

BIMM 120: Bacteriology – WINTER 2010 (SECTION ID 673284)

DR JAMES W. GOLDEN

2722 York Hall – Tues & Thur 6:30 – 7:50 PM

BIMM 120. Bacteriology (4)

A discussion of the structure, growth, molecular genetics, and physiology of procaryotic (prokaryotic) microorganisms, with emphasis on the diverse activities of bacteria and on the interaction of various bacterial species with their environment. Three hours of lecture and one hour recitation. **Prerequisites:** Chem. 140A; Chem. 140B; BIBC 100 or BIBC 102 (may be taken concurrently).

Expanded Prerequisites: To do well in BIMM 120 you should have a strong background in general biology and in organic chemistry. Two quarters/semesters of organic chemistry are important prerequisites. Students should know basic cell biology, molecular biology, and genetics. It is assumed that students know the basic structures and properties of all molecules found in cells. Students may need to study and review Chapters 3, parts of 5, and 7, which will not be covered in lecture.

Class Schedule (approximate, topics will not exactly match class periods)

Readings: includes text, figures & figure legends, tables, and sidebars

DATE	TOPIC	READINGS
Tu Jan 5	1. Overview of microbiology & bacteria	Chapter 1
Th Jan 7	2. Microscopy and basic cell structure	Chapter 2
Tu Jan 12	3. Cell structure	Chapter 4
Th Jan 14	4. Cell structure	Chapter 4
Tu Jan 19	5. Nutrition & Metabolism	Chapter 5.1-5.3, 5.10, 5.14 Research article 1 (TBA)
Th Jan 21	6. Growth	Chapter 6
Tu Jan 26	7. Regulation of gene expression	Chapter 7.10 and 9.1-9.11
Th Jan 28	8. Bacterial development	Chapter 9.12-9.13, 15.7, 16.6-16.7 Paper 1 homework due
Tu Feb 2	9. Archaea	Chapter 17
Th Feb 4	10. MIDTERM EXAM	Topics 1-9
Tu Feb 9	11. Bacterial genetics	Chapter 11
Th Feb 11	12. Bacterial genetic engineering	Chapter 12
Tu Feb 16	13. Bacterial evolution & systematics	Chapter 14
Th Feb 18	14. Metabolic diversity	Chapter 20
Tu Feb 23	15. Metabolic diversity	Chapter 21 Research article 2 (TBA)
Th Feb 25	16. Bacterial ecology	Chapters 22 & 23
Tu Mar 2	17. Industrial microbiology & Biotechnology	Chapters 25 & 26
Th Mar 4	18. Microbial growth control	Chapter 27 Paper 2 homework due
Tu Mar 9	19. Microbial interactions with humans	Chapter 28
Th Mar 11	20. Microbial diseases	Chapters 34.1-34.2, 35.4, 35.7, 36.5, and 37.4-37.6
Tu Mar 16	FINAL EXAM 7:00 PM-9:59 PM, LOCATION TBA	TOPICS 11-20

Lectures: 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 and by not talking and avoiding other distracting activities in class.

Class web site: <http://webct.ucsd.edu/>

The class web site contains links to the syllabus, lecture presentations, practice exam questions, assigned research papers, and is used for submitting the homework assignments. The Discussions tool is monitored by TAs but not by the Instructor unless a TA reports a problem that needs to be addressed.

Required textbook: "Brock Biology of Microorganisms" (12th ed., 2009) by Madigan, Martinko, Dunlap, and Clark; either the hard cover or loose-leaf version.

Several copies of the textbook will be available on reserve at the Biomedical Library.

Textbook web site: <http://www.microbiologyplace.com/>

You are strongly encouraged to use the textbook web site as a learning resource. Please explore it.

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

Microbiology related websites:

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

Small Things Considered: <http://schaechter.asmblog.org/schaechter/>

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

National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/guide/>

Instructor

Dr. James W. Golden

Email: jwgolden@ucsd.edu

Office hours: Friday, 9:30-10:30 AM (or by appointment) in 4882 AP&M conference room

Office: 4832 AP&M (Applied Physics & Mathematics)

Phone: (858) 246-0643

Teaching Assistants (TAs)

TA Name	Email	Office Hours	Location
Megan Glasheen	mglashee@ucsd.edu	W 10:00 - 10:50 AM	Geisel S&E Library 1 st floor
Jasmine Kim	jyk018@ucsd.edu	Th 5:00-5:50 PM	CLICS
Ohmin Kwon	m0kwon@ucsd.edu	F 5:00-5:50 PM	Price Center TBA
Trevor Parry	tparry@ucsd.edu	W 9:00 - 9:50 AM	2130 Pacific Hall
Timothy Shaw	tshaw@ucsd.edu	F 10:00 - 10:50 AM	CLICS
Yekaterina Tarasova	ytarasov@ucsd.edu	M 5:00-5:50 PM	Geisel S&E Library 1 st floor

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

#	Time	Location	TA Name
A01	M 11:00 - 11:50 AM	CENTR 207	Timothy Shaw
A02	M 4:00 - 4:50 PM	CENTR 218	Yekaterina (Kat) Tarasova
A03	M 5:00 - 5:50 PM	CENTR 201	Trevor Parry
A04	M 6:00 - 6:50 PM	CENTR 205	Trevor Parry
A05	Tu 5:00 - 5:50 PM	CENTR 205	Jasmine Kim
A06	F 3:00 - 3:50 PM	CENTR 203	Ohmin Kwon
A09	W 9:00 - 9:50 AM	CENTR 220	Megan Glasheen
A10	F 4:00 - 4:50 AM	CENTR 203	Ohmin Kwon

Attending a discussion section each week is *highly recommended*, but is not required. TA's will answer questions, review class material, review for exams, and discuss and answer questions about the papers.

