

VALDOSTA STATE UNIVERSITY

BIOLOGY 2260: Foundations in Microbiology —Spring 2024

INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: TTh 9:30 to 12:00 or by appointment

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RECOMMENDED TEXTS:

- Foster, J. W., Z. Aliabadi, J. L. Slonczewski. 2021. Microbiology, The Human Experience. 2nd edition. W. W. Norton, New York.
- Brown, A. E. Benson's Microbiological Applications. McGraw Hill, New York. Any edition or version that fits your wallet.

OTHER RESOURCES:

- BlazeView

PREREQUISITES: None

COURSE DESCRIPTION: This integrated lecture and laboratory course provides an introduction to microbiology. This course introduces the student to the diversity and classification of medically significant microorganisms, their modes of pathogenesis and transmission, and the infectious diseases they cause. Topics to be covered include, but are not limited to, microbial cell biology and genetics; major classes of disease-causing microorganisms; host immune response; microbial control; aseptic techniques; disinfection; and isolation, culture, staining, and identification of microorganisms. Select laboratory exercises will provide training in the basic laboratory techniques for culture and identification of microbes. This course is designed primarily for non-biology majors, especially those pursuing majors in nursing and the allied health professions.

ATTENDANCE: Students are expected to attend lectures and participate in lab exercises. They are responsible for the material presented in all classes whether they were in attendance or not. Lectures will be recorded in Kaltura and posted in BlazeView in case you happen to miss a lecture. Labs are more problematic since we work with live cultures and perform complex procedures. Therefore, do not expect to be able to make-up missed labs; if you do miss a lab you will receive a zero for the exercise. 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 shields and glove 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 and a comprehensive final exam. The unit exams will each be worth 100 points; the final exam will be worth 200 points. All the exams will be on-line in BlazeView. Lecture exams will consist of 76 multiple choice questions that you will have to answer correctly in 75 minutes. BE PREPARED. The final exam will consist of 150 multiple choice questions that you will have to answer in 120 minutes. Again, BE PREPARED. The dates of these exams are included in the attached schedule of lectures. DO NOT MISS THESE EXAMS WITHOUT PRIOR PERMISSION. 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. If you are caught cheating on an exam you will receive 0 points. Estimated total from lecture exams—700 points.

LABORATORY EXAMS: There will be two laboratory exams. The first, a lab skills test, is worth 75 points; you may use any notes you wish for this exam. The second will consist of 25 PowerPoint slides illustrating some of the procedures and tests conducted during the lab. Each slide will have two questions requiring either an explanation of the purpose and set-up of the procedure, details of the material used in the procedure, or an analysis of the results, and will be displayed for 60 seconds. You may use a completed study guide, but no other materials, during the exam. This exam is worth 100 points. Estimated total from laboratory exams—175 points.

ADDITIONAL LABORATORY GRADES AND ASSIGNMENTS: Most 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. Once an assignment has been handed back to the class it is too late to submit your assignment. Absolutely no assignment will be accepted later than 5: 00 pm the day of the last class meeting. Estimated total from laboratory work – 500 points.

ORAL REPORTS: All students will be required to prepare and deliver a 10 minute talk on a microbiological subject (see separate handout). Points for this talk will be distributed as follows: references from the text-- 5 points; copies of two references from the primary scientific literature--20 points; printouts of the power point slides and the presentation of the oral report--125 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 complete the process with 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.

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

SPECIAL NOTE 2: Non-Discrimination and Title IX Statement. Valdosta State University (VSU) upholds all applicable laws and policies regarding discrimination on the basis of race, color, sex (including sexual harassment and pregnancy), sexual orientation, gender identity or expression, national origin, religion, age, veteran status, political affiliation, or disability. The University prohibits specific forms of behavior that violate Title IX of the Education Amendments of 1972. Title IX of the Education Amendments of 1972 prohibits discrimination on the basis of sex in education programs and activities that receive federal funding. VSU considers sex discrimination in any form to be a serious offense. Title IX refers to all forms of sex discrimination committed against others, including but not limited to: sexual harassment, sexual assault, sexual misconduct, and sexual violence by other employees, students or third parties and gender inequity or unfair treatment based on an individual's sex/gender. The designated Title IX Coordinator for VSU is Mr. Darius Thomas. To view the full policy or to report an incident visit: <https://www.valdosta.edu/administration/student-affairs/title-ix/>

SPECIAL NOTE 3: Accommodations Statement. Students with disabilities who are experiencing barriers in this course may contact the Access Office (<https://www.valdosta.edu/student/disability/>) for assistance in determining and implementing reasonable accommodations. The Access Office is located in University Center Room 4136 Entrance 5. The phone numbers are 229-245-2498 (V), 229-375-5871. For more information, please visit VSU's Access Office or email: access@valdosta.edu. To request reasonable accommodations for pregnancy and childbirth, contact Christina Kidd, Student Conduct Coordinator at chkidd@valdosta.edu. Please note, you will be required to provide documentation from an appropriately licensed medical professional indicating the requested accommodations are medically necessary.

