

# VALDOSTA STATE UNIVERSITY

## BIOLOGY 2900—FALL 2020

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INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: M 3:30 to 5:00, TTh 2:00-3:00 or by appointment

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### REQUIRED TEXT:

- Foster, J. W., Z. Aliabadi, J. L. Slonczewski. 2018. Microbiology, The Human Experience. Preliminary edition. W. W. Norton, New York.
- Lab Manual for BIOL 3100 Microbiology, Valdosta State University. McGrawHill Higher Education, New York. ISBN 9781308191034

### OTHER RESOURCES:

- BlazeView (Be sure to check Kaltura)

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. 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, face masks, and face shields 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 five unit exams, each worth 100 points. These exams will consist of 70 multiple choice questions, with each question worth 1.5 points—notice there is a chance for bonus points. The questions will be based on the material presented during

lecture or in the extra assignments. The exams will be given on-line, but during the regular class time. Be sure you are somewhere with a good computer and a good internet connection for the duration of the exam. The dates of these exams are included in the attached schedule of lectures. **DO NOT MISS THESE EXAMS WITHOUT PRIOR PERMISSION.** A comprehensive final exam, worth 200 points (150 multiple choice questions, each worth 1.5 points), is scheduled for the end of the quarter. I am not going to use blockers, but if it looks like you are cheating you will have to explain yourself to me. If you are caught cheating on an exam you will receive no points. Estimated total from exams--700 points.

**LABORATORY EXAMS:** There will be two laboratory exams, the first worth 75 points, the second worth 100 points. The first test will give you a chance to demonstrate your laboratory skills. The second include a mix of questions concerning laboratory procedures and microbiological tests. 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 – 500 points.

**REPORTS:** All students will be required to prepare a PowerPoint presentation on a microbiological subject (see separate handout). Points for this talk will be distributed as follows: copies of two references from the scientific literature--25 points; rough draft of the slides--25 points; final report--100 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 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 BIOLOGY 2900, Fall 2020

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

<b>WEEK 1</b>		
8-18-2020	LECTURE— Introduction to microbiology DISEASE OF THE DAY--Rabies	pp. 1-58
8-20-2020	LECTURE—Introduction to microbiology (continued) LECTURE—Basic concepts in medical microbiology DISEASE OF THE DAY— Smallpox	pp. 1-58
<b>WEEK 2</b>		
8-25-2020	LECTURE—Microscopy LECTURE—Bacterial cell structure DISEASE OF THE DAY—Bubonic plague	pp. 62-82 pp. 124-144
8-27-2020	LECTURE—Bacterial cell structure (continued) DISEASE OF THE DAY--Malaria	pp. 124-144
<b>WEEK 3</b>		
9-01-2020	LECTURE—Eukaryotic cell structure DISEASE OF THE DAY—Ebola hemorrhagic fever	pp. 144-152
9-03-2020	<b>UNIT EXAM I</b>	
<b>WEEK 4</b>		
9-08-2020	LECTURE— Viruses & viroids DISEASE OF THE DAY--Cholera	pp. 350-382
9-10-2020	LECTURE— Viruses & viroids DISEASE OF THE DAY—Shigellosis	pp. 350-382
<b>WEEK 5</b>		
9-15-2020	LECTURE— Dynamics of bacterial growth DISEASE OF THE DAY— <i>Escherichia coli</i> infections	pp. 156-186
9-17-2020	LECTURE— Environmental influences on bacterial growth DISEASE OF THE DAY—Salmonellosis/Typhoid fever	pp. 156-186
<b>WEEK 6</b>		
9-22-2020	LECTURE—Intro to bacterial metabolism DISEASE OF THE DAY—Viral gastroenteritis	pp. 106-118
9-24-2020	<b>UNIT EXAM II</b>	
<b>WEEK 7</b>		
9-29-2020	LECTURE— Bacterial metabolism DISEASE OF THE DAY--Polio	pp. 192-218
10-01-2020	LECTURE— Bacterial metabolism DISEASE OF THE DAY— Measles (Rubeola & Rubella)	pp. 192-218
<b>WEEK 8</b>		
10-06-2020	LECTURE—Bacterial genetics I DISEASE OF THE DAY—Mumps & Chickenpox	
10-08-2020	LECTURE— Controlling metabolism DISEASE OF THE DAY— Bacterial and viral meningitis	
<b>WEEK 9</b>		
10-13-2020	LECTURE— Controlling metabolism DISEASE OF THE DAY— Clostridium	pp. 244-254
10-15-2020	<b>UNIT EXAM III</b>	

