

# VALDOSTA STATE UNIVERSITY

## BIOLOGY 2900—SUMMER 2021

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INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: MTWTH 12:00 to 1:00 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:

- Foster, J. W., Z. Aliabadi, J. L. Slonczewski. 2021. Microbiology, The Human Experience. W. W. Norton, New York.

### OTHER RESOURCES:

- BlazeView

PREREQUISITES: None

### 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. 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. IF YOU ARRIVE IN FOR LABS SANDALS OR FLIP-FLOPS YOU WILL BE SENT HOME TO CHANGE.

**LECTURE EXAMS:** There will be four unit exams based on lecture notes. Each unit exams will each be worth 125 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—500 points.

**LABORATORY EXAMS:** There will be two laboratory exams. The first will give you an opportunity to demonstrate your laboratory skills; this exam will be worth 75 points. The second will test your knowledge of the various laboratory tests and procedures; this exam will be worth 100 points. You will be allowed to use your lab manual and notes on both exams. Estimated total from laboratory exams—175 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. Most of these assignments have specified due dates; pay attention them. Absolutely no assignment will be accepted later than 5: 00 pm the day of the last lecture. Estimated total from laboratory work – 200 points.

**POWERPOINT REPORTS:** All students will be required to prepare a 10-minute PowerPoint presentation on a microbiological subject (see separate handout). These will be presented during lab the last week of class. Points will be distributed as follows: listing of the pages in the recommended text where the topic is discussed--5 points; copies of two references from the primary scientific literature investigating some aspect of the topic--20 points; quality of the presentation and PowerPoint slides--100 points (see separate handout for the grading of the presentation and slides). Estimated total for the oral report assignment – 125 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, SUMMER 2021**

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

<b>WEEK 1</b>		
6-9-2021	LECTURE— Introduction to microbiology DISEASE OF THE DAY--Cholera	pp. 1-58
	LAB--Orientation; Lab safety; complete on-line safety by the beginning of lab on Monday, June 14 LAB-- <i>Hand-washing exercise</i>	pp. ix-xiv; supplement  exercise 35
6-10-2021	LECTURE—Introduction to microbiology (continued) DISEASE OF THE DAY—Smallpox	pp. 1-58
	LAB-- <i>Brightfield microscopy: Animal parasites</i> LAB—Set up <i>Ubiquity of Bacteria and Fungi</i>	exercise 2, supplement exercise 6, 7
<b>WEEK 2</b>		
6-14-2021	LECTURE—Basic concepts in medical microbiology LECTURE—Microscopy DISEASE OF THE DAY—Bubonic plague	pp. 32-58 pp. 62-82
	LAB—Complete <i>Ubiquity of Bacteria and Fungi</i> LAB—More microscopy: <i>Bacterial types</i> LAB--Even more microscopy: <i>Living protozoa, algae, cyanobacteria</i>	exercise 6, 7 exercise 5
	6-15-2021	LECTURE—Bacterial cell structure DISEASE OF THE DAY--Malaria
	LAB-- <i>More microscopy: Observing fungi</i> LAB— <i>Aseptic Techniques</i>	handout exercise 9
6-16-2021	LECTURE—Bacterial cell structure (continued) DISEASE OF THE DAY—Zika fever	pp. 124-144
	LAB— <i>Smear preparation, Simple staining</i> LAB— <i>Comparing yeasts and E. coli</i>	exercise 10, 11 handout
6-17-2021 Jacksonville (On-line)	<b>LECTURE—Eukaryotic cell structure</b> <b>DISEASE OF THE DAY--Corona viruses</b>	pp. 144-152
	Lab-- <b>Advanced staining techniques (On-line)</b>	
<b>WEEK 3</b>		
6-21-2021	<b>UNIT EXAM I</b>	
	LAB— <i>Gram Staining</i>	exercise 14
6-22-2021	LECTURE— Viruses & viroids DISEASE OF THE DAY— <i>Shigella &amp; Escherichia coli</i> infections	pp. 350-382
	LAB—Set up: <i>Enumeration of bacteria on natural foods</i> LAB— <i>Gram Staining (continued)</i>	handout exercise 14
6-23-2021	LECTURE— Dynamics of bacterial growth DISEASE OF THE DAY— Salmonellosis/Typhoid fever	pp. 156-186
	LAB—Complete: <i>Enumeration of bacteria on natural foods</i> LAB—Set up <i>Selective and differential media &amp; Isolation of bacteria from natural foods (Streak plates using PEA &amp; Hektoen agar)</i>	handout handout Exercise 10
6-24-2021	LECTURE— Environmental influences on bacterial growth DISEASE OF THE DAY—Bacterial food poisonings	pp. 156-186
	LAB—Complete <i>Effects of UV light</i> LAB—Continue <i>Selective and differential media &amp; Isolation of bacteria from natural foods (MacConkey agar)</i>	exercise 30 handout exercise 10
	LAB—Set up <i>Effects of UV light</i>	exercise 30
	LAB— <i>Spore staining</i>	exercise 15

