

# VALDOSTA STATE UNIVERSITY

## BIOLOGY 2900—SPRING 2016

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INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: TTh 9:00 to 10:00, F 11:00 to 12:00 or by appointment

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### REQUIRED TEXT:

- Lab Manual for BIOL 3100 Microbiology, Valdosta State University. McGrawHill Higher Education, New York. ISBN 9781308191034

### RECOMMENDED TEXT:

- Nester, E. W., D. G. Anderson, C. E. Roberts, Jr., M. T. Nester. 2012. Microbiology, A Human Perspective. 7<sup>th</sup> or 8<sup>th</sup> 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 five unit exams and a comprehensive final exam. The unit exams will each be worth 100 points; the final exam will be worth 200 points. The exams will include a mixture of multiple choice and short answer questions. 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—700 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:** Some of your lab work will be assessed and assigned points based on the quality of the work. In addition you will occasionally be asked to complete informal and formal reports of your lab work. Estimated total from laboratory work – 200 points.

**ORAL REPORTS:** All students will be required to prepare and deliver a 10 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: copies of two references from the scientific literature--20 points; printouts of the power point slides--50 points; presentation of the oral report--80 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, Spring 2016

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

<b>WEEK 1</b>		
1-11-16	LECTURE-- Introduction to microbiology	Chapter 1
	LAB--Orientation; Lab safety; Hand-washing exercise	pp. ix-xiv; supplement
1-13-16	LECTURE—Cell structure	Chapter 3
	LAB-- <i>Brightfield microscopy: Animal parasites</i> LAB—Set up <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts and Molds</i>	exercise 2, supplement exercise 6, 7
1-15-16	LECTURE—Cell structure	Chapter 3
<b>WEEK 2</b>		
1-18-16	LECTURE—NO CLASS; MLK HOLIDAY	Chapter 3
	LAB—NO CLASS; MLK HOLIDAY	
1-20-16	LECTURE—Cell structure (continued)	Chapter 3
	LAB—Complete <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts and Molds</i> LAB—More microscopy: <i>Living protozoa, algae, cyanobacteria, molds</i>	exercise 6, 7 exercise 5
1-22-16	LECTURE—Cell structure (continued)	Chapter 3
<b>WEEK 3</b>		
1-25-16	LECTURE—Cell structure (continued)	Chapter 3
	LAB— <i>Aseptic Techniques</i> LAB—Work on <i>Smear preparation, Simple Staining</i> LAB—More microscopy: <i>Comparing yeasts and E. coli</i>	exercise 9 exercise 10, 11; handout
1-27-16	LECTURE—Cell structure (continued)	Chapter 3
	LAB—Work on microscopy, staining, <i>Negative Staining</i>	exercise 9
1-29-16	<b>UNIT EXAM I</b>	
<b>WEEK 4</b>		
2-1-16	LECTURE—Viruses & viroids	Chapter 13
	LAB— <i>Enumeration of bacteria on natural foods</i> LAB— <i>Gram Staining</i>	handout exercise 14
2-3-16	LECTURE—Viruses & viroids	Chapter 13
	LAB—Complete: <i>Enumeration of bacteria on natural foods</i> LAB— <i>Gram Staining</i>	handout exercise 14
2-5-16	LECTURE— Dynamics of bacterial growth	Chapter 4
<b>WEEK 5</b>		
2-8-16	LECTURE— Dynamics of bacterial growth	Chapter 4
	LAB—Set up <i>Selective and differential media</i> LAB— <i>Spore staining</i>	handout exercise 16
2-10-16	LECTURE— Environmental influences on bacterial growth	Chapter 5
	LAB—Finish <i>Selective and differential media</i> LAB—Set up Isolation of bacteria from natural foods (Streak plates) LAB—Set up <i>Enumeration of virus particles</i> LAB— <i>Acid-fast staining</i>	handout exercise 10 handout exercise 17
2-11-16	LECTURE— Metabolism, the biochemistry of growth	Chapter 6

