

## BIMM 124: Medical Microbiology, Fall 2016

Dr. Cindy Gustafson-Brown  
[cgb@ucsd.edu](mailto:cgb@ucsd.edu) (put **BIMM 124** in the subject line!)  
phone (858) 534-4242

### Lecture meets at:

Solis 107  
MWF 3-4 pm  
Website: <http://ted.ucsd.edu>

**Dr. Gus' office hours:** Wednesdays 4:15-5:10 PM in HSS 1145L.

**Instructional Assistants** office hours (You may attend the office hours of any or all IAs!)

Name	Day	Time	Location
Samuel Lin	Mon	5-5:50 PM	4146 Bonner Hall
Simson Hon	Tues	6-6:50 PM	Middle of Muir (MOM)
Fiona Tseng	Thurs	11-11:50 AM	Sun God Lounge
Jeanae Kaneshiro	Fri	4-4:50 PM	Peet's Coffee Shop
Rashini Jayaratne	Fri	5-5:50 PM	BRFII First Floor

### Sections

Section	Days	Time	Location	IA	Email
A05	Tues	4-4:50 PM	CNTR 203	Simson	<a href="mailto:sihon@ucsd.edu">sihon@ucsd.edu</a>
A01	Tues	5-5:50 PM	HSS 1128A	Simson	<a href="mailto:sihon@ucsd.edu">sihon@ucsd.edu</a>
A02	Tues	6-6:50 AM	HSS 1128A	Sam	<a href="mailto:sal044@ucsd.edu">sal044@ucsd.edu</a>
A03	Tues	7-7:50 AM	HSS 1128A	Sam	<a href="mailto:sal044@ucsd.edu">sal044@ucsd.edu</a>
A04	Tues	8-8:50 PM	HSS 1128A	Fiona	<a href="mailto:ftseng@ucsd.edu">ftseng@ucsd.edu</a>
A09	Wed	2-2:50 PM	CNTR 217B	Jeanae	<a href="mailto:jmkanesh@ucsd.edu">jmkanesh@ucsd.edu</a>
A06	Wed	4-4:50 PM	HSS 1128A	Jeanae	<a href="mailto:jmkanesh@ucsd.edu">jmkanesh@ucsd.edu</a>
A07	Wed	7-7:50 PM	HSS 1128A	Rashini	<a href="mailto:rrjayara@ucsd.edu">rrjayara@ucsd.edu</a>
A08	Wed	8-8:50 PM	HSS 1128A	Rashini	<a href="mailto:rrjayara@ucsd.edu">rrjayara@ucsd.edu</a>

### 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 reemerge again. **The main themes and ideas we will emphasize in Med Micro 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.* It will require you change the way you think about science and learning. A lot 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. It works poorly here, because the critical thinking skills that you need to succeed 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 become more skillful 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 causes disease

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 to benefit our lives. These skills will help you learn new things in biology and beyond science, empowering you to address challenges in your professional and personal lives.
9. researching and communicating about science, disease, and health. YOU can be a resource of knowledge for your family and friends in these issues.

## Required materials

Textbook: *Schaechter's Mechanism of Microbial Disease, 5<sup>th</sup> Edition*. Note: the exams are open book but closed computer, so **possession of a hard copy of the book is needed**. Copies have been placed on reserved in the Biomedical Library.

We encourage you to delve deeper as your time, curiosity, and necessity permits. To assist you, UCSD has other textbooks online that you can access; there are links on the class web site. If you find something confusing in *Schaechter's*, you can turn to another resource, such as *Sherris Medical Microbiology*, *Levinson's Review of Medical Microbiology and Immunology* or others, available free online via the UCSD library (use a VPN on your personal computer for access).

Assigned papers will be posted in the "Lecture materials" folder on TED. You will need to print out all assigned papers and bring them with you to class, and to your exams.

Clickers (basic iClicker is fine) are **required for this class**. Register your clicker under "tools" on the TED BIMM 124 website. **DO NOT REGISTER ON THE ICLICKER WEB SITE**. We cannot look up rubbed-out clicker numbers for you. If you cannot read the code on the back of your clicker, you can either retrieve it from iclicker website (if you've registered it there before) or buy another one.

## How we will achieve the aims of this class:

1. **Readings (textbooks and primary literature):** Mandatory reading must be completed *before* each lecture.

