



## MEDICAL MICROBIOLOGY 2021

MEDS 3024C (undergraduate), PMM 7004C (graduate)

MWF 10:10 – 11:05 am

Lectures: MSB 4051

Labs: Cardiovascular center (CVC) teaching labs, G-level

### Course Director:

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## Course Description

Medical Microbiology is a branch of medical science that studies the biology of microbial pathogens and how it influences the diagnosis, prevention and treatment of infectious disease. Where do microbial pathogens come from? How are they transmitted to humans? What are the biological features of the microbe that explain the clinical presentation of the patient? How do we distinguish which organism is responsible for a specific disease? Why do some microbes cause life-threatening infections while others cause only mild illness? This course considers each of these questions in relation to human microbial pathogens, focusing on bacteria and fungi, but with brief comparisons to parasites and viruses.

## Integration with other courses in the medical sciences

Medical microbiology integrates microbial biology with infectious diseases. As such, it fits into any curriculum that prepares students for entry into health professions or biomedical PhD programs. The prerequisite is introductory college-level biology, but previous coursework in immunology or biochemistry is useful.

## Learning outcomes

After taking this class, students will be able to:

- Describe the pathogenesis of infections caused by the major bacterial and fungal pathogens.
- Compare and contrast the structure of bacteria and fungi.
- Describe the mechanism of action of the major classes of antibacterial and antifungal drugs
- List the principle organisms associated with infection of a specific organ system.
- Correlate clinical manifestations with laboratory information to establish a diagnosis.
- List examples of prokaryotic and eukaryotic pathogens, explaining key differences between bacteria, fungi parasites, and viruses.
- List the clinical, research, and allied health careers in medical microbiology.

## Textbook

The textbook Medical Microbiology (Sherris 7<sup>th</sup> Ed), is available online at no charge to U.C. students. This text provides supplemental reference material for the course. [Textbook website.](#)

## Lectures

The lectures are conducted in person in MSB 4051. These will be recorded and posted on Canvas. Powerpoints will also be posted.

## Laboratory

The laboratory will be conducted in-person, as noted in the table below. In the event of a shutdown, the labs will be conducted remotely via Webex.

The lab uses live microorganisms to teach basic principles in microbiology. These organisms are not known to consistently cause disease in healthy immunocompetent adult humans, and the American Society for Microbiology considers them to have minimal potential hazard to laboratory personnel and the environment (officially classified in Risk Group 1). Students who are immune-compromised (including those who are pregnant or may become pregnant) and students living with or caring for an immune-compromised individual should consult with their physician to determine the appropriate level of participation in the lab (a list of the organisms will be provided).

The lab is located on the ground floor of the Cardiovascular Center (CVC) in the College of Medicine. Exit the Eden Avenue shuttle, cross the street (Eden Avenue) and go up the wide steps. Enter through glass doors into the CARE building. Cross the large atrium into the MSB (E-level). There is no direct access to the labs from E-level of the MSB (unless you go outside). However, if you take the elevators (or stairs) to G-level of the MSB, you can walk directly into G-level of the CVC.

## Office hours

The instructor is usually available following each lecture, but appointments can be scheduled by email request.

## Attendance policy

Attendance is required for the laboratories, but not the lectures. An absence from a lab requires prior permission from the course director and may require documentation of the reason.

## Academic integrity

The University Rules, including the Student Code of Conduct, and other documented policies of the department, college, and university related to academic integrity will be enforced.

## Accessibility

If a student requires special accommodation, they should meet with the course director by the first week to arrange for reasonable provisions to meet course requirements. Some accommodations may require prior approval by U.C. Accessibility Services.

## Pass/fail option, audit policy, and withdrawal policy

There are no pass/fail or audit options for this class. Withdrawal procedures follow U.C. guidelines.

## Grading

There are 3 remote online exams that together comprise 75% of the total grade (20%, 25% and 30%). Each exam focuses on material since the last exam. However, there is some cumulative content. Lab exercises and case presentations comprise 25% of the final grade. There are no makeup exams or extra credit. Under

exceptional circumstances, a student may ask to take the exam before a scheduled date. Unexpected absences due to medical emergencies must be reported as soon as possible.

- Three exams, including the final 75% (20%, 25%, 30%)
- Lab exercises 20% (for graduate students: 10% for lab exercises + 10% a term paper).
- Student case presentations 5%

All pre- and post-lab assignments are due by the start of the next lab (approximately 1 week apart). There is a 50% penalty for late submissions.

Graduate students: a term paper is worth 50% of the lab grade (i.e. 10% lab exercise/10% term paper). This is a 5-page review paper on some aspect of medical microbiology, similar to review articles published in the journal *Current Opinion in Microbiology*. A draft may be submitted before Fall reading days in order to receive feedback, and the final paper is due at the last class. This paper is distinct from the case presentation.

Student case presentations are group powerpoint lectures on a student-chosen clinical case that deals with any organism that has not been covered in the course.

