

BIMM 124: Medical Microbiology, Spring 2021

Dr. Sinem Beyhan
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Lectures: The lectures will be asynchronous (with the exception of the first lecture on Monday, March 29th) and will be posted according to the schedule of lectures (a separate document posted on CANVAS). If you run into technical issues with the CANVAS website, please contact EdTech directly at <https://ucsd servicedesk.service-now.com/its>

Dr. Beyhan's office hours: Mon, Wed, Fri 1:00-2:00 pm (Starts April 5th, Zoom links are provided through CANVAS)

Sections (Starts April 6th, Zoom links are provided through CANVAS)

Section	Days	Time	IA
A01	Tuesday	9:00-9:50 AM	Monica Jeung
A02	Tuesday	12:00-12:50 PM	Monica Jeung
A03	Tuesday	3:00-3:50 PM	Amir Ferry
A04	Tuesday	5:00-5:50 PM	Amir Ferry

Instructional Assistants office hours (Starts April 8th, Zoom links are provided through CANVAS. You may attend the office hours of any IAs!)

IA	Day	Time	Email
Monica Jeung	Thursday	4:00-5:00 pm	mjeung@ucsd.edu
Amir Ferry	Thursday	10:00-11:00 am	amferry@ucsd.edu

Attendance is not mandatory; however, we strongly encourage you to attend sections and office hours. Please ask questions!!

Required materials

- Textbooks:** *Sherris Medical Microbiology, 7th edition (2018)*. Electronic version is available through the UCSD library (use a VPN on your personal computer for access). We encourage you to delve deeper as your time, curiosity, and necessity permits. To assist you, UCSD has many additional textbooks at the library and online that you can access. Another great resource is *Schaechter's Mechanism of Microbial Disease, 5th Edition*. If you have *Schaechter's* from former students of BIMM 124, you would find this book useful. Relevant sections from *Schaechter's* will be integrated throughout the lectures.
- Papers:** Papers assigned for lecture will be posted in the weekly module folders on CANVAS. Also, when it is available, the supplement to each paper is usually posted. You are NOT required to read the supplement in detail; however, you will often find useful information there. For example, details of the methods may help you understand the paper and sometimes a supplemental figure will be of interest.

Introduction

The near doubling in lifespan in the past 1-2 centuries has been due mostly to our control of infectious diseases. However, they are threatening to emerge or re-emerge again. **The main themes we will emphasize in Medical Microbiology are:**

1. How infectious agents can be beneficial or cause disease, and how our immune system responds. The response can lead to tolerance or to full-fledged biological warfare with counter measures, counter-counter measures...
2. How the scientific method is used to study host-microbe interactions and how this knowledge can be used to prevent and treat disease. Mastering the scientific method will help you outside microbiology too!

This is an active learning class that requires active participation and critical thinking skills and de-emphasizes memorization. *All exams and assignments are open book and notes.* This will require you change the way you think about science and learning. Some of the knowledge we cover in class will be obsolete in a few years — critical thinking never will be. Memorization is a skill that got you this far. It will not get you much further. Waiting to the last minute to study for an exam may have worked before, but it works poorly here. Critical thinking skills have to be developed incrementally over time; they cannot be crammed. Today is a new day!

Learning outcomes – At the end of this class you will be more skilled at:

1. knowing how microbes benefit our health
2. knowing how microbes cause disease
3. knowing how the immune system protects us
4. knowing how inappropriate responses of immune system harm us
5. knowing how microbial disease is diagnosed and treated
6. taking charge of your own learning
7. being confident in tackling new questions and challenges
8. reading and understanding primary literature; understanding the scientific method; knowing how the scientist thinks and performs research. These skills will help you learn new things in biology and beyond, empowering you to address challenges in your professional and personal lives.
9. researching and communicating about science, disease, and health. YOU can be a source of knowledge for your family and friends in these issues.

