Session			
Exam	Apr-09	Lab Exam	Lab Exam	Day of - April 09th	<b>15</b>

**There will also be a pre-quiz for each lab to complete on D2L prior to 9am on the day of the lab itself. There will be 7 quizzes, which as a group, will be worth 3.5% of the total course grade.**