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 2260, Spring 2024

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

WEEK 1		
1-8-24	LAB--Orientation; Lab safety; Lab safety quiz (on-line) LAB-- <i>Hand-washing exercise</i>	Lab Exercise 1
1-9-24	LECTURE— Introduction to microbiology DISEASE OF THE DAY-- Smallpox	pp. 1-58
1-10-24	LAB-- <i>Brightfield microscopy: Animal parasites</i> LAB—Set up <i>Ubiquity of Bacteria</i> and <i>The Fungi</i>	Lab Exercise 2
1-11-24	LECTURE—Introduction to microbiology (continued) DISEASE OF THE DAY— Bubonic plague	pp. 1-58
WEEK 2		
1-15-24	MARTIN LUTHER KING HOLIDAY—NO CLASS	
1-16-24 (Kaltura only)	LECTURE—Basic concepts in medical microbiology LECTURE—Microscopy DISEASE OF THE DAY—Epidemic Typhus	pp. 32-58 pp. 62-82
1-17-24	LAB—Complete <i>Ubiquity of Bacteria</i> and <i>The Fungi</i> LAB— <i>Microbial Scavenger Hunt</i>	Lab Exercise 3
1-18-24	LECTURE—Bacterial cell structure DISEASE OF THE DAY--Malaria	pp. 124-144
WEEK 3		
1-22-24	LAB—Observing Fungi LAB— <i>Bacterial Capsules (Negative staining)</i> LAB— <i>Aseptic Techniques</i>	Lab Exercise 4
1-23-24	LECTURE—Bacterial cell structure (continued) DISEASE OF THE DAY—Zika Fever	pp. 124-144
1-24-24	LAB— <i>Smear preparation & Simple Staining</i> LAB— <i>Comparing yeast and bacteria</i>	Lab Exercise 5
1-25-24	UNIT EXAM I	
WEEK 4		
1-29-24	LAB— <i>Gram Staining</i>	Lab Exercise 6
1-30-24	LECTURE—Eukaryotic cell structure DISEASE OF THE DAY--Cholera	pp. 144-152
1-31-24	LAB—Set up: <i>Enumeration of bacteria on natural foods</i>	Lab Exercise 7
2-1-24	LECTURE—Eukaryotic infectious agents LECTURE— Viruses & viroids DISEASE OF THE DAY— <i>Shigella</i> and <i>E. coli</i> infections	pp. 350-382
WEEK 5		
2-5-24	LAB—Complete: <i>Enumeration of bacteria on natural foods</i> LAB—Set up <i>Selective and differential media & Isolation of bacteria from natural foods (Streak plates using PEA & MacConkey agar)</i> LAB—Set up <i>Effects of UV light</i>	Lab Exercise 8
2-6-24	LECTURE— Viruses & viroids DISEASE OF THE DAY—Salmonellosis/Typhoid fever	pp. 350-382