How we will achieve the aims of this class:

1. **Readings** are mandatory and must be completed *before* each lecture.

a. Textbook: Your textbook provides foundational information for class, e.g. information about the immune system, disease symptoms, mechanisms of pathogenesis and protection. Prior reading of the textbook **before** lecture **is required** in this class. Unlike many other classes you have taken, the instructor will not focus primarily on restating what was in the textbook readings. Rather the readings will serve as a starting point for further discussions of much more interesting and applied topics. If you have not done the reading, you will not be able to follow the lectures. *We recommend that you do all your readings in groups.*

Although you do not have to memorize, you still must *have a working knowledge* of what is in the readings in order to benefit from the lectures and, perhaps more importantly, to complete the exams. “Read before to soar.” This is an opportunity to take charge of your own success!

b. Primary literature: We will focus on primary literature relevant to that pathogen, e.g. how it causes disease, interactions with the immune system, or animal models of disease. Virtually everything we know about immunology and microbial pathogenesis is based on published research. This takes you right to the “font of scientific knowledge.” Further, by delving into primary literature, your **critical thinking skills** will grow like on

steroids! This is one of the most important skills we can teach you—a skill you can apply long after UCSD, in professions such as medicine, research, pharmacy, industry, law, journalism, politics, economics... It will enrich your life in many ways.

Each week, you will have 1-2 papers to study and discuss in lecture and/or sections. As with textbook readings, lecture papers must be read **before** lecture. This preparation is essential for the paper to make sense and for you to learn how to read, think about, and work with research literature. Knowing how to do this affects a significant part of your grade: you will use these tools on the exams and your paper assignments. We want to give you ample opportunity to practice and succeed. “Read before to soar.” This is another opportunity to take charge of your own success. *We urge you to do all your readings in groups.*

WHY DO WE REQUIRE READINGS BEFOREHAND? AND WHY WILL WE NOT SIMPLY BE LECTURING FROM THE READINGS AS IN MANY OTHER CLASSES? We assume you are here to learn. Just like athletic training for your body, learning requires **effort**. If the lecture simply rehashes the readings, we will be spoon-feeding you, robbing you of the valuable opportunity to develop your learning and critical thinking skills. For a college junior or senior, preparing for imminent entry into the real world, this would be a disservice. Did you know that focusing on higher level learning skills results in physical brain development? Research shows this! BIMM 124 is a weight-lifting class for your brain. No one else can do the exercising for you. If you do it, your “thinking muscles” will grow and so will your success in life. Our goal is your success. We are equipping you to change the world!!!

2. Quizzes on reading. Each class will begin with a 4-5-question, multiple-choice quiz. The goal of this quiz is to give you added incentive to do the reading ahead of time. The quiz will cover a basic understanding of the readings.

- Quizzes on the **textbook** focus on the most important facts regarding the pathogens that are discussed.
- Quizzes on the **papers** focus on the purpose, hypothesis, basic methods (not too detailed), models used (tissue culture, mice, etc), significant results, importance, take-home message, application, *etc.*

3. Sections. Sections play a significant role in reinforcing and strengthening your analytical skills. This is also where your “Paper Assignments” are discussed and graded. In addition, research papers discussed during the lectures will be further discussed during sections; which is an excellent practice for your exams... another opportunity to take charge of your success!

4. Multimedia.

- The 1-hour film, *Hunting the Nightmare Bacteria*, is assigned for the March 31st lecture. This is a great documentary about the clinical crisis regarding antimicrobial resistance and will set the stage for our discussions of bacterial pathogens. There is a link on course web site. It will be covered on the midterm.
- TED talks of Steffanie Strathdee and Rob Knight are assigned for the relevant lectures. The links are on course web site.

How you will be evaluated

1. **Quizzes, 10%** of your grade: There will be total of 100 quiz questions posted, each will be 1 point. 10% of your total correct answers will be directly added to your total score. If you answer all of them correctly, you will get 10 points.

2. **Papers Assignments, 10-20%** of your grade: There are two write-ups on primary literature. You are only required to submit one of them. Instructions will be given with each paper. You can read and discuss these research papers in groups, but you must then write up your own answers individually. It is critical that your responses be formulated in your own words, that you NOT copy sentences or phrases from the published paper. Your written response will be submitted to Turnitin through CANVAS, to check for plagiarism.