**Textbook:** Your textbook provides foundational information for class, *e.g.* information about the immune system, disease symptoms, mechanisms of pathogenesis and protection. Textbook readings lay the foundation for our lectures. Prior reading of the textbook material **before** lecture **is required** in this class and will serve as the starting point for our discussions. Unlike many other classes you have taken, the instructor will not focus on explaining what was in the textbook readings. Rather the readings will serve as a starting point for discussions in class, delving into much more interesting and applied topics. Remember, the exams are open-book. You do not have to read to memorize, you need to read to comprehend the background for class. Although you do not have to memorize, you still have to know what is in the readings and have a prior understanding of it in order to access the information during exams... "Read before to soar." This is an opportunity to take charge of your own success. *We recommend that you do all your readings in groups.*

**Primary literature:** The second of two lectures for each pathogen will focus on primary literature relevant to that pathogen (*e.g.* how it causes disease, interactions with the immune system, etc.). Virtually everything we know about immunology and microbial pathogenesis is based on published research. This takes you right to the "fountain 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 prepare and discuss in lecture and sections. As with textbook readings, these must be done **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, since you will use these tools for your "Final Paper" and on the exams. We want to give you ample opportunity to practice to 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 improve your learning and critical thinking skills. For a college 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 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. Reading quizzes.** Each class will begin with a 3-question multiple choice clicker quiz. The goal of this quiz is to give you added incentive to do the reading ahead of time. The class quiz will be strictly on basic understanding of the readings. Our expectation is that >75% of the class will get the answers right provided they have done the readings. The slides with these questions will be framed by an **orange** box. See below for grading.

**3. Interactive lectures with additional clicker questions.** These form the “meat” of each class. Dr. Gus will pick a few topics from the readings and write multiple-choice questions that require deeper thinking/cognitive analyses. You will click in to vote on an answer based upon your initial impression. Many of these questions you will not get right the first time around. Then, you will work in assigned groups to discuss the question for a few minutes, followed by a second opportunity to click in based upon your group’s consensus. The slides with these questions will be framed by a **green** box. See grading below. From here, we will have in-class discussions as to what the right answer is and what’s behind it. The goal of these sessions is to actively engage and empower you in YOUR learning process. Our goal is to help you develop your mind and thinking capabilities so that you will be academically and professionally successful. Our goal is your empowerment!

**If you do not do the reading before coming to lecture,** you will be very bored because you will have nothing to do. Further, you will have let down your group members, who depend on one another to come to class ready to work together.

Note on clickers: The primary impetus for using clickers is not to force attendance. Rather, the goal is to promote participation in class, reading ahead of time, and your success and learning.

**4. Sections.** Sections are mandatory and play a significant role in reinforcing and strengthening your analytical skills. This is where your “Section Papers” are discussed and graded. You must be present to receive a grade on your Section Papers, which can help your course grade. Section papers are excellent practice for classroom discussions, for your exams, and for your Final Paper ... another opportunity to take charge of your success. On days when there is no Section Paper, the discussion section will give you the opportunity to practice exam questions (VERY helpful activity) and to clarify concepts from the readings and lecture.

## How you will be evaluated

**1. Clickers, 10%** of your grade:

- a. **Orange box (quiz) questions** = 5% of your grade. Get 75% of these questions correct to get full credit for the quarter. Get 50% of these questions correct to get half credit for the quarter. These are the only possibilities.
- b. **Green box questions** = 5% of your grade. It does not matter whether you get these right or wrong. Participating in 75% of these questions during 75% of the lectures gives you full credit for the quarter. No partial credit.

**2. Section Papers, optionally 10%** of your grade: There are three optional write-ups on primary literature due in Section. Instructions will be given with each paper and write-ups are to be no longer than 1 page in length. 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 TED, to check for plagiarism. Bring a hard copy of each write-up to section, where it will be discussed and graded. You must be present in section to get credit for your Section Paper.

The questions in these assignments will be similar to those on the exams and Final Paper and 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”).

For each Section Paper, you may receive:

- “S” (satisfactory) 1 full point
- “I” (improvement needed) ½ point
- “N” (no credit) 0 points

At the end of the quarter, if your Section Paper total score is:

- $\geq 2$  points, then 10% of your final grade is an A (100%)
- $< 2$  but  $\geq 1$  point, then 5% of your final grade is an A (100%). The other 5% of credit will transfer to your final exam score.
- $< 1$  point, all of the 10% of credit will transfer to your final exam score.

### 3. Exams. There are two exams in this class:

- **midterm** on Thursday, Oct 27, 8:00-9:20 PM (outside regular lecture time!) in Solis 107
- **final exam** on Friday, Dec 9, 3-6 PM

Both exams are cumulative, *open book, and open notes*. No electronic media (cell phones, computers, calculators, etc...) are allowed. 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 article for the Final Paper WILL be covered on the final exam (because it is “required”).

The **midterm** is worth **15%** of your grade, but that 15% 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.

The **final exam** is worth **40-50%** of your grade **depending on whether you get credit for section papers**.

The exam scores will be normalized, against the top 15 grades in the class. In other words, your grade will be your score as a percentage of the average of the top 15 scores. For example, let’s say the average of the top 15 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 (unless you are unconscious!).

### 4. The **Final Paper** is an analysis of a primary research article, due at the START of lecture on **Monday, Nov 28**, and worth **25%** of your grade. The format of this paper and what will be expected from the students will be made explicitly clear when the paper is assigned. The prompt that will accompany the assignment will be similar to the section paper assignments leading up to this. *You are to work on this individually*, not in groups, and are expected to do your own thinking and writing. We use Turnitin.com to detect plagiarism, which will be treated as a breach of academic integrity.

The material in this research paper WILL be fair game on the final exam (because this is “required” work).

