



COURSE OUTLINE

1. **Course:** CMMB 431, Bacterial Pathogens - Winter 2022

Lecture 01 : MWF 10:00 - 10:50 in SB 148

Instructor	Email	Phone	Office	Hours
Dr Joe Harrison	jjharris@ucalgary.ca	403 220-7627	BI 429B	TBA

The course coordinator for CMMB 431 (Dr. Joe Harrison) employs a collaborative teaching and learning model in the delivery of course content. Students are thus required to participate in a class council comprised of Dr. Harrison and ONE representative from each team assembled for the student "pitch" presentations (however all meetings are open to any student wishing to attend). A different student from each team may attend each class council meeting to bring forward feedback from their group. In consultation with students, time may be schedule outside of regularly scheduled classes for this purpose, especially for managing unexpected changes in course content arising from COVID-19 crisis management. Additionally, all students will be given opportunities to submit anonymous feedback via online surveys launched via D2L. Class council will meet no more than 3 times in the semester.

To account for any necessary transition to remote learning in the winter 2022 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:

Lectures will be held online only when required by the University of Calgary in response to the ongoing COVID-19 pandemic. If lectures are permitted to be held in-person, then the class will be delivered in a hybrid modality: students may choose to attend in-person lectures, but these lectures will also be simultaneously delivered via Zoom and recorded.

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](#). **Online Delivery Details:**

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

All lectures - even those that may be eventually held in-person - will be also by synchronously delivered by Zoom. Links will be provided to students via D2L.

Attendance is mandatory for student presentations. Exceptions will be made on a case-by-case basis.

The exam will be comprised of take-home questions (provided 7 days in advance) that are submitted synchronously online via D2L. Exams are open book. Answers to questions will be uploaded by students during the scheduled exam period. There will be some choice in the questions that students can answer. The exam format, which has been chosen in consultation with current students, will not change regardless of unforeseen alterations to course delivery modality so as not to disadvantage students with those changes. The Registrar will schedule a final exam time to provide students with flexibility in time to prepare answers to submit during that scheduled exam time.

Students will be required to complete peer-evaluations using an online tool, ITP Metrics.

Course Site:

D2L: CMMB 431 L01-(Winter 2022)-Bacterial Pathogens

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), 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):

Cellular, Molecular and Microbial Biology 343.

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
Midterm ¹	20%	Feb 14 2022 at 10:00 am (40 Minutes)	online	Online
Term assignment	20%	Feb 28 2022		
Term Paper	20%	Mar 25 2022		
Student Group Pitch Presentation	20%	Apr 11 2022		
Registrar Scheduled Final Exam	20%	Will be available when the final exam schedule is released by the Registrar	online	Will be available when the final exam schedule is released by the Registrar

¹ The midterm will start at 10 am online (more explicit details about it will be posted in D2L) and is designed to take students 40 minutes to complete. Students will have an additional 20 minutes of buffer time should they encounter any technical issues or interruptions during the writing of the midterm. If you experience an issue that affects your ability to complete the online assessment, which can include (but is not limited to) issues with technology, time zone issues, caregiving responsibilities, or distractions within your test-taking environment, you will need to contact your instructor as soon as possible.

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
Minimum % Required	92 %	85 %	80 %	77%	73%	70 %	66 %	62%	60%	55 %	50 %

This course will have a Registrar Scheduled Final exam that will be delivered on-line. [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 2 hours.

Per section [G.5](#) of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. Due to the scheduling of the final exams, the additional time will be added to **the end** of the registrar scheduled **synchronous** exam to support students. This way, your exam schedule accurately reflects the **start time** of the exam for any **synchronous** exams. E.g. If a **synchronous** exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the **end** time of the **synchronous** exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm.

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.

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

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

6. **Course Materials:**

Required Textbook(s):

Ed Yong, *I Contain Multitudes: The Microbes Within Us and a Grander View of Life* HarperCollins Publishers.

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:**

All exams are open book.

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.

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 www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel: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) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>)
- 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](#)
[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 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: [VP Academic](#), Phone: [403-220-3911](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: ombuds@ucalgary.ca.

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.

