

BIMM 120: Microbiology, Winter 2017

Tu & Th 5:00 PM – 6:20 PM; 242 Galbraith 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 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 will not exactly match class periods or weeks)

There are NO alternate exams. Put exams on your schedule. 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 9 | Homework 1 due | |
| 5 | Bacterial viruses (phage) | Chapter 6, 11.1 |
| Tu, Feb 14 | 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 9 | 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 23 | FINAL EXAM 7:00p-9:59p, ?242 Galbraith Hall? | Weeks 6-10 (75 questions: 50 new plus 25 comprehensive) |

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

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 very 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://triton.ed.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 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. The **Discussions tool** is for students to answer each other's questions, and is monitored by IAs who will also answer questions. The discussions are not necessarily monitored by the instructor unless an IA reports a question or problem that needs to be addressed by the instructor.

Required textbook: Microbiology, 3rd ed., Slonczewski & Foster (ebook, paperback, or loose-leaf textbook). The 2nd ed. is okay, or even another microbiology textbook or a free online textbook, but students are responsible for correlating the info and figures with the lecture material. The ebook access code is not essential, but I prefer reading the enhanced ebook. A few copies of the textbook will be available on reserve at the Biomedical Library.

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/>

Instructor: Dr. James W. Golden

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

Email: jwgolden@ucsd.edu (For official correspondence. 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 10-15 minutes; Tuesdays, 3:00-4:00 PM in 4832 AP&M (or 4882 AP&M conference room); or by appointment (just call or send email with a few suggested times to meet)

Instructional Assistants (IAs)

| IA Name | Email | Office Hour | Location |
|-------------------|--|-------------|---|
| Rashini Jayaratne | rrjayara@ucsd.edu | W 4:00 PM | Mandeville Coffee cart |
| Linh Le | ltl003@ucsd.edu | Th 3:30 PM | Price Theater Lounge |
| Sean Paknoosh | spaknoos@ucsd.edu | Th 11:00 AM | Muir Woods Coffee House |
| Eammon Riley | epriley@ucsd.edu | M 2:00 PM | NSB 4 th floor Scholarly Activity Room |
| Andrew Sher | awsher@ucsd.edu | Tu 11:00 AM | Muir BIO 3266 |
| Thu Vuong | tavuong@ucsd.edu | W 3:00 PM | Hi Thai |
| Morgan Wright | mkwright@ucsd.edu | Th 6:30 PM | Pacific Hall 3rd floor Neurolounge |

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

| Section | Day & Time | Location | IA Name |
|---------|------------------|--|-------------------|
| A01 | M 8:00a-8:50a | CENTR 207 | Thu Vuong |
| A02 | M 7:00p – 7:50p | HSS 1305 | Rashini Jayaratne |
| A03 | M 8:00p – 8:50p | HSS 1305 | Rashini Jayaratne |
| A04 | W 2:00p – 2:50p | SEQUO 147 (all 147 moves to 148 on Jan 23) | Eammon Riley |
| A05 | W 3:00p – 3:50p | SEQUO 147 | Andrew Sher |
| A06 | W 4:00p – 4:50p | SEQUO 147 | Andrew Sher |
| A07 | Th 7:00p – 7:50p | CENTR 217B | Morgan Wright |
| A08 | Th 8:00p – 8:50p | CENTR 217B | Morgan Wright |
| A09 | F 8:00a-8:50a | CENTR 207 | Linh Le |
| A10 | M 9:00a-9:50a | WLH 2206 | Sean Paknoosh |
| A11 | M 10:00a-10:50a | WLH 2206 | Eammon Riley |

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*, but is not required. 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 IA office hours if space is available.

Exams and final course grade:

Exams will include questions on information presented in the lecture slides based on the textbook, the in-class lecture on those topics (and possibly current topics that are covered in detail), the textbook sections related to the lectures, and 1 or 2 questions related to the homework assignments. Exams will consist of multiple-choice questions. There will be one midterm exam (50 questions, 100 points), one final exam (75 questions, 150 points), and two written homework assignments (10 points each). The total points possible is 270. Most exam questions will require an *integrated understanding* of the material, not just memorization of facts. Final grades will be based on the percentage of total points for the midterms, the final, and the homework assignments. There are no extra-credit assignments.

There are **NO** alternate exams for conflicts with other classes. Make sure your classes have NO exam conflicts, including the final exam.

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. 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 ($\text{points-earned} / 270 \times 100$ 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. Grades **cannot** be changed for individual students for any reason. To be fair to all, the instructor **cannot** deviate from the syllabus 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, and there are usually more than 25%

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.

The instructor must be completely fair to ALL students in the class and **cannot** under any circumstance give special consideration to an individual student. In a large lecture class, there will always be students who just miss a higher grade at each cutoff score and it is impossible to change this.

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, the exam key will be posted on TritonEd, usually within 24 hours after the exam.

Do not cheat! *Disciplinary steps will be taken when cheating is discovered. These steps will include failing the exam, and therefore the course, and being reported to the appropriate university authorities.*

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 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 clearly 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. Discussion of inquiries about exam questions is done only at office hours and not by email.

Scantrons are not returned. The scantron scanning service itself has never made an error. But, scantrons occasionally are graded with the wrong key. If you are sure that something must be wrong with your score, then discuss your concern with the Instructor.

How to study and prepare for the exams:

1. Attend lectures or listen to the podcasts. 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 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 you were expected to have 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, 10 points each):

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. A scientific paper and homework questions directly related to the paper 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 usually do not need to read all of the supporting materials or appendixes. Your answer(s) to the homework question(s) should occupy no more than **1 side of 1 page**, total. The format should be single-spaced, 1 inch margins, 11 pt Arial or equivalent. Your answer page must have your **name**, **PID**, and **signature**. 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, which is your assurance that your answers are your own work.

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 may be checked by Turnitin.com.

HW grading will be done with a rubric/key developed by the Instructor and IAs, and by comparison to the best student homework answers, 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. Your answers may require a brief explanation of how or why the answer addresses the question. 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. The IAs carefully assign scores for the homework answers, but are not asked to mark corrections or make annotations. An answer key will be posted on TritonEd. If you are sure that there must be a problem with your score, contact the instructor.

General guidelines for reading the papers:

Research papers are written for people who already know something about the subject matter. You may need to look up information to understand the paper. Read the homework assignment and the research paper quickly before attending an IA discussion section to hear your IA's summary of the paper and to ask questions about the paper. You are not expected to understand everything in these primary research articles, but you should pay attention to the following as they relate to the homework questions:

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.

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!

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.