The questions in these assignments will be similar to those on the exams. They are, therefore, *good, low-stress practice for both*. However, the material in these research papers will NOT be covered on the exams (because they are “optional”).

Each Paper will be scored out of 10 points, and these will be directly added to your total score. If you submit both Papers and get good scores, your Final exam can be weighted as 30%.

3. **Exams.** There are three exams in this class:

- **1st Midterm** on Monday, April 26th, 1-hour long with a flexible time frame based on your location
- **2nd Midterm** on Monday, May 24th, 1-hour long with a flexible time frame based on your location
- **Final exam** on Thursday, June 10th, 3-hours long with a flexible time frame based on your location

All exams are *open book, open notes and electronic media*. Final exam is cumulative. Exams emphasize problem-solving skills and being able to analyze and extrapolate information from readings. The information in the section papers is not included on the exams (because they are “optional”), but the research articles discussed during the lectures will be covered on exams.

The **midterms** are worth **20% each** of your grade, but one of the 20% will be replaced with your final exam score if you do better on the final (most students do). The midterm is a low pressure opportunity to practice for the final. If you miss the midterm (for ANY reason, including illness), the credit rolls over to the final exam.

The **final exam** is worth **30-40%** of your grade **depending on whether you get credit for both assigned papers**.

The exam scores will be normalized, against the top 12 grades in the class. In other words, your grade will be your score as a percentage of the average of the top 12 scores. For example, let’s say the average of the top 12 scores is 90 out of 100 points, and your raw score is 75 points. Your normalized score will be $75/90 = 83\%$.

There is **no re-grading** of the exams, except for incorrect addition of points.

We realize you may have many finals. Please look at your finals week schedule now. If the timing of this final conflicts with other finals, then you need to drop one of the conflicting courses. Writing a fair exam for this class takes a lot of time and effort. Therefore, I can write only one version of the exam. To be fair to everyone, I regret I can only offer the final at the time scheduled, except under extraordinary, documented circumstances (*e.g.* documented illness that requires hospitalization), and I must be notified of that extraordinary circumstance *prior* to the final exam (unless you are unconscious!).

Grades

The class will be graded on a standard scale (not on a curve) so that everyone has the opportunity to achieve a high grade. There will be pluses and minuses.

Course grades will be assigned as follows:

A	89-100%
B	80-88%
C	68-79%
D	55-67%.

Note that the vast majority of students do better on the final exam than they do on the midterm. In this scenario, your final exam grade will replace your midterm score!

Academic Integrity

Academic dishonesty undermines the hard work of all students in the class who take responsibility for their learning. Academic dishonesty is incompatible with science and the search for truth. We do not tolerate it. Out of respect and appreciation for your own efforts, nor should you. We encourage you to talk with any of the BIMM

124 teaching team if you learn of any incidents of academic dishonesty. If we suspect cheating, the case will be referred to the Office of Academic Integrity, who will contact the offending student's college dean.

Academic dishonesty includes:

- copying from or getting answers from another student
- copying from any published source (including patchwriting)
- cheating on an exam

Each student is responsible for knowing and abiding by

- UCSD's policies on Academic Dishonesty
 - <https://senate.ucsd.edu/Operating-Procedures/Senate-Manual/appendices/2>
- A description of cheating at UCSD can be found here
 - [Cheating: The Arch Nemesis of Integrity](#)
- Office of Academic integrity FAQ
 - <https://academicintegrity.ucsd.edu/faq/index.html>
- There is also a link to the Office of Academic Integrity on the left side of the CANVAS class web site.

All students are expected to read the **BIMM 124 plagiarism policy** (posted on CANVAS) prior to the submission of the first paper assignment. *By submitting a writing assignment, we assume that you acknowledge that you have read the plagiarism policy.*

Any student violating UCSD's Academic Dishonesty or Student Conduct policies will earn an 'F' in the course and will be reported to their college Dean for administrative processing. Committing acts that violate Student Conduct policies, resulting in course disruption, may be cause for suspension or dismissal from UCSD. Submitting online assignments for someone else, cheating on exams, and plagiarism will be treated as violations Student Conduct Policies.

