

Syllabus: Biology 3100 – Microbiology – Fall 2009

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Office: 2093 Bailey Science Center

Office hours: Mon., Wed., Fri. 12:00pm – 12:50pm or by appointment

Class: Mon., Wed., Fri. 11:00-11:50am Bailey Science Center Rm. 2022

Laboratory: Section A (CRN 81605) - Mon. and Wed. 1:00-2:25pm - Bailey Science Center Rm. 2068

Section B (CRN 81606) – Mon. and Wed. 3:00pm-4:25pm – Bailey Science Center Rm. 2068

Required texts (all available at the bookstore):

- 1.) **Brock Biology of Microorganisms, Twelfth Edition**
by Madigan MT, Martinko JM, Dunlap PV, Clark DP
Pearson 2009
- 2.) **Benson's Microbiological Applications, Complete Version, Eleventh Edition**
by Alfred E. Brown
McGraw Hill 2009
- 3.) **The Coming Plague: Newly Emerging Diseases in a World out of Balance**
by Laurie Garrett
Farrar, Straus and Giroux 1994

Course Description/Objectives: The objective of this course is to give you a foundation in microbiological concepts, as well as the laboratory skills required to answer a variety of microbiological questions (i.e. medical and ecological). This course will focus on concepts and critical thinking skills with emphasis on the scientific method. Supplementary scientific readings (both primary articles and reviews), lab reports and an oral presentation will be assigned in order to improve your critical thinking and communication (oral and written) abilities. In addition, at the end of this course, you should have an appreciation for the ubiquity and diversity of microbes, be able to apply your knowledge of microorganisms to real-life situations, and you should be able to evaluate various types of scientific reports. Specifically, you should be fully knowledgeable on aseptic technique, all lab techniques, the different types of microbes and their cell structures, various metabolic processes, dilution problems, DNA transcription, translation, replication, gene expression, mutation, and the basics of virology and immunology. **These objectives fall under the VSU General Education Outcomes #4, 5, 7 as well as the VSU Department of Biology Education Outcomes # 1, 2, 3, 4.**

Grading and assignments: In addition to the exams, lab quizzes, lab reports, homework assignments and the oral presentation, I will be giving a few short graded quizzes randomly during lab and lecture. The purpose of the quizzes is to motivate you to come to lab prepared, as well as to motivate you to study regularly. Lab participation points will come from lab attendance (see attendance policy below). Exams will include both lecture and lab material with an emphasis on lecture material. The exam format is varied. It will include short answer, drawing, labeling figures, completing tables, word problems, fill in the blank and some multiple choice questions. In addition, **exams II, III and IV will have a comprehensive component**, meaning that these exams will have content that was covered on previous exams. I will do this in order to insure that you learn key concepts that you may have missed previously. I do not post answer keys to my exams so you will have to see me in my office to go over previous exam questions. **You have only one week after you receive your exam to contest any grading errors or point miscalculations** so go through your exam right away. **There will be absolutely no make-up exams, labs, presentations nor quizzes! If you know that you will not be able to take an exam on the scheduled day, be sure to talk to me before the exam day and not after the exam.**

Exam I (M9/14)	150 pts	Grading scale:
Exam II (M10/12)	150 pts	900-1000 pts = A
Exam III (M11/9)	150 pts	800-899 pts = B
Exam IV (F12/11)	150 pts	700-799 pts = C
Lab quiz I	50 pts	600-699 pts = D
Lab quiz II	50 pts	< 600 pts = F
Lab report – I. D. of Unknown	50 pts	
Lab report – Winogradsky column	50 pts	
Oral presentation	75 pts	
Quizzes and homework	25 pts	
HIV assignment	25 pts	
Lab participation	75 pts	
Total	1000pts	

Attendance and tardiness:

In order to do well in this class, you need to come to class! This is not a straight lecture/textbook-based course so you will miss a lot of material and learning opportunities if you do not come to class. In particular, you must attend all of the laboratory (including oral reports) sessions. The lab/oral report sessions are vital to your understanding of the material. **You will get only one free absence. You will lose 7.5 pts for each additional lab session missed. More than six absences will result in failure of the course. If you come to all the lab sessions, you will receive 7.5 bonus points.** In addition, since you have limited time during the laboratory sessions, **you need to be on time for the lab sessions! Coming to the lab/oral report sessions late three times equals one absence.** If you have a family emergency or a medical excuse, please come talk to me and we will work something out.

Late assignments:

All assignments need to be in my office by 5pm on the due date. Late assignments will receive a maximum of half-credit.

Cheating/plagiarism:

Cheating and plagiarism will absolutely not be tolerated! Although you will be doing work in groups and with a lab partner, **you must write-up your work in your own words**; this is the only way to assess your learning. If I get two lab reports that look identical or nearly identical, both parties will fail the assignment. You must also be diligent in citing all of your references, including websites.

