

BIMM 120: Microbiology, Winter 2019

Tu & Th 5:00 PM – 6:20 PM; 110 Peterson Hall; Instructor: Dr. James W. Golden

BIMM 120. Microbiology (4)

A discussion of the structure, growth, physiology, molecular genetics, genomics, and ecology of prokaryotic microorganisms, with emphasis on the genetic and metabolic diversity of bacteria and archaea and their interactions with hosts and the environment. **Prerequisites:** BILD 1 and BIBC 100 or BIBC 102.

Expanded Prerequisites: To do well in BIMM 120, students should have a strong background in general biology and organic chemistry. Two quarters/semesters of organic chemistry are important prerequisites. Students should know sophomore-level cell biology, molecular biology, genetics, and evolution. It is assumed that students know the basic structures and properties of the major types of molecules found in cells. Students may need to review and study basic information on organic chemistry and biochemistry in Appendix 1 – Biological Molecules. Students are individually responsible for any remedial learning required to understand the material presented in this course.

Class Schedule (approximate, topics may not match planned class periods or weeks)

There are NO alternate exams. Put exams on your calendar. Drop conflicting courses.

Week or Date	Lecture Number & Topic	Readings*
1	Microbial Life	Chapter 1
1-2	Microscopy	Chapter 2
2-3	Cell Structure & Function	Chapter 3
3-4	Growth & Development	Chapter 4
4-5	Environmental influences and control of growth	Chapter 5
Th, Feb 7	Homework 1 due	
5	Bacterial viruses (phage)	Chapter 6 and 11.1
Tu, Feb 12	MIDTERM EXAM	Weeks 1-5 (50 questions)
6-7	Genomes	Chapter 7
7	Gene expression	Chapter 8
8	Bacterial Genetics	Chapter 9
8	Regulation	Chapter 10
9	Synthetic Biology	Chapter 12
Th, Mar 7	Homework 2 due	
9	Energetics and Catabolism	Chapter 13
9	Organo-, Litho-, and Photo-trophy, and Biosynthesis	Chapter 14
10	Food and Industrial Microbiology	Chapter 16
10	Bacteria and Humans	Chapter 23
Th, Mar 21	FINAL EXAM 7:00p-9:59p, TBA	Weeks 6-10 (75 questions total: 50 new + 25 comprehensive)

***Readings:** all information in the textbook **related to lecture material** including text, figures & figure legends, tables, and assigned Special Topics.

Instructor: Dr. James W. Golden

Office: 4832 AP&M (Applied Physics & Mathematics); Phone: (858) 246-0643

Email: jwgolden@ucsd.edu (For issues related to course administration. Course content questions should be asked in IA discussion sections or IA office hours, or at the Instructor's office hours.)

Office hours: after each class for short questions; Tuesdays, 3:30-4:30 PM in 4832 AP&M (or 4882 AP&M conference room); or by appointment (just call or send email with suggested times to meet)

Lectures: Lecture PowerPoint presentations will be on **TritonEd** and the lectures will be **podcasted** (however technical problems sometimes cause podcasts to fail). Lectures will also contain additional material, usually current topics in the news that are not in the lecture slides, so it is important to attend the lectures or listen to the podcasts. Because this is a large lecture class, minimizing distractions is important. Please have respect for your classmates and the instructor by turning off or silencing cell phones, not talking, and minimizing other distracting activities in class.

Class web site: TritonEd at <https://tritoned.ucsd.edu/>

The "**Content**" section contains links to the syllabus, lecture presentations, old exams, and homework assignments including the assigned research papers. The "**Course Materials**" page contains links to study materials supplied by the textbook publisher. For each chapter, these learning materials may include a summary, flashcards, videos, animations, and quiz questions. The **quizzes** are provided by the textbook publisher and contain questions on material that is not presented in class and that will not be on exams. The **quizzes are not graded** and are provided only as a study aid.

Required textbook: Microbiology, 4e, Slonczewski & Foster (ebook, paperback, or loose-leaf textbook). Previous editions are okay, or even another microbiology textbook, or a free online textbook, but students are responsible for correlating the information, text, and figures with the lecture material, which is based on the 4e textbook. I personally prefer reading the enhanced **ebook**.

The ebook has various study tools, such as animations and quiz questions, and is a good learning resource that some students find useful.