2-7-24	LAB—Complete <i>Effects of UV light</i> LAB— <i>Spore staining</i> LAB—Continue <i>Selective and differential media & Isolation of bacteria from natural foods (EMB agar)</i>	Lab Exercise 9
2-8-24	LECTURE— Dynamics of bacterial growth DISEASE OF THE DAY—Viral gastroenteritis; amoebic dysentery	pp. 156-186
WEEK 6		
2-12-24	LAB—Continue <i>Selective and differential media & Isolation of bacteria from natural foods (Nutrient agar)</i> LAB--Set up <i>Enumeration of virus particles</i>	Lab Exercise 10
2-13-24	LECTURE— Environmental influences on bacterial growth DISEASE OF THE DAY—Bacterial food poisonings	pp. 156-186
2-14-24	LAB—Continue <i>Selective and differential media & Isolation of bacteria from natural foods (Nutrient agar)</i> LAB—Complete <i>Enumeration of virus particles</i> LAB—Set up <i>Effectiveness of disinfectants</i>	Lab Exercise 11
2-15-24	UNIT EXAM II	
WEEK 7		
2-19-24	LAB—Complete <i>Effectiveness of disinfectants</i> LAB—Set up <i>Identifications - Part I: Morphology, Motility and Cultural Characteristics</i>	Lab Exercise 12
2-20-24	LECTURE—Intro to bacterial metabolism DISEASE OF THE DAY— Polio	pp. 106-118
2-21-24	LAB—Complete <i>Identifications - Part I: Morphology, Motility and Cultural Characteristics</i> LAB—Set up <i>Identifications - Part II: Fermentations</i> LAB— <i>Gram stain of unknowns</i>	Lab Exercise 13
2-22-24	LECTURE— Bacterial metabolism DISEASE OF THE DAY-- Measles (Rubeola & Rubella)	pp. 192-218
WEEK 8		
2-26-24	LAB—Complete <i>Identifications - Part II: Fermentations</i> LAB—Set up <i>Identifications - Part III: Fat & protein metabolism</i>	Lab Exercise 14
2-27-24	LECTURE— Bacterial metabolism DISEASE OF THE DAY— Mumps & Chickenpox	pp. 192-218
2-28-24	LAB—Complete <i>Identifications - Part III: Fat & protein metabolism</i> LAB— <i>Identification of Unknown Bacterium</i>	Lab Exercise 15
2-29-24	LECTURE—Controlling metabolism DISEASE OF THE DAY— Diphtheria & Whooping cough	pp. 244-254
WEEK 9		
3-4-24	LAB QUIZ I	
3-5-24	LECTURE—Controlling metabolism DISEASE OF THE DAY—Wound infections	pp. 244-254
3-6-24	LAB—Set up <i>Staphylococcus aureus Experiment: Inoculation of SM medium</i> LAB— <i>DNA extraction -- unknowns</i>	Lab Exercise 16
3-7-24	UNIT EXAM III	
WEEK 10 SPRING BREAK - NO CLASSES		
WEEK 11		
3-18-24	LAB—Continue <i>Staphylococcus aureus Experiment: Streak onto Mannitol-Salt agar</i> LAB—Set up <i>PCR-based analysis of unknown bacteria</i> LAB— <i>RFLP-based fingerprinting (gel electrophoresis)</i>	Lab Exercise 17

3-19-24	LECTURE—Bacterial genetics DISEASE OF THE DAY—Influenza	pp. 225-244
3-20-24	LAB—Continue <i>Staphylococcus</i> Experiment: <i>Streak onto DNA agar and Blood agar</i> LAB—Continue PCR-based analysis of unknown bacteria (gel electrophoresis)	Lab Exercise 18
3-21-24	LECTURE—Bacterial genetics DISEASE OF THE DAY—Coronavirus infections	pp. 225-244
WEEK 12		
3-25-24	LAB--Complete <i>Staphylococcus</i> Experiment: Slide agglutination LAB—Set up Antimicrobial Sensitivity Testing	Lab Exercise 19
3-26-24	LECTURE—Host-microbe interactions and the disease process DISEASE OF THE DAY--Bacterial pneumonia	pp. 524-560
3-27-24	LAB—Complete Antimicrobial Sensitivity Testing	Lab Exercise 20
3-28-24	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY— Tuberculosis	pp. 428-482
WEEK 13		
4-1-24	LAB—Set up Transformation of <i>E. coli</i> LAB—Intro to Prevalence of Antibiotic Resistance in the Environment (PARE) project	Lab Exercise 21
4-2-24	LECTURE—Defenses: Innate immunity DISEASE OF THE DAY— Bacterial and viral meningitis	pp. 456-482
4-3-24	LAB—Complete Transformation of <i>E. coli</i> LAB—ELISA	Lab Exercise 22
4-4-24	UNIT EXAM IV	
WEEK 14		
4-8-24	LAB—Set up PARE Project: Dilutions	Lab Exercise 23
4-9-24	LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY—Viral hepatitis	pp. 480-560
4-10-24	LAB—Complete PARE project: Counting	Lab Exercise 24
4-11-24	LECTURE—Applications DISEASE OF THE DAY— <i>Chlamydia</i> & Gonorrhea	pp. 842-872
WEEK 15		
4-15-24	LAB QUIZ II	
4-16-24	LECTURE—Controlling disease (medications) DISEASE OF THE DAY-- Syphilis	pp. 397-422
4-17-24	LAB—Student presentations (6)	
4-18-24	LECTURE—Controlling disease (medications) DISEASE OF THE DAY—Genital herpes & genital warts	pp. 397-422
WEEK 16		
4-22-24	LAB—Student presentations (6)	
4-23-24	LECTURE—Epidemiology DISEASE OF THE DAY— HIV infections	pp. 878-902
4-24-24	LAB—Student presentations (6)	
4-25-24	UNIT EXAM V	
WEEK 17		
4-29-24	LAB—Student presentations (6)	
4-30-24	COMPREHENSIVE FINAL EXAM @ 8:00 AM	