All topics are tentative due to availability of guest speakers. Class notes will be posted online.

Date	Topic	Lecturer
Jan. 10	1 - Introduction - What are bacterial pathogens?	Harrison
Jan. 12	2 - How bacterial pathogens survive, infect, and attack their hosts	Harrison
Jan. 14	3 - How the host fights back: Innate immunity	Harrison
Jan. 17	4 - How the host fights back: Adaptive immunity	Harrison
Jan. 19	5 - Protecting the public: Sanitation, vaccination, and health policy	Harrison
Jan. 21	6 - Antibiotics and resistance	Harrison
Jan. 24	7 - <i>Pseudomonas aeruginosa</i>	Harrison
Jan. 26	8 - Research seminar: Bacterial thermal sensing	Harrison
Jan. 28	9 - <i>Staphylococcus aureus</i> and sepsis	Harrison
Jan. 31	10 - Clinician seminar: Chronic lung infections in Cystic Fibrosis	Parkins
Feb. 2	11 - <i>Listeria monocytogenes</i>	Harrison
Feb. 4	12 - <i>Legionella pneumophila</i>	Harrison
Feb. 7	13 - <i>Haemophilus influenzae</i> and iron acquisition	Harrison
Feb. 9	14 - <i>Neisseria</i> and antigenic variation	Harrison
Feb. 11	15 - Research seminar: Vaccine development	Schryvers
Feb. 14	16 - MIDTERM EXAM	Harrison
Feb. 16	17 - Research seminar: <i>Escherichia coli</i>	Savchenko

Feb. 18	18 - Clinician seminar: Sexually transmitted infections	Ugarte-Torres
Feb. 21	Winter break	---
Feb. 23	Winter break	---
Feb. 25	Winter break	---
Feb. 28	19 - The human microbiome	Harrison
Mar. 2	20 - Book club	Harrison
Mar. 4	21 - Book club	Harrison
Mar. 7	22 - Research seminar: The vaginal microbiome	Sycuro
Mar. 9	23 - Research seminar: Human gut microbiome and asthma	Arrieta
Mar. 11	24 - Research seminar: <i>Borrelia burgdorferi</i> and Lyme disease	Chaconas
Mar. 14	25 - <i>Clostridiodes difficile</i>	Harrison
Mar. 16	26 - <i>Bordetella pertusis</i>	Harrison
Mar. 18	27 - <i>Corynebacterium diphtheriae</i>	Harrison
Mar. 21	28 - <i>Yersinia pestis</i> and arthropod borne pathogens	Harrison
Mar. 23	29 - <i>Mycobacterium tuberculosis</i>	Harrison
Mar. 25	30 - <i>Vibrio cholerae</i> and type VI secretion	Harrison
Mar. 28	31 - Flexible Lecture: Student choice	Harrison
Mar. 30	32 - Student pitch presentations	Harrison
Apr. 1	33 - Student pitch presentations	Harrison
Apr. 4	34 - Student pitch presentations	Harrison
Apr. 6	35 - Student pitch presentations	Harrison
Apr. 8	36 - Student pitch presentations	Harrison
Apr. 11	37 - Student pitch presentations	Harrison

Course Outcomes:

- Explain, and discuss the major principles and concepts of a range of bacterial pathogens at various levels including: i. Specific bacterial pathogens ii. Diseases caused by the bacterium iii. Mechanisms of pathogenesis
- Describe host immune response to bacterial infections and how we fight off bacterial infections using antibiotics and how we prevent disease using vaccines
- Explain the role of the human microbiome in health and protection against bacterial invaders
- Communicate scientific information by writing a scientific literature review and in particular be able to recognize and present primary scientific literature
- Sharpen your ability to reason logically and critically evaluate information
- Deepen skills needed to work with a group of your peers and present a research approach i. Apply your knowledge of scientific research on bacterial pathogens by presenting a research grant ii. Sharpen your oral communication Skills
- Recognize members of the U of C community carrying out research on bacterial pathogens and infections and describe their findings

Electronically Approved - Jan 26 2022 10:01

Department Approval

Electronically Approved - Jan 27 2022 11:57

Associate Dean's Approval