Audio & Video of lectures: <http://podcast.ucsd.edu/>

Microbiology related websites:

ASM, American Society for Microbiology: <http://www.asm.org/>

Microbe wiki: <http://microbewiki.kenyon.edu/>

Instructional Assistants (IAs)

IA Name	Email	Office Hour	Location
Anderson, Brooke	beanders@ucsd.edu	Th 3:45p	Mandeville Coffee cart
Pierce, Emily	e1pierce@ucsd.edu	W 4:30p	AP&M 3880
Bruni, Cassi	cbruni@ucsd.edu	M 3:30p	AP&M 4882
Demelo, Matthew	mdemelo@ucsd.edu	Tu 3:45p	Muir Woods Coffee house
Ivanoff, Christopher	civanoff@ucsd.edu	F 11:00a	AP&M 4882
Trieu, Kevin	kptrieu@ucsd.edu	W 4:00p	Sun God Lounge
Korya, Karam	kkorya@ucsd.edu		

Discussion Section times and locations: (Sections start the second week of classes)

Section	Day & Time	Location	IA Name
A01	Tu 7:00p – 7:50p	CENTR 220	Anderson, Brooke
A02	Tu 8:00p – 8:50p	CENTR 220	Anderson, Brooke
A03	Tu 9:00p – 9:50p	CENTR 220	Ivanoff, Christopher
A04	W 4:00p – 4:50p	SOLIS 110	Bruni, Cassi
A05	W 5:00p – 5:50p	WLH 2209	Bruni, Cassi
A06	W 6:00p – 6:50p	WLH 2209	Pierce, Emily
A07	W 7:00p – 7:50p	WLH 2209	Pierce, Emily
A08	F 8:00a-8:50a	WLH 2209	Demelo, Matthew
A09	F 1:00p – 1:50p	WLH 2208	Korya, Karam
A10	F 2:00p – 2:50p	WLH 2208	Trieu, Kevin

IA discussion sections and office hours are provided to help you learn course material. Use IA sections and office hours for review and questions about course material, homework assignments, exam preparation and review, post-exam questions, etc. Attending your discussion section each week is *highly recommended* and there will be sign-in sheets and grade points for attendance. IAs will review class material, answer questions, review for exams, and discuss and answer questions about the homework assignments. Students should normally attend the section they are registered for but may attend other discussion sections or other IA office hours if space is available.

Exams and final course grade:

Exams will include questions based on information presented in the lecture including information in the slides and related sections of the textbook. A couple questions will be related to the homework assignments, and a couple questions may be related to current topics that are covered in class. Exams will consist of **multiple-choice questions**. Most exam questions will require an *integrated understanding* of the material, not just memorization of facts. Grades will be based on the following:

- 1 midterm exam (50 questions, 50 points)
 - 1 final exam (75 questions, 75 points)
 - 2 written homework assignments (5 points each, 10 points total)
 - 9 discussion section attendance (1 point each, 9 points total)
- The total points possible is 144.

Final grades will be based on the percentage of total points. There are **NO** extra-credit assignments. There are **NO** alternate exams. Make sure your classes have NO exam conflicts.

There are **NO** scheduled make-up exams. Make-up exams are decided case-by-case and require a written university-authorized excuse signed by the student documenting that the exam was missed because of unavoidable circumstances outside of the student's control. Make-up exams may have multiple choice or essay questions. If you miss an exam, you **must contact the Instructor within 24 hours** of the missed exam to determine if you are eligible for scheduling a make-up exam. Missing the final exam will result in an incomplete grade.

The grade earned for the course will be based on a straight scale of the percentage of total possible points (points-earned / 144 x 100 rounded to nearest 0.01%) with cutoffs as shown below. For example, the computer will assign a B+ grade to a percentage of 89.99, and an A- grade for 90.00. There are always grades just below each of the cutoffs. Grades must be based on only academic criteria and **cannot** be changed for individual students for any reason. To be fair to all students, the instructor **cannot** deviate from the syllabus or final grading scale for an individual student for any reason. If you have what you consider extraordinary circumstances that deserve special consideration, then you should contact your academic advisor in your college.

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Percentage	97.0	93.0	90.0	87.0	83.0	80.0	77.0	73.0	70.0	60.0	<60.0

Historically, the grade cutoffs have been slightly adjusted each year. The class average for this course is typically a B-, and the final grades will be assigned with an appropriate adjustment or "curve" if necessary. It is expected that there will be at least 20% A grades for this class. The grade scale adjustment (curve) is not made until after the final exam scores and all other scores are available, and cannot be precisely predicted before then.