<b>WEEK 6</b>		
2-15-16	LECTURE— Metabolism, the biochemistry of growth	Chapter 6
	LAB—Complete <i>Enumeration of virus particles</i> LAB—Continue isolations LAB—Set up <i>Morphological Study of an Unknown Bacterium</i> LAB—Set up <i>Motility Determination; Cultural Characteristics</i>	handout handout exercise 24 exercise 18, 25
2-17-16	LECTURE— Metabolism, the biochemistry of growth	Chapter 6
	LAB—Continue isolations LAB—Complete <i>Morphological Study of an Unknown Bacterium</i> LAB—Complete <i>Motility Determination; Cultural Characteristics</i>	handout exercise 24 exercise 18, 25
2-19-16	<b>UNIT EXAM II</b>	
<b>WEEK 7</b>		
2-22-16	LECTURE—Applications: industrial microbiology	Chapters 30, 31
	LAB—Set up <i>Physiological Characteristics I</i> LAB— <i>Gram stain of unknowns</i>	exercise 26, 27
2-24-16	LECTURE—Applications: industrial microbiology	Chapters 30, 31
	LAB—Complete <i>Physiological Characteristics I</i> LAB—Set up <i>Physiological Characteristics II</i>	exercise 26, 27 exercise 27, 28
2-26-16	LECTURE—Controlling metabolism	Chapter 7
<b>WEEK 8</b>		
2-29-16	LECTURE—Controlling metabolism	Chapter 7
	LAB—Complete <i>Physiological Characteristics II</i> LAB—Set up <i>Staphylococcus aureus Experiment</i> LAB— <i>Identification of Unknown Bacterium</i>	exercise 27, 28 handouts handouts
3-2-16	LECTURE—Controlling metabolism	Chapter 7
	LAB—Continue <i>Staphylococcus aureus Experiment</i> <b>LAB QUIZ I</b>	handouts
3-4-16	LECTURE—Bacterial genetics	Chapter 8
<b>WEEK 9</b>		
3-7-16	LECTURE—Bacterial genetics	Chapter 8
	LAB—Set up <i>Enterotube System</i> LAB—Complete <i>Staphylococcus aureus Experiment</i>	exercise 29 handout
3-9-16	LECTURE—Bacterial genetics	Chapter 8
	LAB—Complete <i>Enterotube System</i> LAB—Set up DNA extraction	exercise 29 handout
3-11-16	<b>UNIT EXAM III</b>	Chapter 8
<b>WEEK 10 – Spring Break, no lectures or labs</b>		
<b>WEEK 11</b>		
3-21-16	LECTURE—Applications	Chapter 9
	LAB—Set up <i>Genetic analysis of bacteria using PCR</i>	handout
3-23-16	LECTURE—Applications	Chapter 9
	LAB—Complete <i>Genetic analysis of bacteria using PCR</i> LAB—Set up <i>Transformation of E. coli</i>	handout handout
3-25-16	LECTURE—Applications	Chapter 9
<b>WEEK 12</b>		
3-28-16	LECTURE—Host-microbe interactions and the disease process	Chapter 16
	LAB—Complete <i>Transformation of E. coli</i> LAB—Set up <i>Antimicrobial Sensitivity Testing</i>	handout exercise 21
3-30-16	LECTURE—Host-microbe interactions and the disease process	Chapter 16

	LAB—Complete <i>Antimicrobial Sensitivity Testing</i> LAB—Intro to <i>Prevalence of Antibiotic Resistance in the Environment (PARE)</i> project	exercise 21 handout
4-1-16	LECTURE—Defenses: Innate immunity	Chapter 14
<b>WEEK 13</b>		
4-4-16	LECTURE—Defenses: Innate immunity	Chapter 14
	LAB—Set up <i>PARE project I</i>	handouts
4-6-16	LECTURE—Defenses: Adaptive immunity	Chapter 15
	LAB—Complete <i>PARE project I</i>	handout
4-8-16	<b>UNIT EXAM IV</b>	
<b>WEEK 14</b>		
4-11-16	LECTURE—Defenses: Adaptive immunity	Chapter 15
	LAB—Set up <i>PARE project II</i>	handouts
4-13-16	LECTURE—Defenses: Adaptive immunity	Chapter 15
	LAB—Complete <i>PARE project II</i>	handout
4-15-16	LECTURE—Defenses: Adaptive immunity	Chapter 15
<b>WEEK 15</b>		
4-18-16	LECTURE—Immunologic disorders	Chapter 17
	LAB— <b>LAB QUIZ II</b>	
4-20-16	LECTURE—Applications	Chapter 18
	LAB—Student presentations (6)	
4-22-16	LECTURE—Applications	Chapter 18
<b>WEEK 16</b>		
4-25-16	LECTURE— Controlling disease (medications)	Chapter 20
	LAB—Student presentations (6)	
4-27-16	LECTURE— Controlling disease (medications)	Chapter 20
	LAB—Student presentations (6)	
4-29-16	<b>UNIT EXAM V</b>	
<b>WEEK 17</b>		
5-2-16	LECTURE— Review	
	LAB—Student presentations (6)	
5-3-16	<b>COMPREHENSIVE FINAL EXAM @ 10:15 AM</b>	