

MICB 211: FOUNDATIONS OF MICROBIOLOGY

Course Syllabus 2022W1

Course Introduction

MICB 211 is an introductory microbiology course that covers topics in medical microbiology, which is concerned with how microbes cause disease, and environmental microbiology, which concerns the impact of microbes on global systems. This is the first time we are offering MICB 211! It is replacing MICB 201 which was an introduction to environmental microbiology course. This new course expands the breath of topics in microbiology and is heavily focused on case studies adopted from research papers. The purpose of this change was to improve the way that we teach microbiology. Many of the aspects in this course will be new to the teaching team so we really appreciate your patience and understanding as we deliver this new curriculum and strive to collect your feedback to continuously improve the MICB 211 learning experience.

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A. INSTRUCTOR INFORMATION

Instructor and Course Coordinator: **Dr. Evelyn Sun**
Department of Microbiology and Immunology
evelyn.sun@ubc.ca
Office: BIOL 3136

Instructor: **Dr. Sean Crowe**
Department of Microbiology and Immunology
sean.crowe@ubc.ca
Office: LSI 2440

We also have two amazing TAs and one peer tutor that will help support your learning in this new course. We will introduce them during the first class.

B. COURSE DESCRIPTION AND LEARNING OBJECTIVES

We designed this course with specific learning outcomes in mind that will help you build a strong foundation in microbiology. If you are willing and able to meet the requirements, by the end of this course, you will be able to:

1. communicate using conventional microbiology terms and concepts.
2. interpret microbiology literature with a focus on data analysis.
3. describe the structural and molecular characteristics of bacteria known from studies of model organisms
4. identify key roles of microorganisms in the Earth system and environment, and on host organisms including humans
5. appreciate applications of microbiology from medical, commercial, and environmental perspectives.
6. understand how components of the bacterial cell, and molecules produced by bacteria, can impact human health
7. explain or predict microbiological phenomena using concepts introduced in the course

C. TEXTBOOK / LECTURE MATERIAL

There is no commercial textbook required for MICB 211. This course uses a custom e-text that can be freely accessed through the MICB 211 Canvas site. We build this tailored textbook to directly complement the curriculum, the lectures, and all of the course assessments to provide you with a better learning experience than using a more generic commercial textbook.

In person lectures are scheduled **Tuesdays and Thursdays at 12:00-1:30 PM in CHEM B150**. Lecture slides and material will be posted on the MICB 211 Canvas site before and/or after each class. Lectures will not be recorded or available online. In person attendance is mandatory.

D. ICLICKER

iClicker Reef is used to collect student responses to questions posed during class. Each student is expected to download the iClicker App on their computer or mobile device in order to participate in in-class activities. Responses will not be graded for accuracy. It will count towards the participation grade of the course. Please let the course coordinator know if you do not have access to iClicker so that an alternative can be arranged.

Instructions on how to set-up your iClicker can be found here: <https://lthub.ubc.ca/guides/iclicker-cloud-student-guide/> Please have this set up for the first day of classes.

E. COURSE REQUIREMENTS: PREREQUISITES, PREVIOUS LEARNING AND STUDENT RESPONSIBILITIES

A previous understanding of the following information is important to succeed in MICB 211:

- The cell concept and the difference between cells and organisms.
- Principles of protein structure and enzyme function.
- Principles of membrane structure, permeability properties and mechanisms of transport across membranes.
- DNA structure, bacterial DNA replication, mutation and DNA repair.
- Bacterial gene structure and gene expression (transcription and translation).
- Principles of bacterial regulation of gene expression at the level of transcription initiation (mal/lac operons).
- Principles of oxidative phosphorylation, photophosphorylation and substrate level phosphorylation.
- The concepts of metabolism, catabolism, anabolism, respiration and fermentation.

This is the background for MICB 211 that should have been learned in BIOL 112 or its equivalent. Although much of this prerequisite content appears in the custom e-text for review purposes, it will not be retaught in MICB 211.

Prerequisite: One of BIOL 112, BIOL 200, SCIE 001. For students with BIOL 112, CHEM 121 is recommended.

F. COURSE CONTENT AND SCHEDULE

The course units are given below:

Unit 1: General Microbiology (5 chapters)

Unit 2: Medical Microbiology (4 chapters)

Unit 3: Environmental Microbiology (5 chapters)

See schedule on the next page.