<b>WEEK 10</b>		
10-20-2020	LECTURE—Bacterial genetics II DISEASE OF THE DAY— Influenza	pp. 225-244
10-22-2020	LECTURE— Bacterial genetics III DISEASE OF THE DAY— Coronavirus infections	pp. 225-244
<b>WEEK 11</b>		
10-27-2020	LECTURE—Host-microbe interactions and the disease process DISEASE OF THE DAY—Bacterial pneumonia	pp. 524-560
10-29-2020	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY— Diphtheria & Whooping cough	pp. 428-482
<b>WEEK 12</b>		
11-03-2020	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY—Tuberculosis	pp. 456-482
11-05-2020	<b>UNIT EXAM IV</b>	
<b>WEEK 13</b>		
11-10-2020	LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY— <i>Rickettsia</i> infections	pp. 480-560
11-12-2020	LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY— <i>Chlamydia</i> & Gonorrhea	pp. 480-560
<b>WEEK 14</b>		
11-17-2020	LECTURE—Applications DISEASE OF THE DAY-- Syphilis	pp. 842-872
11-19-2020	LECTURE—Controlling disease (medications) DISEASE OF THE DAY—Viral hepatitis	pp. 397-422
<b>WEEK 15</b>		
11-24-2020	LECTURE—Controlling disease (medications) LECTURE—Epidemiology DISEASE OF THE DAY— HIV infections	pp. 397-422
11-26-2020	THANKSGIVING HOLIDAY—NO CLASSES	
<b>WEEK 16</b>		
12-03-2020	<b>UNIT EXAM V</b>	
<b>WEEK 17</b>		
12-11-19	<b>COMPREHENSIVE FINAL EXAM @ 10:15 AM</b>	

## SCHEDULE OF LABS Group I BIOLOGY 2900, Fall 2020

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

<b>WEEK 1</b>		
8-17-2020	ON-LINE - <i>Orientation; Lab safety</i>	exercise 1
8-19-2020	ON-LINE - <i>Brightfield microscopy</i>	exercise 2
<b>WEEK 2</b>		
8-24-2020	LAB - <i>More microscopy: infectious agents</i> LAB - <i>Ubiquity of bacteria and fungi</i>	Handout exercises 6 & 7
8-26-2020	ON-LINE - <i>More microscopy: Pond organisms</i>	exercises 5 & 7
<b>WEEK 3</b>		
8-31-2020	LAB - <i>Ubiquity of bacteria and fungi</i> LAB - <i>Aseptic techniques</i> LAB - <i>Smear preparation, Simple staining</i>	exercises 6 & 7 exercise 9 exercises 12 & 13
9-02-2020	ON-LINE - <i>Bacteriological stains</i>	exercises 14, 15, & 17
<b>WEEK 4</b>		
9-07-2020	LABOR DAY HOLIDAY—NO CLASS	
9-09-2020	LAB - <i>Aseptic techniques</i> LAB - <i>Gram staining (First half of lab only)</i>	exercise 9 exercise 15
<b>WEEK 5</b>		
9-14-2020	LAB - <i>Set up Enumeration of bacteria on natural foods</i> LAB - <i>Gram staining</i>	handout exercise 15
9-16-2020	ON-LINE - <i>Dilution problems</i>	handouts
<b>WEEK 6</b>		
9-21-2020	LAB - <i>Complete Enumeration of bacteria on natural foods</i> LAB - <i>Set up Selective and differential media &amp; Isolation of bacteria from natural foods (Streak plates using PEA &amp; Hektoen agar)</i> LAB - <i>Set up Effects of UV</i>	handout handout, exercise 10  exercise 20
9-23-2020	ON-LINE - <i>Most probable number calculations</i>	exercise 31
<b>WEEK 7</b>		
9-28-2020	LAB - <i>Continue Selective and differential media &amp; Isolation of bacteria from natural foods (streak onto MacConkey agar)</i> LAB - <i>Complete Effects of UV light</i> LAB - <i>Spore staining</i>	handout exercise 10  exercise 20 exercise 16
9-30-2020	ON-LINE - <i>Temperature effects on the growth of bacteria</i>	handout
<b>WEEK 8</b>		
10-05-2020	LAB - <i>Set up Enumeration of virus particles</i> LAB - <i>Continue Selective and differential media &amp; Isolation of bacteria from natural foods (streak onto EMB agar)</i>	handout handout exercise 10
10-07-2020	ON-LINE - <i>Effects of pH and salt concentrations on bacterial growth</i>	handout