How to succeed in Medical Microbiology

1. Spend the 8 hours/week reading and studying outside of class, as is expected for a four-unit course.
2. When reading, look up and learn words that you did not know previously.
3. Participate. We have run the statistics. Students that participate in sections and office hours statistically do better than those that do not.
4. Ask questions whenever something is not clear during Dr. Beyhan's or IAs office hours and in sections.
5. Do all the paper assignments. Even if you have already gotten credit for one paper, doing another paper, just for the practice, will further strengthen your analytical skills and empower you to excel on the final exam.
6. **Study in groups when possible.** Read the textbook in groups. Read the papers in groups. Reading primary literature by yourself is challenging to say the least. It is better in groups. Be a groupie! You learn more from your peers than from instructors. If you are in need of a group, please contact your IA and they will put together the students who are in need of groups.
7. Talk with Dr. Beyhan and/or your IA's about any challenges you are having with assignments, with understanding the material, with reading primary literature, with problem-solving techniques. We know this is not easy. Let us know right away how we can help you learn.

Credit: This syllabus was prepared using Dr. Cynthia Gustafson-Brown's previous syllabi for BIMM 124.

Week	Date	Lecture	Required reading
1	Mon, March 29	Introduction to the course	-
	Wed, March 31	Film: Hunting the Nightmare Bacteria (PBS-Frontline)	-
	Fri, April 2	Introduction to bacterial pathogens	Chapter 22
2	Mon, April 5	Staphylococci	Chapter 24
	Wed, April 7	Streptococci	Chapter 25
	Fri, April 9	<i>Vibrio cholerae</i> & <i>Helicobacter pylori</i>	Chapter 32
3	Mon, April 12	Enterobacteriaceae	Chapter 33
	Wed, April 14	Mycobacteria (Guest lecturer: Tim Rodwell)	Chapter 27
	Fri, April 16	Chlamydia	Chapter 39 + research article
4	Mon, April 19	Microbiota	Chapter 1+ research article
	Wed, April 21	Antibacterial agents and resistance	Chapter 23
	Fri, April 23	ID diagnostics (Guest lecturer: Ana Dowey)	Chapter 4
5	Mon, April 26	MIDTERM #1	
	Wed, April 28	Introduction to viral pathogens	Chapter 7
	Fri, April 30	Influenza (Guest lecturer: Gene Tan)	Chapter 9
6	Mon, May 3*	HIV (Guest lecturer: Stephen Rawlings)	Chapter 18
	Wed, May 5	SARS-CoV-2 (Guest lecturer: Sydney Morgan)	Quiz after lecture!
	Fri, May 7	SARS-CoV-2 (Guest lecturers: Rob Knight and Faith Quenzer)	-
7	Mon, May 10	Opportunistic fungal pathogens (Guest lecturer: Alison Coady)	Chapter 46
	Wed, May 12	Opportunistic fungal pathogens	Research articles (no quiz)
	Fri, May 14	Systemic fungal pathogens	Chapter 47
8	Mon, May 17	GI Protozoa (Guest lecturer: Sharon Reed)	Quiz after lecture!
	Wed, May 19	Parasites (Guest lecturer: Jim McKerrow)	Chapter 51
	Fri, May 21	Parasites	Research articles (no quiz)
9	Mon, May 24	MIDTERM #2	
	Wed, May 26	Innate Immunity-I	Chapter 2
	Fri, May 28	Innate Immunity-II (Guest lecturer: Ben Croker)	Research article (no quiz)
10	Mon, May 31**	HOLIDAY (Memorial Day)	-
	Wed, June 2	Adaptive Immunity-I	Chapter 2
	Fri, June 4	Adaptive Immunity-II	-
	Thu, June 10	FINAL EXAM	

*: Paper assignment #1 is due on Mon, May 3rd.

** : Paper assignment #2 is due on Mon, May 31st.