To get full credit you *must* hand in your assignment on time. If you submit it late, there will be several unavoidable consequences. One is, we may not be able to find time to grade it (which would result in a zero), because we have scheduled readers with limited time to grade these. The second is your peers will justly complain that it is unfair you got more time. The third is your peace of mind will probably suffer since you will be piling on your workload before/during finals week. If, for some reason outside your control, you cannot meet this deadline, please email Dr. Gus before the due date. There are no re-grades of the Final Paper.

## 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.

Course grades will be assigned as follows:

A	87-100%
B	77-86%
C	64-76%
D	50-63%.

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:

- clicking in for another student
- copying from another student's paper or from any other source
- cheating on an exam

The UCSD Academic Integrity policy states: *"Each student is responsible for knowing and abiding by UCSD's policies on Academic Dishonesty and on Student Conduct. Any student violating UCSD's Academic Dishonesty or UCSD's 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 that result in course disruption are cause for suspension or dismissal from UCSD."* Use of two or more clickers in the class (*i.e.* clicking in for someone else) will be treated as a violation Student Conduct Policies. Likewise, plagiarism and cheating on exams will result in disciplinary action.

## How to succeed in Medical Microbiology

1. Spend the 8-10 hours/week outside of class, as is expected for a four-unit course.
2. Come to class prepared, having done the assigned readings prior to the lecture. "Read before to soar." Students who do the work and come prepared to class do better. Period.
3. Participate in lectures and sections. We have run the statistics. Students that participate in class and in section statistically do better than those that do not.
4. Ask questions whenever something is not clear, before/during/after class, during instructor office hours (please come!), during IA office hours, and in sections.
5. Click in and do all the assignments, including Section Papers. Whether you get "S" or not, you will learn a lot in the process. Even if you have already gotten credit for two papers, doing a third paper, just for the practice, will further strengthen your analytical skills and empower you to excel on the final exam and final paper.
6. Talk with the instructor 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.
7. **Study in groups.** 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. To help, we will arrange assigned groups in section.
8. Class etiquette: Come on time. Be present. Turn cell phones off. Focus your laptop on class material. Texting, surfing, etc... is disruptive to the students around you.

Sections	Monday lecture	Wednesday lecture	Friday lecture
			<b>Sept 23</b> Intro and course logistics
Set up groups; Prepare for writing papers	<b>Sept 26</b> Innate Immunity Chpt 6	<b>Sept 28</b> Innate Immunity <b>Brinkmann 2004</b>	<b>Sept 30</b> Adaptive Immunity Chpt 7
Section paper #1	<b>Oct 3</b> Adaptive Immunity Chpt 7	<b>Oct 5</b> Bacteria intro pp 18 to top of 26 (before "Cytoplasmic membrane") and pp 29 ("Capsules, Flagella...") and pp 31	<b>Oct 7</b> Host-pathogen interaction: Tolerance <b>Janelle Ayres</b> <b>Ayres &amp; Schneider 2012</b>
Review; Exam prep	<b>Oct 10</b> Microbiota Chpt 2 <b>Rob Knight</b>	<b>Oct 12</b> Secretory diarrhea Chpt 16	<b>Oct 14</b> Secretory diarrhea <b>Allen 2006</b>
Section paper #2	<b>Oct 17</b> Staphylococcus Chpt 11	<b>Oct 19</b> Staphylococcus <b>paper TBA</b>	<b>Oct 21</b> Syphilis Chpt 24
Review; Exam prep	<b>Oct 24</b> Syphilis <b>paper TBA</b>	<b>Oct 26</b> Film: Hunting the Nightmare Bacteria (PBS – Frontline)	<b>Oct 28</b> GI protozoa Chpt 53 <b>Sharon Reed</b>
Review; Exam prep	<b>Oct 31</b> GI protozoa: drug development <b>Debnath 2012</b>	<b>Nov 2</b> Schistosoma, malaria, Trypanosoma cruzi pp 506-512, 517-519, 546- 548 <b>Jim McKerrow</b>	<b>Nov 4</b> <b>paper TBA</b>
Section paper #3	<b>Nov 7</b> Virus intro Chpt 31	<b>Nov 9</b> Zika virus <b>review article TBA</b>	<b>Nov 11</b> HOLIDAY
Review; Exam prep	<b>Nov 14</b> Herpes Chpt 41	<b>Nov 16</b> Herpes <b>paper TBA</b>	<b>Nov 18</b> Influenza Chpt 36
Review; Exam prep	<b>Nov 21</b> Influenza <b>paper TBA</b>	<b>Nov 23</b> Vaccines Chpt 45	<b>Nov 25</b> HOLIDAY
Review; Exam prep	<b>Nov 28</b> Prions - Chpt 56 <b>Christina Sigurdson</b> <b>FINAL PAPER DUE IN</b> <b>CLASS!!!</b>	<b>Nov 30</b> Film: The Forgotten Plague (PBS – Amer. Experience)	<b>Dec 2</b> Mycobacteria Chpt 23 <b>Timothy Rodwell</b>