

# VALDOSTA STATE UNIVERSITY

## BIOLOGY 2900--FALL 2014

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INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: MW 4:00 to 5:00, Th 1:00 to 2:00 or by appointment

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### RECOMMENDED TEXTS:

- Nester, E. W., D. G. Anderson, C. E. Roberts, Jr., M. T. Nester. 2012. Microbiology, A Human Perspective. 7th Edition. McGrawHill Higher Education, New York.
- Brown, A. E. 2012. Benson's Microbiological Applications. Short Version. 12th Edition. McGrawHill Higher Education, New York.

### OTHER RESOURCES:

- <http://www.valdosta.edu/~jnienow>

PREREQUISITES: Chemistry 1152K.

### COURSE GOALS:

- Students will acquire basic knowledge of bacteriology, immunology, and virology with an emphasis on applications and disease processes.
- Students will gain experience with some basic techniques used for studying microorganisms in the laboratory including aseptic technique, transfer and culture of bacteria, identification and quantification of bacteria, and antibiotic sensitivity testing. Students will learn how to prepare and give an oral presentation on a clinical microbiological topic.

**ATTENDANCE:** Students are responsible for attending class and for the material presented in all classes. There will be no make-ups of missed labs, quizzes, and other assignments. However, students who miss more than three labs will have 20 points deducted from their point total for each lab missed. Exams missed without prior permission of the instructor may be made up, but the final score on the exam will be reduced by 25%. It is the student's responsibility to contact the instructor to set up a time to take a make-up exam. Arrangements for a make-up exam must be made within 1 week of the missed exam, otherwise no make-up will be given and the student will receive 0 points for the exam. Students who have missed 20% of regularly scheduled class meetings, especially labs, are subject to a failing grade for the course.

**ATTIRE:** Lab aprons will be provided and must be worn during lab. SANDALS, FLIP-FLOPS AND OTHER OPEN-TOED SHOES ARE NOT PERMITTED IN LAB.

**LECTURE EXAMS:** There will be four unit exams. The first 3 exams will each be worth 125 points, the last will be worth 225 points. The exams will include a mixture of multiple choice and short answer questions. Expect the later exams, especially the fourth, to include some material covered in the earlier exams. The dates of these exams are included in the attached schedule of lectures. DO NOT MISS THESE EXAMS WITHOUT PRIOR PERMISSION. If you are caught cheating on an exam you will receive no points. CELL PHONES MUST BE OFF AND OUT OF SIGHT DURING THE EXAM. IF I SEE OR HEAR YOUR CELL PHONE DURING THE EXAM, YOU WILL BE TOLD TO TURN YOUR EXAM IN IMMEDIATELY. IF YOU LEAVE THE EXAM ROOM DURING THE EXAM FOR ANY REASON, YOU WILL BE TOLD TO TURN IN YOUR EXAM IMMEDIATELY. Estimated total from lecture exams—600 points.

**LABORATORY EXAMS:** There will be two laboratory exams, each worth 75 points. These will include a mix of explanations of laboratory procedures and opportunities to demonstrate your laboratory skills. Estimated total from laboratory exams—150 points.

ADDITIONAL LABORATORY GRADES: Periodically you will be asked to complete informal and formal reports of your lab work. Estimated total from laboratory reports – 100 points.

ORAL REPORTS: All students will be required to prepare and deliver a 7 minute talk on a microbiological subject (see separate handout). PRESENTATION OF AN ORAL REPORT IS MANDATORY. FAILURE TO GIVE AN ORAL REPORT WILL RESULT IN A ZERO FOR THE ENTIRE LAB PORTION OF THE GRADE!!! Points for this talk will be distributed as follows: preliminary information from the text--10 points; copies of two references from the scientific literature--20 points; printouts of the power point slides--50 points; presentation of the oral report--70 points. Estimated total for the oral report assignment – 150 points.

