

Syllabus: Biology 3100 – Microbiology – Fall 2011

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Office: 2093 Bailey Science Center

Office hours: Mon., Wed., Fri. 11:00 – 11:50am or by appointment

Class: Mon., Wed., Fri. 10:00-10:50am Bailey Science Center Rm. 2022

Laboratory: Section A (CRN 81622) - Mon. and Wed. 12:00-1:25pm - Bailey Science Center Rm. 2068
Section B (CRN 81623) – Mon. and Wed. 2:00-3:25pm – Bailey Science Center Rm. 2068

Required texts (all available at the bookstore):

- 1.) **Brock Biology of Microorganisms, Thirteenth Edition**
by Madigan, Martinko, Stahl and Clark
Pearson 2011
- 2.) **Benson's Microbiological Applications, Complete Version, Twelfth Edition**
by Alfred E. Brown
McGraw Hill 2011
- 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: 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. **If you know that you cannot take an exam on the scheduled day, be sure to talk to me before the exam day and not after the exam. If you have a situation, please come talk to me and we will try to work something out.**

Exam I (F9/16)	150 pts	Grading scale: 900-1000 pts = A 800-899 pts = B 700-799 pts = C 600-699 pts = D < 600 pts = F
Exam II (F10/14)	150 pts	
Exam III (F11/11)	150 pts	
Exam IV (F12/9)	150 pts	
Lab exam I (TBA)	50 pts	
Lab exam II (M12/5)	50 pts	
Lab report #1(TBA)	50 pts	
Lab report #2 (TBA)	50 pts	
Oral presentation (TBD)	100 pts	
HIV reading assignment (TBA)	25 pts	
Lab participation	75 pts	
Total	1000pts	

Lab report #1 – identification of the unknown

Lab report #2 – choose one of the following: bacterial food counts, A_{600} growth curves, Winogradsky column, antibiotics & antiseptics

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 lab 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 situation, please come talk to me and we will try to work something out.**

Late assignments:

All assignments need to be in my office by 5pm on the due date.

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. Disruptive behavior will not be tolerated. Anyone who is disruptive will be asked to leave the classroom and/or laboratory, and will be counted as absent. If the disruptive student does not leave, the instructor will contact campus police to have them removed from the class. 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 may lose points. You must bring a dedicated lab notebook, your lab manual and a pen to every laboratory session.

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. Due dates will be announced in class and email. Please check your VSU email.

Date	topic	Reading assignments (please read before coming to class)
M8/15	syllabus, class expectations	
M8/15lab	lab orientation	
W8/17	intro to microbiology, history	Ch.1
W8/17lab	lab safety rules, handwashing	handout
F8/19	review of macromolecules	
M8/22	domains and evolution of life	Ch. 2, 16
M8/22lab	media preparation, intro to Winogradsky	handouts, Ex. 19, 52

W8/24	domains and evolution of life	Ch. 2, 16
W8/24lab	set up Winogradsky column with slides	handout, Ex. 52, must have pondwater, soil and shredded newspaper for column preparation
F8/26	eukaryotic microbes, malaria, giardiasis	Ch. 20, 34, 35
M8/29	eukaryotic microbes, fungal pathogens, microbial growth control, antifungals	Ch. 20, 26, 34
M8/29lab	microscope rules, view and record results from Winogradsky column slides, inoculate culture	handout, Ex. 1, 6, 9, 52
W8/31	bacteria and archae cell structure	Ch. 3
W8/31lab	purify Winogradsky cultures by streak plate, simple stain of teeth and gums, yeast and bacteria simple stain, fungal cultures	Ex. 8, 10, 11, 12
F9/2	bacteria and archae cell structure	Ch. 3
M9/5	no class – labor day holiday	
W9/7	bacteria and archae cell structure	Ch.3
W9/7lab	yeast and bacteria wet mount, mold microscopy, restreak Winogradsky cultures	Ex. 8, 10
F9/9	microbial growth	Ch. 5
M9/12	microbial growth	Ch. 5
M9/12lab	stock purified Winogradsky culture, view and record results from Winogradsky column slides	Ex. 6, 52
W9/14	dilution problems	no slides, chalk-talk, Ch. 5
W9/14lab	gram-staining of unknown and knowns capsular stain of unknown and knowns	Ex. 14, 15
F9/16	Exam I	