Week #	Class #	Date	Unit	Corresponding Chapter	Tutorial
1	1	Tues Sept 8	1	Chap 1: Intro to Micro	
2	2	Tues Sept 13	1	Chap 2: Microbial structures	Tutorial #1
	3	Thurs Sept 15	1	Chap 3: Growth	
3	4	Tues Sept 20	1	Chap 3: Environmental Pressures	Tutorial #2
	5	Thurs Sept 22	1	Chap 4: Gene expression	
4	6	Tues Sept 27	1	Chap 4: HGT	Tutorial #3
	7	Thurs Sept 29	1	Chap 5: Signal transduction	
5	8	Tues Oct 4	1	Chap 5: Signal transduction cont.	Assignment 1 Quiz (Unit 1)
	9	Thurs Oct 6	Exam 1		
6	10	Tues Oct 11	2	Chap 1: Microbiome	No tutorials (Holiday on Monday)
	11	Thurs Oct 13	2	Chap 2: Biofilms, Quorum sensing	
7	12	Tues Oct 18	2	Chap 2: Biofilms, Chemotaxis	Tutorial #4
	13	Thurs Oct 20	2	Chap 3: Pathogenesis	
8	14	Tues Oct 25	2	Chap 3: Virulence	Tutorial #5
	15	Thurs Oct 27	2	Chap 4: Antibiotics	
9	16	Tues Nov 1	2	Chap 4: Resistance	Assignment 2 Quiz (Unit 2)
	17	Thurs Nov 3	Exam 2		
10	18	Tues Nov 8	3	Chap 1: Chem for microbiologists	No tutorials due to midterm break Nov 9-11
11	19	Tues Nov 15	3	Chap 2: Intro to metabolism	No tutorials
	19	Thurs Nov 17	3	Chap 3: Catabolism	
12	20	Tues Nov 22	3	Chap 3: Catabolism	Tutorial #6
	21	Thurs Nov 24	3	Chap 4: Anabolism	
13	22	Tues Nov 29	3	Chap 4: Anabolism	Tutorial #7
	23	Thurs Dec 1	3	Chap 5: Microbial Ecology	
14		Tues Dec 6	Exam 3		Assignment 3 Quiz (Unit 3)

G. GRADING and EXAM POLICIES

The following is a summary of the grade distribution for MICB201:

	% Final grade	Content	Date/Time/Location
Participation	3%	iClicker Questions (at least 80%)	During lectures
Tutorial	7% (1% each)	Worksheets and quizzes	Tutorials
Assignments	30% (10% each)	Worksheet and in tutorial quiz	During tutorial sections
Exam-I	20%	Unit 1	Oct 6
Exam-II	20%	Unit 2	Nov 3
Exam-III	20%	Unit 3	Dec 6

Participation: Participation includes completing at least 80% of all iClicker questions. This will require you to set an iClicker account and have it set-up for the second class. Responses will not be graded for correctness but rather for completion. Please ensure your name registered to your iClicker account is exactly the same as the one on your student ID.

Figure Facts Assignments: This course has 3 literature-based assignments that have been adapted from an existing learning strategy called Figure Facts¹. Each assignment will require you to interpret data figures or tables from an original research paper chosen by the instructor(s). Students are expected to complete a worksheet template as a reference guide to complete a quiz on the assigned paper. The grade assigned will reflect both the worksheet completion and quiz performance. More instructions on this assignment will be given during class.

Tutorials: Students will be required to attend weekly tutorials starting in week 2 (see schedule for tutorial weeks). Tutorials will be facilitated by a TA and will require the completion of a worksheet followed by a short Canvas quiz (4 questions). Each tutorial (total of 8) will be assessed as 1 pt for handing in a completed worksheet by the end of your tutorial session and a 4pt quiz based on the tutorial case study completed on Canvas by the Friday following your tutorial.

Exams: The exams will be open-book. The questions will be mixed, with different levels of assessment, in a multiple-choice format. Exam questions will be drawn from lectures, quizzes, and the custom e-text. The e-text is very detailed and covers all topics of this course. The lectures are designed to highlight the main concepts from each chapter and to further your understanding of what is in the e-text through case studies and problem-solving questions. Although exams are not cumulative, many of the concepts taught in later chapters build off of concepts taught in earlier chapters. All exams must be written in person including make-up exams.

Students should consult the Learning Outcomes, tutorial material, course notes and case studies as study guides for the exams. The exam questions will require you to do more than just recall the numbers or facts presented. The exams will test your comprehension of the covered material or your ability to apply material in a new context. It is in your best interest to study concepts rather than memorize facts.

¹ <https://www.lifescied.org/doi/10.1187/cbe.11-07-0057>

Important note about exams: All of the exams are scheduled during regular class times. **IF YOU CANNOT ATTEND AN EXAM DATE/TIME**, you must inform the instructor via email at least one week before the exam. In this case, we will make special arrangements for your exam period. You must have a valid excuse to take the exam outside of the scheduled time and may be given an alternate version of the exam.

H. POLICY FOR MISSED EXAMS, ASSIGNMENTS

If you are unable to write an exam for medical reasons or other excusable circumstances (e.g., family emergency), a make-up exam can be scheduled. The make-up exam must be written within 72 hours of the original exam. Under special circumstances at the instructor's discretion, if you are unable to write the make-up exam in the allotted time period, the weighting of the missed exam may be re-distributed to the other exam.

I. CENTRE FOR ACCESSIBILITY

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here (<https://senate.ubc.ca/policies-resources-support-student-success>)

Students who are registered with UBC's Centre for Accessibility should contact the Centre as soon as possible to discuss how your accommodations can be met.

J. ACADEMIC MISCONDUCT

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at <http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0>