

BIOL 350: General Microbiology –Syllabus Fall 2009

BIO 350 is an upper division course on Microbial Biology consisting of both lecture and laboratory. The course will cover eukaryotic and prokaryotic microbes and viruses, but will emphasize bacteria. This course will provide a conceptual and experimental background in microbiology sufficient to enable students to take more advanced courses in related fields.

Instructors:	Kelly Doran, Ph.D.	Scott Kelley, Ph.D.
Office:	NLS 317	LS 373
Email:	kdoran@sciences.sdsu.edu	skelley@sciences.sdsu.edu
Phone:	(619) 594-1867	(619) 206-8014
Lecture:	MW 12:00 – 12:50, HH 221	
Office hours:	Wed 1 – 2:30 PM or <i>by appointment</i>	<i>by appointment</i>

Please Write 350 and your lab section in the subject line of email messages to the instructor

Student Learning Outcomes

At the end of this course you will be able to:

- Compare and distinguish the basic groups of microbes, including prokaryotic microbes (Archaea, Bacteria), and Viruses, and eukaryotic microbes.
- Understand the processes needed for one bacterium to become two, and understand the mechanisms involved.
- Compare and contrast major pathways of catabolism, specify the relative energy yield from each pathway, list the key products of each pathway, and describe biochemical pathways used for microbial taxonomy.
- Compare and contrast major pathways of biosynthesis and list the key products of each pathway.
- Draw a typical microbial growth curve, and predict the effect of different environmental conditions on the curve.
- Compare and contrast eukaryotic and prokaryotic genomes, and gene expression in each group.
- Compare and contrast the acquisition of novel genetic information in microbes via mutations and genetic exchange, specifically conjugation, transformation and transduction,
- Specify the role of microbes in global C, N, S, and P cycles, and list examples of microbes that contribute to key metabolic aspects of these cycles.
- List different types of symbiotic interactions between microbes and other organisms, including commensalism, mutualism, and parasitism, and provide examples of each.
- Summarize common features of microbial pathogens, with emphasis on bacterial and viral pathogens.
- Summarize mechanisms of animal defenses to infection, including primary defenses, innate immunity, and acquired immunity.
- Compare and contrast beneficial and harmful uses of organisms, including applications in biotechnology and bioterrorism.
- Have a solid grasp of the scope of the microbial world and its role in shaping this planet and all its inhabitants

Prerequisites: This course requires that you have taken the following courses (or equivalent) in biology and molecular biology (BIOL 201A [now 203 & 203L], 201B [now 204 and 204L]), chemistry (CHEM 231 [now 232 and 232L]), and you have completed the lower division writing competency requirement. If you have not fulfilled these prerequisites you will be dropped from the class. You may not take them concurrently with BIOL 350.

Website: Notices and supplemental materials will be posted on the BlackBoard website “<https://blackboard.sdsu.edu/webapps/login>”. Check this website regularly for updates.

Textbook: The textbook for this course is *Microbiology: An Evolving Science* (W. W. Norton, Inc.) by Joan Slonczewski and John Foster. The textbook will be used as a resource for both the lecture and lab portions of this course. Pages of the textbook that correlate with the corresponding lecture topics are listed on the Lecture schedule. Reading the textbook may help you understand and be able to apply concepts presented in class but, unless specifically noted in class, you will not be tested on topics that are not discussed in the lecture or lab, or included in handouts or supplements on the course website.

Study Space: <http://www.wwnorton.com/college/biology/mbio/welcome.asp>. Provides resources to help you master the material in your textbook, and earn better grades. This includes access to Process Animations, Study Plans, Summaries, Flashcards, and Diagnostic Quizzes. Additionally the textbook is available as an **ebook** at 2\$ per chapter.

Lecture exams: There will be 2 midterm exams and one final exam each worth 100 points. No make-up exams will be given. If you believe a question on your exam was incorrectly graded, you must contact the instructor within one week of the day the exam was returned – no considerations will be made after this one week window.

Use of cell phones, books, notes, or calculators will not be allowed during exams. The exams will concentrate on the material covered in lectures, handouts, and assigned readings. Because the lab and lecture are closely related, some concepts from labs can be included in each lecture exam. The exams will be short answer or multiple choice questions, given during the regularly scheduled class times. Exams will be promptly graded and returned. Answers for the exams will be posted on the course BlackBoard site after the exams are graded. The Final exam will not be returned, but you may make an appointment to peruse your exam if desired.