Exam procedures:

You must bring your **student ID** and a **#2 pencil** and **eraser**. Scantron exam forms will be provided. **No** calculators, phones, smart watches, or other electronic devices are required or allowed. **ALL** personal items must be **CLOSED** and placed on the floor **UNDER** your seat. Make sure your phone is turned **OFF** and put away. Once you leave the room, you may **NOT** reenter the room until the exam is over.

Always choose the *BEST* answer even though it might not be perfect. There should be *one best* answer for each question. For the midterm exams only, students should mark their answers on the exam questions, which they can take with them after the exam. The exam key will be posted on TritonEd, usually within 24 hours after the exam. Students will be able to self-grade their midterm exam before the drop date.

Do not cheat! *Disciplinary steps will be taken when cheating is discovered. The instructor and IAs will attempt to obtain hard evidence of cheating (for example, video of seating positions or student actions during exams). Instructors **must** file a report of suspected academic integrity violations to the university Academic Integrity Office.*

*From APPENDIX 2: UCSD POLICY ON INTEGRITY OF SCHOLARSHIP: "If the Instructor decides that there is evidence of a Policy violation, he or she **must** submit a formal charge describing the suspected violation to the AI Office."*

During the exam: If you are sure that a question is written ambiguously or feel that more than one answer is correct, raise your hand and ask for clarification. Most ambiguities and problem questions should be identified this way, so that clarifications can be announced to the entire class and so that the grading key can be modified before the exams are graded. The instructor or IAs **cannot** define scientific words, help you understand a question, or confirm that you have chosen the correct answer.

Turning in the exam: When finished with the exam, show your **student ID** at the front of the room and turn in the completed and **signed scantron** form in the correct form stack (1, 2, 3, or 4), and then leave quietly. *For the midterm, you can take the exam question pages with you.*

Exam concerns or problems: If you are sure that there is a problem with a question or that the exam key is incorrect, then within **24 hours** after the key is posted, you should prepare a written explanation, with documentation (e.g., reference the textbook page and section), and send the query to your IA via email. All valid inquiries and concerns will be carefully considered and forwarded to the course Instructor. The exam key will be modified if required. If we find that a question has more than one answer or should be discarded after the exams have been graded, then all the exams will be re-graded using the corrected answer key.

Scantrons are not returned. The scantron scanning service is extremely reliable but scantrons are occasionally graded with the wrong key. If you are sure that something must be wrong with your score, then notify the Instructor with your concerns.

How to study and prepare for the exams:

1. Attend lectures. Exam questions will be on topics and information presented in lecture; however, related textbook readings are required to fully understand the material. A few questions will come from current topics covered in class and the homework assignments. The *BEST* answer for exam questions is always related to the content of this course and textbook. You may have confounding information from another source that might complicate which answer is best, so always choose the answer that is best in the context of this course.
2. Read and study the textbook sections covered in lecture. These readings will reinforce the lectures and provide information that is necessary to understand and integrate the information provided in lecture.

3. As necessary, review textbook sections or other sources that provide review/remedial material that was expected to have been learned in prerequisite courses.
4. Attend your discussion section for review and to ask questions about the lectures and readings.
5. Use the study materials provided by the textbook publisher.

In past years, the students who do best on exams regularly attended lectures and discussion sections, read the textbook, and reviewed their class notes each week.

Homework (HW) written assignments (Posted on TritonEd):

The homework assignment questions and the related research paper will be posted on TritonEd. Scientific research articles, also called "papers", are the basis for scientific progress and information exchange. Scientists use scientific methods and logic to obtain and interpret data that are presented in these papers. These published ideas, methods, data, and conclusions can be critically analyzed by other scientists who can then repeat and extend the original results. For students, reading scientific articles is important to understand the scientific method and the original source of the information you are learning.

For the homework assignments, you will turn in your answers as a 1-page printout AND upload the file to TritonEd. The scientific paper and homework questions will be posted on TritonEd. You should read the whole paper quickly without getting bogged down in the detail, and then carefully read the sections and figures related to the homework assignment. You do not need to read all of the supporting materials or appendixes. Your answers to the homework questions should occupy no more than **1 side of 1 page**, total. The format should be single-spaced, 1-inch margins, 11-point Arial or equivalent. Your answer page must have your **name, PID, section, and signature**, which is your assurance that your answers are your own work. You should use a spelling and grammar checker. The IAs can help you understand the papers at discussion sections and office hours, but they CANNOT pre-grade answers or help you with your specific answers. On or before the due date, a signed printout of your homework answers (1 side of 1 page, total) should be turned in at lecture or at your IA discussion section or office hour, AND your answer file should be **uploaded to TritonEd** to provide a **time-stamped** backup. **The printed answer page will be graded** by the IAs and must have your name, PID, and signature.