<b>WEEK 9</b>		
10-12-2020	LAB - Complete <i>Enumeration of virus particles</i> LAB - <i>Identification of unknown bacteria (Part I)</i>	handout exercises 24 & 25
10-14-2020	ON-LINE - <i>The Trouble with Antibiotics</i>	handout
<b>WEEK 10</b>		
10-19-2020	LAB - <i>Identification of unknown bacteria (Parts II &amp; III)</i>	handout exercises 26 & 27
10-21-2020	ON-LINE - <i>The prevalence of antibiotic resistance in the environment (The PARE project)</i>	handout
10-24-2020	<b>LAB: LAB EXAM I</b> (Group I)	
<b>WEEK 11</b>		
10-26-2020	LAB - <i>Identification of unknown bacteria (Part IV)</i> LAB - <i>Genetic analysis of bacteria using PCR (Part I)</i>	handout handout
10-28-2020	ON-LINE - <i>Antimicrobial Sensitivity Testing:Kirby-Bauer</i>	exercise 22
<b>WEEK 12</b>		
11-02-2020	LAB - <i>Identification of unknown bacteria (Part IV)</i> LAB - <i>Extracting DNA from bacteria</i> LAB - <i>Genetic analysis of bacteria using PCR (Part II)</i>	handout handout handout
11-04-2020	ON-LINE - <i>Identification of bacteria using multi-test systems</i>	handout, exercise 29
<b>WEEK 13</b>		
11-09-2020	LAB - <i>ELISA</i> LAB - <i>Ribosomal sequences using PCR (Part I)</i>	handout handout
11-11-2020	ON-LINE - <i>Using ribosomal sequences</i>	handout
<b>WEEK 14</b>		
11-16-2020	LAB - <i>Ribosomal sequences using PCR (Part II)</i> LAB - <i>Transformation of bacteria using pGLO</i>	handout handout
11-18-2020	ON-LINE - <i>Analysis of an epidemic using ELISA</i>	handout
<b>WEEK 15</b>		
11-23-2020	LAB - <i>Analysis of results from pGLO transformation (First half of lab only)</i>	handout
11-25-2020	THANKSGIVING HOLIDAY—NO CLASSES	
<b>WEEK 16</b>		
11-30-2020	<b>ON-LINE: LAB EXAM II</b>	