M9/19	DNA structure, replication, PCR	Ch. 6
M9/19lab	endospore stain, acid-fast stain, UV irradiation	handout, Ex. 16
W9/21	nucleic acid hybridization, sequencing, transcription	Ch. 6, 11, 12
W9/21lab	finish staining, finish UV irradiation, bacterial food counts (dilution plating on various media)	handouts
F9/23	translation, archae and eukaryote molecular biology	Ch. 6, 7
M9/26	gene expression	Ch. 8
M9/26lab	finish bacterial food counts, set up A_{600} growth curves, view and record results from Winogradsky column slides	handouts
W9/28	gene expression	Ch. 8
W9/28lab	genomic DNA extraction of unknown	handout
F9/30	expression vectors, microarrays and proteomics	Ch. 11, 12
M10/3	metabolism	Ch. 4
M10/3lab	motility, cultural characteristics, oxidation and fermentation reactions of unknown	Ex. 37, 38, 39
W10/5	phototrophy, chemolithotrophy	Ch. 13
W10/5lab	motility, cultural characteristics, oxidation and fermentation reactions of unknown	Ex. 37, 38, 39
F10/7	chemoorganotrophy	Ch. 14
M10/10	prokaryotic genetics	Ch. 10
M10/10lab	hydrolytic and degradative reactions of unknown, multiple test media, using <i>Bergey's</i> , blood agar and <i>Streptococci</i>	Ex. 40, 41, 42, 70

W10/12	prokaryotic genetics	Ch. 10
W10/12lab	hydrolytic and degradative reactions of unknown, multiple test media, using <i>Bergey's</i> , blood agar and <i>Streptococci</i>	Ex. 40, 41, 42, 70
F10/14	Exam II	
M10/17	antibiotics and antibiotic resistance	Ch. 26
M 10/17lab	effectiveness of alcohol, antibiotics and antiseptics, view and record results from Winogradsky column slides	Ex. 33, 34, 35
W10/19	antibiotics and antibiotic resistance	Ch. 26
W10/19lab	effectiveness of alcohol, antibiotics and antiseptics, conjugation	Ex. 33, 34, 35
F10/21	virology	Ch. 9
M10/24	no class – Fall Break	
W10/26	virology	Ch. 9, 21
W10/26lab	conjugation, phage plaque assay, set up PCR of unknown genomic DNA	handouts
F10/28	colds, influenza, sexually transmitted viruses, antivirals	Ch. 26, 33
M10/31	colds, influenza, sexually transmitted viruses, antivirals	Ch. 26, 33
M10/31lab	conjugation, phage plaque assay, PCR gel, <i>Staphylococcus</i> , urinalysis	handouts, Ex. 69
W11/2	innate immunity	Ch. 28, 29, 30
W11/2lab	view and record results from Winogradsky column slides, <i>Staphylococcus</i> , urinalysis	handouts, Ex. 44, 69
F11/4	innate and adaptive immunity	Ch. 28, 29, 30
M11/7	adaptive immunity	Ch. 28, 29, 30

M11/7lab	<i>Staphylococci</i> and urinalysis experiments, ligation and electroporation of PCR product	handout, Ex. 44, 69, 74
W11/9	adaptive immunity	Ch. 28, 29, 30
W11/9lab	analyze transformation plates, oral presentations	handout
F11/11	Exam III	
M11/14	immunological techniques	Ch. 31
M11/14lab	oral presentations	
W11/16	host-microbe interactions	Ch. 25, 27
W11/16lab	oral presentations	
F11/18	host-microbe interactions	Ch. 25, 27
M11/21	host-microbe interactions	Ch. 25, 27
M11/21lab	oral presentations	
W11/23	no class – thanksgiving break	
F11/25	no class – thanksgiving break	
M11/28	epidemiology	Ch. 32
M11/28lab	oral presentations	
W11/30	water-borne diseases and water treatment	Ch. 35
W11/30lab	oral presentations	
F12/2	food-borne diseases and food preservation	Ch. 36
M12/5	catch-up lecture	
M12/5lab	Remove aprons from drawers, Lab exam II	
F12/9	Exam IV - 8-10am	

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!