Students may attend any discussion section, but if your preferred section is too crowded, then it would be best to attend a different section.

Exams and final course grade:

There will be one midterm exam (120 points), one final exam (120 points), and two written homework assignments (20 points each). 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 midterm, the final, and the homework assignments. There are no extra-credit assignments.

There are no scheduled make-up exams. Make-up exams are decided case-by-case and require an authorized excuse and may be an oral exam administered by the Instructor or a TA. If you miss an exam, you must contact the instructor within **24 hours**.

The grade earned for the course will be based on a straight scale of the percentage of total possible points (points earned / 280 x 100) with cutoffs as shown below.

A+	A	A-	B+	B	B-	C+	C	C-	D	F
97	93	90	87	83	80	77	73	70	60	<60

There may be an adjustment to the grade scale to be more lenient, but your grade will not be lower than specified by the above scale. The class average for this course is typically a B-.

Exams:

You must bring your student ID and a #2 pencil for exams. Exam forms will be provided. No calculators are required or allowed. All personal items must be closed and placed on the floor. Make sure your phone is turned off.

Each exam will consist of 60 multiple-choice questions, and will include questions taken from the lecture and the textbook readings, and one or two questions related to the research articles. Always choose the *best* answer. There should be *one best* answer for each question. The exam key will be posted to WebCT, usually within **24 hours** after the exam.

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

After the exam: If you are sure that the exam key is clearly wrong, then, within **24 hours** after the key is posted, prepare a written explanation, with documentation (reference to the textbook), and deliver the query to your Instructor via email. *Just one written inquiry, and no verbal inquiries, will be considered for each exam, from each student.*

If we find that a question has more than one answer or should be discarded after the exams have been graded, then all of the exams will be re-graded using the corrected answer key.

To prepare for the exams:

1. Attend lectures! Many questions will come directly from the lectures.
2. Read the related material in the text. These readings will reinforce the lectures and provide information that is necessary to understand and integrate the information provided in lecture.
3. Attend section regularly, as you will be able to ask questions about the lectures and papers.
4. Study the textbook Mini Reviews, Review of Key Terms, Review Questions, and Applications Questions.
5. Use the textbook web site to better understand the material.
6. Do not cheat! *Disciplinary steps will be taken when cheating is discovered. These steps may include failing the exam and being reported to the appropriate authorities.*

In past years, the students who do best regularly attended lectures and discussion sections, read the textbook, and read the research articles before attending discussion sections.

Homework written assignments (20 points each):

Scientific research articles are the basis for scientific progress and information exchange, and for the information in textbooks and science classes. Scientists use scientific methods and logic to obtain 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. As a student, reading scientific articles is important to understand scientific methods and the source of the information you are learning.

For the homework assignments, you will be given one or two questions related to the research article and asked to write a short essay for each one. The answer(s) to the question(s) should be single-spaced and occupy no more than 1 side of 1 page, total. The questions will be posted on the web site and the homework answers must be turned in at class AND uploaded on the web site prior to midnight on the due date. The printed answer page 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 discussion sections and with your classmates, you must write your own homework answers independently. By submitting a homework assignment you are certifying that it is exclusively your own work. All homework answers will be checked by Turnitin.com.

Research article 1:

López D, Vlamakis H, Losick R, & Kolter R (2009) Cannibalism enhances biofilm development in *Bacillus subtilis*. *Molecular Microbiology* 74(3):609-618.

<http://www3.interscience.wiley.com/journal/122604922/abstract>

Research article 2:

Lartigue C, et al. (2009) Creating Bacterial Strains from Genomes That Have Been Cloned and Engineered in Yeast. *Science* 325(5948):1693-1696.

<http://www.sciencemag.org/cgi/content/abstract/325/5948/1693>

General guidelines for reading the papers:

Familiarize yourself with the related topic:

Research papers are written for people who already know something about the subject matter. Read the related material in the textbook or other sources to familiarize yourself with the subject matter.

Attend lectures to hear a summary of the paper and to obtain background information.

Read the paper before attending a discussion section after the paper is assigned to hear your TA'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 try to answer the following questions as you read the papers:

1. What questions were addressed in this paper?

Frequently the introduction (or the first few paragraphs of Science and Nature articles) will present background information and raise the questions that will be addressed in the paper.

2. What were the main conclusions from the paper?

The main conclusions will be summarized in the abstract, and further presented in the discussion/conclusion section. Why were these conclusions important?

3. What experiments were performed to answer these 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:

How was the experiment done? (But you are not expected to understand all of the details in the methods.) What do the data show? What conclusion did the experiment allow? What were the control samples or conditions? Were there caveats or concerns related to the experiment? Were there alternative explanations for the data? Were there experiments that ruled out these alternatives?

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.

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://www.ucsd.edu/current-students/academics/academic-integrity/official-policy.html>

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.
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.