## SCHEDULE OF LABS Group II BIOLOGY 2900, Fall 2020

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

<b>WEEK 1</b>		
8-17-2020	ON-LINE - <i>Orientation; Lab safety</i>	exercise 1
8-19-2020	ON-LINE - <i>Brightfield microscopy</i>	exercise 2
<b>WEEK 2</b>		
8-24-2020	ON-LINE - <i>More microscopy: Pond organisms</i>	exercises 5 & 7
8-26-2020	LAB - <i>More microscopy: infectious agents</i> LAB - <i>Ubiquity of bacteria and fungi</i>	Handout exercises 6 & 7
<b>WEEK 3</b>		
8-31-2020	ON-LINE - <i>Bacteriological stains</i>	exercises 14, 15, & 17
9-02-2020	LAB - <i>Ubiquity of bacteria and fungi</i> LAB - <i>Aseptic techniques</i> LAB - <i>Smear preparation, Simple staining</i>	exercises 6 & 7 exercise 9 exercises 12 & 13
<b>WEEK 4</b>		
9-07-2020	LABOR DAY HOLIDAY—NO CLASS	
9-09-2020	LAB - <i>Aseptic techniques</i> LAB - <i>Gram staining (Second half of lab only)</i>	exercise 9 exercise 15
<b>WEEK 5</b>		
9-14-2020	ON-LINE - <i>Dilution problems</i>	handouts
9-16-2020	LAB - <i>Set up Enumeration of bacteria on natural foods</i> LAB - <i>Gram staining</i>	handout exercise 15
<b>WEEK 6</b>		
9-21-2020	ON-LINE - <i>Most probable number calculations</i>	exercise 31
9-23-2020	LAB - <i>Complete Enumeration of bacteria on natural foods</i> LAB - <i>Set up Selective and differential media &amp; Isolation of bacteria from natural foods (Streak plates using PEA &amp; Hektoen agar)</i> LAB - <i>Set up Effects of UV</i>	handout handout, exercise 10  exercise 20
<b>WEEK 7</b>		
9-28-2020	ON-LINE - <i>Temperature effects on the growth of bacteria</i>	handout
9-30-2020	LAB - <i>Continue Selective and differential media &amp; Isolation of bacteria from natural foods (streak onto MacConkey agar)</i> LAB - <i>Complete Effects of UV light</i> LAB - <i>Spore staining</i>	handout exercise 10  exercise 20 exercise 16
<b>WEEK 8</b>		
10-05-2020	ON-LINE - <i>Effects of pH and salt concentrations on bacterial growth</i>	handout
10-07-2020	LAB - <i>Set up Enumeration of virus particles</i> LAB - <i>Continue Selective and differential media &amp; Isolation of bacteria from natural foods (streak onto EMB agar)</i>	handout handout exercise 10



<b>WEEK 9</b>		
10-12-2020	ON-LINE - <i>The Trouble with Antibiotics</i>	handout
10-14-2020	LAB - <i>Complete Enumeration of virus particles</i> LAB - <i>Identification of unknown bacteria (Part I)</i>	handout exercises 24 & 25
<b>WEEK 10 LAB QUIZ I</b>		
10-19-2020	ON-LINE - <i>The prevalence of antibiotic resistance in the environment (The PARE project)</i>	handout
10-21-2020	LAB - <i>Identification of unknown bacteria (Parts II &amp; III)</i>	handout exercises 26 & 27
<b>WEEK 11</b>		
10-26-2020	ON-LINE - <i>Antimicrobial Sensitivity Testing:Kirby-Bauer</i>	exercise 22
10-28-2020	LAB - <i>Identification of unknown bacteria (Part IV)</i> LAB - <i>Genetic analysis of bacteria using PCR (Part I)</i>	handout handout
<b>WEEK 12</b>		
11-02-2020	ON-LINE - <i>Identification of bacteria using multi-test systems</i>	handout, exercise 29
11-04-2020	LAB - <i>Identification of unknown bacteria (Part IV)</i> LAB - <i>Extracting DNA from bacteria</i> LAB - <i>Genetic analysis of bacteria using PCR (Part II)</i>	handout handout handout
11-07-2020	<b>LAB: LAB EXAM I</b> (Group II)	
<b>WEEK 13</b>		
11-09-2020	ON-LINE - <i>Using ribosomal sequences</i>	handout
11-11-2020	LAB - <i>ELISA</i> LAB - <i>Ribosomal sequences using PCR (Part I)</i>	handout handout
<b>WEEK 14</b>		
11-16-2020	ON-LINE - <i>Analysis of an epidemic using ELISA</i>	handout
11-18-2020	LAB - <i>Ribosomal sequences using PCR (Part II)</i> LAB - <i>Transformation of bacteria using pGLO</i>	handout handout
<b>WEEK 15</b>		
11-23-2020	LAB - <i>Analysis of results from pGLO transformation (Second half of lab only)</i>	handout
11-25-2020	THANKSGIVING HOLIDAY—NO CLASSES	
<b>WEEK 16</b>		
11-30-2020	<b>ON-LINE: LAB EXAM II</b>	