<b>WEEK 4</b>		
6-28-2021	LECTURE—Intro to bacterial metabolism DISEASE OF THE DAY— Viral gastroenteritis, Amoebic dysentery	pp. 106-118
	LAB—Continue <i>Selective and differential media &amp; Isolation of bacteria from natural foods (EMB agar)</i> LAB—Complete: <i>Spore staining</i> LAB—Complete: <i>Effects of UV light</i>	handout exercise 10 exercise 15 exercise 30
6-29-2021	LECTURE— Bacterial metabolism DISEASE OF THE DAY--Polio	pp. 192-218
	LAB—Set up: <i>Enumeration of virus particles</i> LAB—Continue isolations (Nutrient agar)	handout
6-30-2021	LECTURE— Bacterial metabolism DISEASE OF THE DAY—Measles (Rubeola & Rubella)	pp. 192-218
	LAB—Complete: <i>Enumeration of virus particles</i> LAB--Set up: Characterizing unknown bacteria I LAB— <i>Gram stain of unknowns</i>	handout exercise 24 exercise 18, 25
	LAB—Set up: <i>Characterizing unknown bacteria II</i>	
7-1-2021	LECTURE—Controlling metabolism DISEASE OF THE DAY—Mumps & Chickenpox	pp. 244-254
	LAB—Complete: <i>Characterizing unknown bacteria I</i> LAB—Set up: <i>Characterizing unknown bacteria II</i>	exercise 26, 27 exercise 27, 28
<b>WEEK 5</b>		
7-5-2021	<b>HOLIDAY—NO CLASSES</b>	
7-6-2021	<b>UNIT EXAM II</b>	
	LAB—Complete: <i>Characterizing unknown bacteria II</i> LAB—Set up: <i>Characterizing unknown bacteria III</i>	exercise 27, 28 handouts
7-7-2021	LECTURE—Controlling metabolism DISEASE OF THE DAY— Bacterial and viral meningitis	pp. 244-254
	LAB—Complete: <i>Characterizing unknown bacteria III</i> LAB-- <i>Identifying unknown bacteria</i> LAB—Set up: <i>Staphylococcus aureus Experiment</i>	handout handout exercise 52
	LAB—Set up: <i>Staphylococcus aureus Experiment</i>	
7-8-2021	LECTURE— Bacterial genetics DISEASE OF THE DAY--Influenza	pp. 225-244
	LAB—Set up <i>DNA extraction -- unknowns</i> LAB—Set up <i>DNA fingerprinting</i>	handouts handouts
<b>WEEK 6</b>		
7-12-2021	LECTURE— Bacterial genetics DISEASE OF THE DAY—Bacterial pneumonia	pp. 225-44
	LAB—Continue <i>Staphylococcus aureus Experiment (Mannitol salt)</i> LAB—Continue <i>PCR-based fingerprinting (gel electrophoresis)</i> LAB—Set up <i>PCR-based analysis of unknown bacteria</i>	exercise 52 handouts handouts
	LAB—Set up <i>PCR-based analysis of unknown bacteria</i>	
7-13-2021	LECTURE—Host-microbe interactions and the disease process DISEASE OF THE DAY--Tuberculosis	pp. 524-560
	LAB--Continue <i>Staphylococcus experiment (Blood and DNAase)</i> LAB--Continue <i>PCR-based analysis of unknown bacteria (gel electrophoresis)</i>	exercise 52 handout
7-14-2021	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY—Diphtheria & Whooping cough	pp. 428-482
	LAB—Complete: <i>Staphylococcus experiment (bead agglutination)</i> LAB—Set up: <i>Antimicrobial Sensitivity Testing</i>	handout exercise 21
7-15-2021	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY—Viral hepatitis	pp. 456-482
	LAB—Complete: <i>Antimicrobial Sensitivity Testing</i>	exercise 21

<b>WEEK 7</b>		
7-19-2021	<b>UNIT EXAM III</b>	
	LAB—Set up <i>Transformation of E. coli</i>	handout
7-20-2021	LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY— <i>Rickettsia</i> infections	pp. 480-560
	LAB—Complete <i>Transformation of E. coli</i>	handout
	LAB—Set up <i>ELISA</i>	handout
7-21-2021	LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY—Chlamydia, Gonorrhea	pp. 480-560
	<b>LAB QUIZ I</b>	handouts
7-22-2021	LECTURE— Controlling disease (medications) DISEASE OF THE DAY--Syphilis	pp. 397-422
	<b>LAB QUIZ II</b>	handout
<b>WEEK 8</b>		
7-26-2021	LECTURE—Controlling disease (medications) DISEASE OF THE DAY--Genital warts and herpes	pp. 397-422
	Student presentations	
7-27-2021	LECTURE--Aspects of epidemiology DISEASE OF THE DAY—HIV	pp. 878-902
	Student presentations	
7-28-2021	<b>UNIT EXAM IV during FINAL EXAM period (8:00 -10:00 AM)</b>	