BIOL 350 Syllabus – GENERAL MICROBIOLOGY – Spring 2009

BIOL 350 is a four-unit course consisting of lecture (two units) and laboratory classes (two units). It is an upper division course on Microbial Biology. Although it will include the study of both prokaryotic and eukaryotic microorganisms, and viruses, the main emphasis will be bacteria. The course is intended to provide basic knowledge in Microbiology and students will gain both background and experimental experience in the broad field of Microbes, setting the foundation needed for more advanced and specialized courses.

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Classroom: HH 221

Important: Please write BIOL 350/ section # of your lab in the subject line of your E-mail

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Student learning outcomes:

At the end of BIOL 350 students will be able to:

- Compare and distinguish the basic groups of microbes, including Bacteria, Archaea, Eukaria and Viruses.
- Compare gram positive and negative bacteria and draw their basis membrane structure.
- Learn and understand the need for energy source in the microbial world.
- Study and differentiate between the major pathways of anabolism and list their key products.
- Study and differentiate between the major pathways of catabolism and list their key products.
- Learn and understand the yield of catabolic pathways at the energetic level.
- Study the processes needed for one bacterium to become two, and understand the mechanisms involved.
- Draw the typical bacterial growth curve and predict how the curve will be altered due to environmental changes.
- Study the microbial genome and understand how adaptation works through genomic exchange or mutations.
- Compare prokaryotic and eukaryotic genomes, and understand how their differences influence gene expression.
- Understand the symbiotic interactions between microbes and other organisms, and list examples of commensalism, mutualism and parasitism.
- Compare microbial pathogens and
- Describe the life cycle of HIV-1 and pinpoint the steps that we can target for therapy.
- Study the interrelationship between host and infectious agent and compare innate versus acquired immunity.
- Understand the importance of microorganisms in biotechnology and list examples of organisms exploited for ‘good’ and for ‘bad’.

Special needs: If you are in need of any disability accommodation, please contact the instructor at the beginning of the semester.

Office hours: Office hours will be set by appointment only, either by phone or E-mail. I would like to install to types of appointments:
- For questions or issues regarding material taught in class (Please specify '**for class issues**')
- For private / personal issues (Please specify '**for personal issues**')

This will allow me to set up a non-necessarily-private meeting on one hand, and a private meeting on the other. In the former, students with 'class' related questions can gain from each other questions. The latter will ensure that confidentiality is not compromised.

Prerequisites: The General Microbiology course assumes you do have some basic background in Biology and Molecular Biology. Courses such as BIOL 201, 202, 215 and CHEM 231 will help you go through BIOL 350 smoothly. Completion of lower division writing competency is required.

Course announcements and updates: Announcements and any supplementary material will be posted on Blackboard (https://blackboard.sdsu.edu/webapps/login). It is the responsibility of the student to check Blackboard regularly for updates.

Textbook: The lectures will be based mainly on 'Microbiology, an evolving Science' by Slonczewski, JL and Foster, JW. 2009. For additional reading: 'Microbe' by Schaechter M, Ingraham JL and Neidhardt FC from ASM Press 2006, is recommended. Several copies of the book are available in the bookstore. Material not appearing in the books will be posted when needed.

Classroom: The classroom assigned for this course is Hepner Hall, HH 221. It is a 'smart' class. The use of 'clickers' will be considered by the instructor in the first day of class.

Learning, or 'how should I learn?': This is not a class on 'learning skills'. Learning and the learning process is a very personal issue. However, it is a process that can be learned by itself and improved with time. It is relevant for Microbiology or Computer Science, Theater or Dance or choosing the right restaurant. But some advice can be given. Read the material you are asked to read, read before class rather than afterwards, you will enjoy the class more. Read in order to know, not to 'finish your homework', read in order to open your mind, read for yourself and not for the instructor. If you do it this way, your chances of getting an 'A' is greater and the class will be more enjoyable.

Taking notes: Notes could be posted online. But they will not. By attending the class, by taking your own notes, you will discover that you will be more focused. But do not try to 'copy-paste' the lecture. It is unnecessary. And a waste of your time! Pictures, diagrams, tables, and so on, will generally be found in books or literature. Taking notes means just that, 'taking notes'. Abbreviate when possible. Here are some abbreviations that you can adopt and might find useful:

=	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	trx	transcription
Δ	change	enz	enzyme	tln	translation
w/	with	mut	mutagenesis		

Exams: 'Exam' is the most frightening word for all. Frightening is not the purpose though. Exams help you recapitulate the concepts and ideas taught during the course. They oblige you in pursuing a good strategy for learning, adopting serious homework strategy and keeping in touch with the material. Try eliminating the negative connotation of the word and it will become easier.

There will be four exams during the course, three midterms (one at the end of each month) and one final exam, as posted in the lecture schedule. The General Microbiology course is assigned a total of 600 points, 300 from the lecture class and 300 from the laboratory class. Each of the exams for the lecture class is assigned 100 points. You can drop one of your midterm exams, **but not the final exam**. You are obliged to attend all the exams. Dropping an exam means here choosing to drop the midterm exam with the lowest score. If for any reason, you were not able to attend one of your midterm exams, this will be your 'dropped' exam, and obviously you will not be able to choose to drop any of the remaining exams. Only medical, extreme personal reasons and religious observance will be accepted as valuable excuses.