Course grades: Course grades will be based upon a total of 600 points; 300 points for the lecture and 300 points for the lab. The distribution of points assigned in the lab is described in the BIOL 350 Lab syllabus. The final grade will be based upon the percentage of total points obtained using the following scale:

Scale:	B+: 88-89%	C+: 78-79%	D+: 68-69%	F: <59%
A: 93-100%	B: 83-87%	C: 73-77%	D: 63-67%	
A-: 90-92%	B-: 80-82%	C-: 70-72%	D-: 60-62%	

The percent cutoff for a grade may be lowered but will not be raised.

Class etiquette: Please be considerate of your neighbors *and* the lecturer. Abstain from distractions such as carrying on conversations or entering and exiting during lectures. Cell phones must be turned off during the lecture and lab. If you must be available for a potential emergency, set your phone to vibrate.

Special accommodations: To request disability accommodations, please make an appointment to speak with the instructor at the beginning of the semester.

Studying: How should you study for this course? Go over your lecture notes after each lecture, while the material is still fresh on your mind. Although some memorization is invariably necessary when learning a new "language", the goal of learning is to understand the information, not to simply memorize a bunch of disconnected "facts". A major purpose of studying is to discover what you don't understand so that you can do something about it. Don't just passively read the notes, think about them and ask yourself questions about them. Do you understand what was said? Does it make sense and why? Compare and contrast the new information with things that you have already learned. Some people find study groups very helpful for the learning process.

Keep up regularly. You can't cram all of the information into your brain the night before an exam, and we may not be available to answer your questions at the last minute. For this upper division lecture and laboratory course – you should plan to spend at least 6 hours per week OUTSIDE of class studying for this course.

Use the Norton Microbiology Study Space!

<http://www.wwnorton.com/college/biology/mbio/welcome.asp>.

Taking notes: Attending class regularly and keeping good notes is essential for success in this course. Good notetaking is an acquired skill. Don't try to write full sentences – you will be so busy writing that you may miss the next point and your notes will be harder to study. Instead of writing down every word during lecture, write down key phrases and use short abbreviations. Some useful abbreviations are listed below, and of course you can make up your own.

=	equals, the same as	w/o	without	mut	mutagenesis
≠	not equal to, different	[]	concentration	prot	protein
≈	approximately equal to	E	energy	S	substrate
↑	increased	AA	amino acid	P	product
↓	decreased	NA	nucleic acid	ss	single-stranded
<	less than	bp	base pair	ds	double-stranded
>	greater than	Kb	kilobase	φ	phage
Δ	change	Mb	megabase		
w/	with	enz	enzyme		

Additional Resources:

The Microbe blog by Dr. Schaechter's "Small Things Considered":

<http://schaechter.asmblog.org/schaechter/>

Todar's Online Textbook of Bacteriology: <http://www.textbookofbacteriology.net/>

Enrichment Activities:

- Consider attending the **Microbiology Journal Club** Fridays at Noon in the BioScience Center, Gold Auditorium.
- Consider attending meetings of the **San Diego Microbiology Group** at Scripps Institute of Oceanography the 3rd Wed of every month at 6 pm (pizza included).

State Budget Cuts Cause Faculty Furloughs:

CSU Employee Furloughs - Impact on Classes

This year across this campus and around the CSU system some class days will be cancelled because of furloughs. A furlough is mandatory un-paid time off; faculty and staff on each CSU campus are being "furloughed" two days per month.

These cancelled class days are marked on the schedule. It is important to recognize that these days off are not holidays. Instead, they are concrete examples of how massive state budget cuts have consequences for you as students and for me as a faculty member.

The CSU has suffered chronic under-funding for at least 10 years. This year the budget cuts are the worst in the history of the CSU system -- \$584 million or 20% of our budget.

The CSU administration is attempting to deal with these cuts with huge increases in your student fees (32%), elimination of your classes, and lay-offs of faculty and other university employees.

In addition to paying higher fees, you will be affected by reduced services and classes. The library will have shorter hours. Many campus support services will be decreased or eliminated. It will be more difficult to get signatures to meet deadlines. Classes you need may have been cut from the class schedule or are full. The faculty furlough prohibits faculty members from teaching, being on campus, doing research, and consulting with students on two days per month. Furlough days are listed on the schedule.

On those days, classes and office hours are cancelled and telephone and e-mail messages will not be answered. *You will still be responsible for material listed in the schedule.*

To avoid faculty and staff furloughs at SDSU in the future, you may want to contact your legislators in Sacramento so that they better understand how cutting the state budget for higher education affects your education and your future.