BIOL 350: General Microbiology – Spring 2005

BIOL 350 is an upper division course on Microbial Biology. 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.

Student Learning Outcomes – At the end of this course students will be able to:

- Compare and contrast basic groups of microbes, incuding Eukaryotic microbes, Archae, Bacteria, and viruses.
- Compare and contrast major pathways of anabolism and list the key products of each pathway.
- 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.
- 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.
- Draw typical microbial growth and killing curves, explain the rationale for the shape of the 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.
- 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.
- Compare and contrast examples of beneficial and pathogenic microbe-plant and microbe-animal interactions.
- 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.

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

Office hours: Mon 1-2 and by appointment; additional review sessions TBA prior to exams

Prerequisites: This course will assume that you have a basic knowledge of biology and molecular biology (as taught in BIOL 201, 202, 215), chemistry (through CHEM 231), and you have completed the lower division writing competency requirement.

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

Textbook: The text for this course is Microbiology (6th edition) by Prescott, Harley, and Klein. 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 course syllabus. 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.

Lecture exams: There will be 3 exams worth 100 points each and a cumulative final exam worth 100 points. The lowest score on any of these four exams may be dropped. No make-up exams will be given – if you miss an exam, that exam will be dropped. If you believe a question on your exam was incorrectly graded, you must contact the instructor within two weeks of the day the exam was returned – no grade changes will be made after this two week window.

Use of 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 will be included in the lecture exams. The exam format will be described in class prior to each exam. The exams will be short answer or multiple choice questions, given during the regularly scheduled class times. Midterm exams will be promptly graded and returned. Answers for the midterm exams will be posted on the course BlackBoard site after the exams are graded. Final exams will not be returned, but you may make an appointment to peruse your exam if desired.

One-minute writes: "One-minute writes" are short written responses to questions occasionally posed during class. Each one-minute write that you turn in will recieve 1 point, whether or not the answer is correct. The important point is that you think about the question and try to answer it. However, to recieve credit the one-minute write must be turned in during the class when the question is posed. The answers to one-minute write questions will be discussed in class, but the answers will not be posted on the web and the answers will not be returned.

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 lecture total will include exam scores and one-minute write scores. 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:

A > 90%; B = 80-90%; C = 70-80%; D = 60-70%.

Plus and minus grades will be assigned within the indicated ranges. The percent cutoff for a grade may be lowered but will not be raised.

Class etiquette: Please be considerate of your neighbors. 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 I may not be available to answer your questions at the last minute. As a rule of thumb you should spend at least 2 hours per week studying for every credit hour. This is particularly important 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.

Exams from previous semesters will be posted online to give you an idea of the types of questions that may be asked. You may find it useful to go over the previous exams for practice, but remember that new exam questions will be used each semester and the order that particular topics are discussed in class may differ from semester to semester, so the format and topics covered on the exams may be different from previous semesters.

Taking notes: We could post the lecture notes online or you could photocopy a friend's notes, but people remember better if they listen attentively and actively write down what they hear. Therefore, 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, but there is nothing wrong with making up your own.

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