Exams will be promptly checked and graded. They will be composed of questions that request very short answers and/or multiple choice questions. Because Lecture and Laboratory are interconnected, exams might include questions from both 'arenas'. In case of you feeling that you were wrongly graded, please contact the instructor **within the first week** following the exam, and not later.

Cell phones, books, notes, calculators or any other 'smart' device will be absolutely restricted during exams. You will not have to calculate complicated equations anyhow so do not worry about that! Make sure not to drink excessively before the exam as you will not be able to leave the classroom for a trip to the bathroom (sorry).

Course grades: As mentioned above, the lecture class will be given 300 points total. **(For information on laboratory grades please see the laboratory manual and syllabus).** Although the total amount of points from the exams will be equal to 300, you will have the opportunity to gain some extra credit by answering some questions during the class or attending seminars (yet to be determined). This points will give you the opportunity to improve your course final grade, unless you got already a perfect 'A' (100%) in your exams. The grade scale will be as following:

A+: 98-100%	B+: 88-89%	C+:78-79	D+:68-69%	F: Less than 59%
A : 94-97%	B : 84-87%	C :74-77%	D :64-67%	
A-: 90-93%	B-: 80-83%	C-:70-73%	D-:60-63%	

(Please note that both A+ and A will be actually 'A').

Behavior in class: As they say, treat your neighbor as you would like to be treated in return. The same concept applies in class too. Respect your classmates and your instructors, and your classmates and instructors will respect you in return. Cell phones and other 'disturbing' technology will be forbidden during classes. If you need your cell phone for emergencies, please keep it on 'vibration mode'.

Dishonesty: Dishonesty is self-explanatory. You do know what it is and the instructor does not feel the need to explain. Cheating in an exam is part of it, You know it, so simply avoid it. If you are found cheating (and the instructor always finds out) you will get automatically an 'F'. It will be a tremendous pity. Remember! Do not throw away three beautiful months of study for a stupid moment of self-destruction. If you understood the syllabus of this course you know that you will not need to cheat, because you simply will not want to. Remember, you do not cheat the instructor, you cheat yourself. So again, avoid it!

Feedback: The instructor will always love to hear any comments regarding the class, whether positive or negative. Please, do not be afraid of sending your constructive comments any time to wish during the course. They will, by no means, influence your grade. This feedback has nothing to do with the official and anonymous student evaluation that you will be asked to fill anyway after the last class of the course. Most importantly, remember, the instructor can learn too!

Instructor: Roland Wolkowicz **BIOL 350 Lecture Schedule Spring 2009**

#	Instructor	Date	Topic	Chapter
1	RW	Mon Jan 26	Course overview / Intro to Microbiology / History	1,**
2	RW	Wed Jan 28	Microbial cell biology	2,3
3	RW	Mon Feb 2	On the surface of the prokaryotic cell	2,3
4	RW	Wed Feb 4	Prokaryotic cell growth	4,5
5	RW	Mon Feb 9	When one cell becomes two	7
6	RW	Wed Feb 11	Inheritance and gene expression	8,9
7	RW	Mon Feb 16	Regulation of gene and protein expression	8,9,10
8	RW	Wed Feb 18	Adaptating to the environment	10
	RW	Mon Feb 23	**EXAM #1**	
9	RW	Wed Feb 25	Differentiation and development	4,10,18
10	RW	Mon Mar 2	Microbial diversity / Taxonomy	17,18
11	RW	Wed Mar 4	Fuel through fermentation	13,14
12	RW	Mon Mar 9	Fuel through respiration	13,14
13	RW	Wed Mar 11	Ecology and the biogeochemical cycles	21,22
14	RW	Mon Mar 16	Symbiosis and its types	21,**
15	RW	Wed Mar 18	Archaea	19
16	RW	Mon Mar 23	Eukarya - Fungi and Protozoa	20
	RW	Wed Mar 25	**EXAM #2**	
	RW	Mon Mar 30	Spring recess	
	RW	Wed Apr 1	Spring recess	
17	RW	Mon Apr 6	The microbe as a pathogen	25
18	RW	Wed Apr 8	Toxins and their secretion	25
19	RW	Mon Apr 13	Innate and acquired immunity	23,24
20	RW	Wed Apr 15	Viruses, viroids and prions	6,11
21	RW	Mon Apr 20	The bacterial virus: The bacteriophage	6,11
22	RW	Wed Apr 22	Retroviruses - HIV-1, the cause of AIDS	11,**
23	RW	Mon Apr 27	Fighting microbes: Antibiotics and vaccines	27,28
	RW	Wed Apr 29	**EXAM #3**	
24	RW	Mon May 4	Biotechnology: Microorganisms for food	16
25	RW	Wed May 6	Biotechnology: Microorganisms for drugs, etc	16
26	RW	Mon May 11	Course synopsis	
	RW	Mon May 18	**FINAL EXAM 10:30-12:30pm**	

**** other sources**