Paraphrasing does not mean changing a word or two; if you are taking the bulk of someone else's words, you must quote them. The best way to ensure that you do not plagiarize is to read the material, then step away from it for a day or two, and then begin writing. This method also allows you to gauge your understanding of the material.

Classroom/Laboratory conduct:

Turn off your cellphones and be respectful of others! In addition, lab aprons will be provided and must be worn during the lab. Sandals, flip-flops and other open shoes are not permitted in the lab. If you do not show up for lab in appropriate attire you will lose points.

Accommodations Statement:

“ Valdosta State University complies fully with the requirements of the Americans with Disabilities Act (ADA). If you believe that you are covered under this act, and if you have need for special arrangements to allow you to meet the requirements of this course, please contact the Access Office for Students with Disabilities in Nevins Hall, 245-2498. Also, please discuss this need with the instructor at the time of the first class.”-from the Academic Affairs webpage

This is a tentative schedule; changes will be announced in class. Additional supplementary readings of scientific literature will be assigned throughout the semester. Due dates will be announced in class and email. Please check your VSU email.

Date	topic	Reading assignments (please read before coming to class)
M8/17	beneficial microbes introduction	
M8/17lab	lab orientation	
W8/19	overview of microbiology, history	Ch.1
W8/19lab	media preparation	handout
F8/21	macromolecules	Ch. 3
M8/24	domains of life, euk vs. prok	Ch. 2, 14
M8/24lab	microscope rules, Winogradsky intro,	Ex. 1, 6, 11, 12, be sure to bring Winogradsky column materials to

	pondwater microscopy, simple stain of teeth and gums	lab on Wednesday 8/26
W8/26	eukaryotic microbes	Ch. 18
W8/26lab	set up *Winogradsky column, set up bacterial cultures from Winogradsky materials	Ex. 9, 54, must have pondwater, dirt and shredded newspaper
F8/28	eukaryotic microbes, antifungals	Ch. 18, Ch. 27.11
M8/31	bacteria and archae cell structure	Ch. 4
M8/31lab	purify Winogradsky cultures, begin ubiquity of bacteria, fungal cultures	Ex. 7, 8, 10
W9/2	bacteria and archae cell structure	Ch. 4
W9/2lab	fungal and bacterial microscopy, yeast and bacteria wet mount	Ex. 8, 11, 12
F9/4	bacteria and archae cell structure cont.	Ch. 4
M9/7	no class – labor day holiday	
W9/9	microbial growth	Ch.6
W9/9lab	gram-stain	Ex. 15
F9/11	microbial growth	Ch. 6
M9/14	Exam I	
M9/14lab	endospore and acid-fast stains, UV irradiation	Ex. 16, 17, 33
W9/16	dilution problems	Ch. 6
W9/16lab	finish stains, cont. UV irradiation	Ex. 16, 17, 33, be sure to bring environmental water sample to analyze for Monday 9/21 lab
F9/18	DNA structure and replication	Ch. 7

M9/21	DNA amplification, sequencing, hybridization and restriction enzymes	Ch. 12.1-12.8
M9/21lab	bacterial examination of water, bacterial counts of food (dilution plating)	Ex. 60, 61, must have environmental water sample
W9/23	transcription & translation	Ch. 7
W9/23lab	continue bacterial examination of water, bacterial counts of food (dilution plating)	Ex. 60, 61
F9/25	archae and eukaryote molecular biology	Ch. 8
M9/28	gene expression	Ch. 9
M9/28lab	finish bacterial examination of water, growth curve and A_{260}	Ex. 61, supplemental handout
W9/30	gene expression cont. and techniques	Ch. 9, Ch. 13.6-13.8, Ch. 12.10, Ch. 12.13
W9/30lab	beta-galactosidase assay	supplemental handout
F10/2	metabolism	Ch. 5
M10/5	metabolism	Ch. 5
M10/5lab	characteristics of unknown	Ex. 39, 40, 41
W10/7	metabolic diversity	Ch. 20, 21
W10/7lab	continue characteristics of unknown – record data well	Ex. 39, 40 41
F10/9	metabolic diversity	Ch. 20, 21
M10/12	Exam II	
M10/12lab	more characteristics of unknown; desoxycholate, phenylethyl alcohol and blood agar plates, <i>Streptococci</i>	Ex. 42, 43
W10/14	bacterial genetics and antimicrobials	Ch. 11, 27, S. Levy article
W10/14lab	continue more characteristics of unknown and	Ex. 42, 43, Ex. 71, lab supplement, bring in an antimicrobial to test