A	94-100	B+	87-89	C+	77-79	D+	67-69	F	0-59
A-	90-93	B	84-86	C	74-76	D	64-66		
		B-	80-83	C-	70-73	D-	60-63		

## What you can expect from your instructors

- We will start and end the class/lab on time.
- We will stick to the syllabus schedule, topics, and exam schedule as closely as possible.
- We will do our part to make sure class/lab time is valuable.
- We will abide by the policies listed in the syllabus.
- We will answer email questions from students within 24 hours, during the work week.
- We will welcome questions in class and the lab.
- We will grade student exams promptly.
- We will be respectful, civil, and professional in all student interactions.

## What we expect from students

- “5 minutes early is on-time; on-time is late; late is unacceptable”. Developing the habit to live by this expression, commonly used in the corporate world, will serve you well in any future employment.
- This class, like all of your classes, should be viewed as a business meeting: focus entirely on the task-at-hand and do not allow distracting devices to control your attention.
- Accept that all course policies, exam dates, and grading scales apply to all students equally, no exceptions.
- Be respectful, civil and professional in your dealings with your instructors, and conduct yourself with personal integrity and honesty.

Week	Date	Topic	Lecturer
<b>FUNDAMENTALS OF MICROBIOLOGY</b>			
WEEK 1	M 08-23	The nature of infection & the microbiome	Askew
	W 08-25	Bacterial structure	Askew
	F 08-27	Bacterial growth & genetics	Askew
WEEK 2	M 08-30	Immune responses & infection	Askew
	W 09-01	Antibiotics & mechanisms of resistance	Askew
	F 09-03	LAB 1: Intro to the micro lab and biological safety Anthrax case & sentinel microbiology labs	
WEEK 3	M 09-06	No class: Labor Day	
<b>PROKARYOTIC PATHOGENS</b>			
	W 09-08	<i>Staphylococci</i>	Askew
	F 09-10	LAB 2: Principles of differential and selective media	
WEEK 4	M 09-13	<i>Streptococci &amp; Enterococci</i>	Askew
	W 09-15	<i>Haemophilus &amp; Bordetella</i>	Weiss
	F 09-17	LAB 3: Analysis of 1-2	
WEEK 5	M 09-20	<i>Corynebacterium &amp; Listeria</i>	Askew
	W 09-22	<i>Mycobacteria spp.</i>	Askew
	F 09-24	<b>EXAM 1</b>	
WEEK 6	M 09-27	STDs: <i>Neisseria, Chlamydia &amp; Treponema</i>	Askew
	W 09-29	Serology case exercise: dengue fever	Askew
	F 10-01	LAB 4: The gram-stain	
WEEK 7	M 10-04	Enterobacteriaceae I	Askew
	W 10-06	Enterobacteriaceae II	
	F 10-08	LAB 5: Horizontal gene transfer & antibiotic resistance	
WEEK 8	M 10-11	<b>READING DAY</b>	
	W 10-13	<i>Vibrio, Campylobacter &amp; Helicobacter</i>	Askew
	F 10-15	LAB 6: Analysis of 4-5, prep for biofilms	
WEEK 9	M 10-18	<i>Legionella &amp; Pseudomonas</i>	Askew
	W 10-20	Zoonotic infections I	Askew
	F 10-22	LAB 7: Antibiotic susceptibility testing	
WEEK 10	M 10-25	Zoonotic infections II	Askew
	W 10-27	<i>Mycoplasma &amp; Rickettsia</i>	Askew
	F 10-29	<b>EXAM 2</b>	
WEEK 11	M 11-01	Anaerobes: <i>Clostridium &amp; Bacteroides</i>	Askew
<b>OTHER MICROBIAL PATHOGENS</b>			
	W 11-03	Eukaryotic pathogens I: intro to fungi and superficial infections	Askew
	F 11-05	LAB 8: Intro to fungi:	
WEEK 12	M 11-08	Eukaryotic pathogens II: opportunistic fungi	Askew
	W 11-10	Eukaryotic pathogens III: systemic fungi-1	Askew
	F 11-12	LAB 9: analysis of 7-9, prep for agar art/microbiome	
WEEK 13	M 11-15	Eukaryotic pathogens IV: systemic fungi-2	Askew
	W 11-17	Eukaryotic pathogens V: intro to parasites	
	F 11-19	LAB 10 analysis of art, microbiome, lab shutdown	
WEEK 14	M 11-22	Intro to viruses: SARS-Cov-2	Miller
	W 11-24	Careers in microbiology & infectious diseases	Powers
	F 11-26	<b>NO CLASS: THANKSGIVING</b>	
<b>STUDENT CASE PRESENTATIONS</b>			
WEEK 15	M 11-29	Student case presentations (10 groups of 5)	
	W 12-01	Student case presentations	
	F 12-03	Student case presentations	
Ex week	12/6-12/10	<b>EXAM 3 (W 12/8, 8:00-10:00am)</b>	