GRADING: Your grade will depend on how well you do on the exams, quizzes, and reports. Expect the following grading scale (based on the total number of points actually assigned):

A = 90 - 100 %  
B = 80 - 89 %  
C = 70 - 79 %  
D = 60 - 69 %  
F < 60 %

DROPPING A COURSE WITHOUT PENALTY: In order to officially drop a course without penalty, a student must obtain and fill out a drop/add form from the Registrar's Office, acquire appropriate signatures, and return the completed form to the Registrar's Office before the designated date (published in the academic calendar). If you don't officially withdraw, and instead just stop coming to class, you will receive an F for the course. It will then take three A's in science classes cancel out that F and bring your GPA back up to 3.0 so you can maintain your scholarship.

SPECIAL NOTE 1: Grades will be neither posted nor given out over the telephone.

SPECIAL NOTE 2: Students requesting classroom accommodations or modifications because of a documented disability should discuss this need with the instructor at the beginning of the semester. These students must contact the Access Office for Students with Disabilities located in Farber Hall. The phone numbers are 245-2498 (V/VP) and 219-1348 (TTY).

#### STUDY TIPS

- It is recommended that you form small study groups and study together in the library or other locations without TV, stereo or other distractions.
- Before you begin reading a chapter, make a very quick outline using the chapter subheadings, this will give you some idea of what the chapter is all about and how it is organized.
- You should read ahead of the schedule. So when you come to class you can ask questions.
- Answer the review questions at the ends of the chapters.
- When studying, ask yourself how this information would be applied.
- Come to office hours and ask questions if there is material you do not understand.
- Ask questions in class!!

SCHEDULE OF LECTURES AND LABS  
BIOLOGY 2900, Fall 2014

Note: Pacing and testing dates may be changed if the need arises. Attend class regularly.

WEEK 1		
8-18-14	LECTURE-- Introduction to microbiology	Chapter 1
	LAB--Orientation; Lab safety; Hand-washing exercise	pp. ix-xiv; supplement
8-20-14	LECTURE—Cell structure	Chapter 3
	LAB--Lab safety; <i>Brightfield microscopy; Protozoa, algae, and cyanobacteria</i>	pp. ix-xiv; exercises 1, 5
WEEK 2		
8-25-14	LECTURE—Cell structure	Chapter 3
	LAB—Set up <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts and Molds</i> , LAB— <i>Aseptic Techniques, Microscopic measurements</i>	exercises 6, 7 exercises 4, 8
8-27-14	LECTURE—Cell structure (continued)	Chapter 3
	LAB—Complete <i>Aseptic Techniques</i> ; More microscopy, <i>Comparing yeasts and E. coli</i>	exercises 5, 6, 7, & 8 handout
WEEK 3		
9-1-14	NO LECTURE; LABOR DAY HOLIDAY	
	NO LAB; LABOR DAY HOLIDAY	
9-3-14	LECTURE—Viruses & viroids	Chapter 13
	LAB--Complete <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts and Molds</i> ; Work on <i>Smear preparation, Simple Staining</i>	exercises 6, 7, 10, 11
WEEK 4		
9-8-14	LECTURE—Viruses & viroids	Chapter 13
	LAB— <i>Enumeration of Bacteria</i> LAB—Work on staining, <i>Negative Staining</i>	exercise 19 exercise 9
9-10-14	LECTURE— Dynamics of bacterial growth	Chapter 4
	LAB—Complete <i>Enumeration of Bacteria</i> LAB— <i>Gram Staining</i>	exercise 19 exercise 14
WEEK 5		
9-15-14	LECTURE— Environmental influences on bacterial growth	Chapter 5
	LAB—Set up <i>Counting Virus Particles</i> LAB— <i>Capsular staining</i>	exercise 21 exercise 13
9-17-14	<b>UNIT EXAM I</b>	
	LAB—Finish <i>Counting Virus Particles</i> LAB— <i>Spore Staining</i>	exercise 21 exercise 15
WEEK 6		
9-22-14	LECTURE— Metabolism, the biochemistry of growth	Chapter 6
	LAB—Assignment of unknowns LAB—Set up <i>Morphological Study of an Unknown Bacterium</i> LAB—Set up <i>Motility Determination; Cultural Characteristics</i>	exercise 34 exercise 17, 35
9-26-14	LECTURE— Metabolism, the biochemistry of growth	Chapter 6
	LAB—Complete <i>Morphological Study of an Unknown Bacterium</i> ; <i>Cultural Characteristics of an Unknown Bacterium</i> ; <i>Motility Determination; Gram stain of unknown</i>	exercises 17, 34, 35
WEEK 7		
9-29-14	LECTURE—Applications: industrial microbiology	Chapters 30, 31
	LAB—Set up <i>Growth of Bacteria on Selective Media</i> LAB—Set up <i>Physiological Characteristics</i>	supplements exercises 36, 37, 38
10-1-14	LECTURE—Controlling metabolism	Chapter 7
	LAB—Complete <i>Growth of Bacteria on Selective Media</i> LAB—Complete <i>Physiological Characteristics</i>	supplements exercises 36, 37, 38