	desoxycholate, phenylethyl alcohol and blood agar plates, <i>Streptococci</i>	for Wednesday 10/21 lab
F10/16	bacterial genetics and antimicrobials	Ch. 11, 27, S. Levy article
M10/19	no class - fall break holiday	
W10/21	bacterial genetics and antimicrobials	Ch. 11, 27, S. Levy article
W10/21lab	effectiveness of alcohol, antibiotics and antiseptics, conjugation	Ex. 35, 36, 37, lab supplement, may have antimicrobial to test
F10/23	bacterial genetics and antimicrobials	Ch. 11, 27, S. Levy article
M10/26	virology	Ch. 10
M10/26lab	continue effectiveness of alcohol, antibiotics and antiseptics, conjugation, phage plaque assay	Ex. 35, 36, 37, lab supplements
W10/28	virology	Ch. 19
W10/28lab	conjugation, phage plaque assay cont.	lab supplements
F10/30	virology, anti-virals	Ch. 19, Ch. 27.10
M11/2	microbial growth control and immunology	Ch. 27, Ch. 29
M11/2lab	<i>Staphylococci</i> and urinalysis experiments	Ex. 70, lab supplement
W11/4	immunology	Ch. 29, 30, 31
W11/4lab	<i>Staphylococci</i> and urinalysis experiments cont.	Ex. 70, lab supplement
F11/6	immunology	Ch. 29, 30 31
M11/9	Exam III	
M11/9lab	<i>Staphylococci</i> and urinalysis experiments cont.	Ex. 70, lab supplement
W11/11	immunology	Ch. 29, 30, 31
W11/11lab	oral presentations	from 11/11 – 12/2 labs are to be announced (possibly chromosomal DNA extractions, PCR, <i>Halobacterium</i> , gram-negative intestinals)

F11/13	immunology	Ch. 29, 30, 31
M11/16	Immunological techniques	Ch.32
M11/16lab	oral presentations	
W11/18	immunological techniques	Ch. 32
W11/18lab	oral presentations	
F11/20	host-microbe interactions	Ch. 28
M11/23	epidemiology	Ch. 33
M1/23lab	oral presentations	
W11/25	no class – thanksgiving break	
F11/27	no class – thanksgiving break	
M11/30	catch-up or select topics	
M11/30lab	oral presentations	
W12/2	catch-up or select topics	
W12/2lab	oral presentations	
F12/4	catch-up or select topics	
M12/7	catch-up or select topics	
M12/7lab	finish oral presentations, class evaluations	
F12/11	Exam IV - 12:30pm	

* Winogradsky column must be viewed and described weekly by both lab partners. Don't forget to put in fresh slides.

Tips for success:

- 1.) **Study, study, study!!!** For every class credit hour, you should be putting in 2-3 hrs per week studying, so you should study for this class 8-12 hours per week. So, if you are planning on working full-time and taking this class, it is likely that you will not do well.
- 2.) **Do not study superficially or merely for recognition. You need to study the material for recall, meaning that you're learning should be active not passive.** Reading alone is not sufficient. I recommend using drawings, concept maps, outlines, verbalizing concepts, working problems and the like. If you need help developing study skills, I recommend going to the Student Success Center.
- 3.) **You will need to see the material several times before it will sink in.** This is not easy material. I recommend reading the text before class, taking notes during class (the power-points do not substitute for note-taking), reviewing your notes after class and looking up confusing concepts immediately. I have also found that students who ask questions about the material immediately after class tend to do better.
- 4.) **Come to class.** Do not schedule work during class time. By registering for this class, you have made a commitment to coming to class. Even if lectures aren't your thing, learning the material will be much easier if you come to class. Please have your mind engaged during class. Physically being in class is not the same as mentally being in class.
- 5.) **Take notes.** It is imperative that you take notes during both lab and lecture. Anything that I say has the possibility of being on the exam. I do not have much text on my slides and do not write on the board much during lab. I give most information verbally so you must take notes. If I'm talking too fast for you to take notes, please stop me and ask me to repeat the information.
- 6.) **Ask questions in class or come to my office hours for help.** Typically, the students who do the best are the ones who ask questions. I give many opportunities during class for questions and I am open to interruptions so feel free to ask questions as simple as "Can you explain that again?" If you are not comfortable asking questions in class, come to my office hours or email me to make an appointment.
- 7.) **You also need to mentally engaged in lab.** Don't just go through the motions. Lab is there to help you understand the material, but you need to pay attention in lab. You also need to come prepared and read the lab manual before coming to class. You have to be prepared to make the mental connections between lab and lecture.
- 8.) **Come to lab on time and listen.** I give an explanation of the day's lab at the beginning of class and will not explain it repeatedly so you need to be at lab on time and ready to listen. Once you get started with lab, then you can talk all you want.
- 9.) **It is your responsibility to learn this material.** I can give you all the tools to learn this material, but I can't get in your head and make you learn it. As they say, "You can lead a horse to water, but you can't make it drink". Be pro-active!