Although the research articles may be discussed in IA discussion sections and with your classmates, you must **write your own homework answers independently**. It is expected that you may need to look up additional information in textbooks or on the web to understand the research articles, but all answers must be **in your own words**. Do **NOT** copy or plagiarize the article or any other source in your answers. By submitting a homework assignment, you are certifying that it is exclusively your own work. Homework answers will be checked by Turnitin.com.

HW grading will be done with a rubric/key developed by the Instructor and IAs to achieve consistent and fair scores for all students. All aspects of the answers, **including logical presentation and spelling/grammar** will be considered for your score. Points may be deducted for including information that is not related to the correct answer because this indicates a lack of understanding. Homework assignments will not be returned or re-graded, but you can ask your IA to see your HW during their office hour. The IAs carefully assign scores for the homework answers, but are not asked to mark corrections or make annotations. A general answer key will be posted on TritonEd.

General guidelines for reading the papers:

Research papers are written for people who already know something about the subject matter. You will need to look up information to understand the paper. You are not expected to understand everything in the reviews and primary research articles, but you should pay attention to the following:

1. Identify the questions being asked in the paper.

Frequently the introduction or the first few paragraphs will present background information and raise the questions that will be addressed in the paper.

2. Identify the main conclusions in the paper.

The main conclusions will be summarized in the abstract and are presented in the discussion/conclusion section. Determine why the conclusions are important.

3. Examine the experiments that were performed to answer the questions.

The experiments and data will be briefly summarized in the abstract and will be presented in the Methods and Results sections of the paper. What was the questions the experiments were trying to address? What was the experimental design? How was the experiment done? What do the results mean? Did the experiment actually answer the question or not?

4. For each experiment:

Determine how the experiment was done. Examine the data. Consider the author's conclusion about the experiments and decide if the conclusions are valid. Decide if proper **experimental controls** were included. Consider any caveats or concerns raised by the authors about their data. Think about alternative conclusions or explanations for the data — maybe the authors are wrong!

Google "How to Read and Understand a Scientific Paper"

For example:

[How to Read and Comprehend Scientific Research Articles - YouTube](https://www.youtube.com/watch?v=t2K6mJkSWoA)

<https://www.youtube.com/watch?v=t2K6mJkSWoA>

How to Read and Understand a Scientific Paper: A Step-by-Step Guide for Non-Scientists

https://www.huffingtonpost.com/jennifer-raff/how-to-read-and-understand-a-scientific-paper_b_5501628.html

Statement on Office for Students with Disabilities (OSD):

To receive accommodation, students must present their "Authorization for Accommodation" (AFA) form provided by the Office for Students with Disabilities (OSD) to the instructor. Extended exam times will overlap with the regular exams and usually start at the same time as the regular exams. If OSD exam times for this course conflict with another class, then this course should **not** be taken. It is the student's responsibility to make sure class and exam schedules for all of their classes do not have any conflicts.

Statement on Academic Integrity:

Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. The consequences of being caught cheating can be severe.

Information can be found here:

<http://www.ucsd.edu/current-students/academics/academic-integrity/index.html>

Students are expected to do their own work, as outlined in the UCSD Policy on Integrity of Scholarship:

<http://senate.ucsd.edu/Operating-Procedures/Senate-Manual/Appendices/2>

Academic misconduct will NOT be tolerated. Any student who engages in suspicious conduct will be confronted and subjected to the disciplinary process. Cheaters will receive a failing grade on the exam or assignment, and/or in the course. They may also be suspended from UCSD pursuant to University guidelines. (Translation: just don't do it!)

Academic misconduct includes but is not limited to:

1. **Cheating**, such as using "crib notes" or copying answers from another student during the exam.
2. **Plagiarism**, such as using the writings or ideas of another person, either in whole or in part, without proper attribution to the author or the source. Copying anything from any source is plagiarism if the source is not clearly cited. Plagiarism is stealing someone else's ideas and presenting them as your own.
3. **Collusion**, such as engaging in unauthorized collaboration on exams or assignments, completing for another student any part or the whole of an exam or assignment, or procuring, providing or accepting materials that contain questions or answers to an exam or assignment to be given at a subsequent time.