WEEK 8		
10-6-14	LECTURE—Controlling metabolism	Chapter 7
	<b>LAB QUIZ I</b> LAB— <i>Identification of unknown using cultural characteristics</i> LAB—Set up <i>Enterotube II System</i>	handouts exercise 41
10-8-14	LECTURE—Bacterial genetics	Chapter 8
	LAB—Complete <i>Enterotube II System</i> LAB—Set up <i>Staphylococcus aureus Experiment</i>	exercise 41 exercise 51
WEEK 9		
10-13-14	LECTURE—Applications	Chapter 9
	LAB—Set up <i>Genetic analysis of bacteria using PCR</i> LAB—Continue <i>Staphylococcus aureus Experiment</i>	handout exercise 51
10-15-14	LECTURE—Applications	Chapter 9
	LAB—Complete <i>Genetic analysis of bacteria using PCR</i> LAB—Complete <i>Staphylococcus aureus Experiment</i>	handout handout
WEEK 10		
10-20-14	<b>UNIT EXAM II</b>	
	LAB—Set up <i>Transformation of E. coli</i>	handout
10-22-14	LECTURE—Host-microbe interactions and the disease process	Chapter 16
	LAB—Complete <i>Transformation of E. coli</i>	handout
WEEK 11		
10-27-14	LECTURE—Microbial diseases	Chapter 16
	LAB—Set up <i>Lethal Effects of UV Light</i> LAB—Set up <i>Effects of Lysozyme</i>	exercise 28 exercise 29
10-29-14	LECTURE—Defenses: Innate immunity	Chapter 14
	LAB— Complete <i>Lethal Effects of UV Light</i> LAB—Complete <i>Effects of Lysozyme</i>	exercise 28 exercise 29
WEEK 12		
11-3-14	LECTURE—Defenses: Innate immunity	chapter 14
	LAB—Set up <i>Effectiveness of Alcohol</i> LAB—Set up <i>Antimicrobial Sensitivity Testing</i>	exercise 30 exercise 31, 32
11-5-14	LECTURE—Defenses: Adaptive immunity	Chapter 15
	LAB—Set up <i>Effectiveness of Alcohol</i> LAB—Set up <i>Antimicrobial Sensitivity Testing</i>	exercise 30 exercise 31, 32
WEEK 13		
11-10-14	LECTURE—Defenses: Adaptive immunity	Chapter 15
	LAB—Conduct <i>ELISA</i>	handout
11-12-14	LECTURE—Defenses: Adaptive immunity	Chapter 15
	<b>LAB QUIZ II</b> LAB—Set up <i>Minimum Inhibitory Concentration</i>	handout
WEEK 14		
11-17-14	<b>UNIT EXAM III</b>	
	LAB—Complete <i>Minimum Inhibitory Concentration</i> LAB— <i>Protozoan and Animal Parasite</i>	handout handout
11-19-14	LECTURE—Immunologic disorders	Chapter 17
	LAB—Student presentations (6)	
WEEK 15		
11-24-14	No Lecture or Lab--Thanksgiving Holiday	
11-26-14	No Lecture or Lab--Thanksgiving Holiday	

WEEK 16		
12-1-14	LECTURE—Applications	Chapter 18
	LAB—Student presentations (6)	
12-3-14	LECTURE— Controlling disease (medications)	Chapter 20
	LAB—Student presentations (6)	
WEEK 17		
12-8-14	LECTURE— Controlling disease (medications)	Chapter 20
	LAB—Student presentations (6)	
12-9-14	READING DAY—NO CLASSES	
12-10-14	<b>UNIT EXAM IV @ 12:30 PM</b>	