

VALDOSTA STATE UNIVERSITY

BIOLOGY 2900—FALL 2021

INSTRUCTOR: Dr. J. A. NIENOW

OFFICE: 2089 Bailey Science Center; 249-4844

Office hours: MW 3:30 to 5:00, TTh 10:00 to 11:00 or by appointment

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REQUIRED TEXT:

- Foster, J. W., Z. Aliabadi, J. L. Slonczewski. 2021. Microbiology, The Human Experience. 2nd 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

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, 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. 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. 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. The will include a mix of explanations and analysis of laboratory procedures; it is worth 100 points. 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.

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 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 2021

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

| WEEK 1 | | |
|---------------|--|--|
| 8-16-21 | LAB--Orientation; Lab safety; Lab safety quiz (on-line) LAB-- <i>Hand-washing exercise</i> | pp. ix-xiv; supplement exercise 35 |
| 8-17-21 | LECTURE— Introduction to microbiology DISEASE OF THE DAY--Rabies | pp. 1-58 |
| 8-18-21 | LAB-- <i>Brightfield microscopy: Animal parasites</i> LAB—Set up <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts & Molds</i> | exercise 2, supplement exercise 6, 7 |
| 8-19-21 | LECTURE—Introduction to microbiology (continued) DISEASE OF THE DAY—Smallpox | pp. 1-58 |
| WEEK 2 | | |
| 8-23-21 | LAB—Complete <i>Ubiquity of Bacteria</i> and <i>The Fungi: Yeasts & Molds</i> LAB—More microscopy: <i>Living protozoa, algae, cyanobacteria</i> | exercise 6, 7 exercise 5 |
| 8-24-21 | LECTURE—Basic concepts in medical microbiology LECTURE—Microscopy DISEASE OF THE DAY—Bubonic plague | pp. 32-58 pp. 62-82 |
| 8-25-21 | LAB—Observing Fungi LAB— <i>Aseptic Techniques</i> LAB— <i>Negative Staining</i> | exercise 6,7; handouts exercise 9 |
| 8-26-21 | LECTURE—Bacterial cell structure DISEASE OF THE DAY--Malaria | pp. 124-144 exercise 9 |
| WEEK 3 | | |
| 8-30-21 | LAB—Work on <i>Smear preparation, Simple Staining</i> LAB— <i>Comparing yeasts and E. coli</i> | exercise 10, 11 handout |
| 8-31-21 | LECTURE—Bacterial cell structure (continued) DISEASE OF THE DAY—Zika fever | pp. 124-144 |
| 9-01-09 | LAB— <i>Gram Staining</i> | exercise 14 |
| 9-02-21 | UNIT EXAM I | |
| WEEK 4 | | |
| 9-06-21 | LABOR DAY HOLIDAY—NO CLASS | |
| 9-07-21 | LECTURE—Eukaryotic cell structure LECTURE— Viruses & viroids DISEASE OF THE DAY--Cholera | pp. 144-152 pp. 350-382 |
| 9-08-21 | LAB—Set up: <i>Enumeration of bacteria on natural foods</i> LAB— <i>Gram Staining</i> | handout exercise 14 |
| 9-09-21 | LECTURE— Viruses & viroids DISEASE OF THE DAY— <i>Shigella</i> and <i>E. coli</i> infections | pp. 350-382 |
| WEEK 5 | | |
| 9-13-21 | 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> | handout handout Exercise 10 exercise 30 |
| 9-14-21 | LECTURE— Dynamics of bacterial growth DISEASE OF THE DAY—Salmonellosis/Typhoid fever | pp. 156-186 |

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| 9-15-21 | 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> | exercise 30 exercise 15 exercise 10; handout |
| 9-16-21 | LECTURE— Environmental influences on bacterial growth DISEASE OF THE DAY— Bacterial food poisonings | pp. 156-186 |
| WEEK 6 | | |
| 9-20-21 | 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> | handout exercise 10 handout |
| 9-21-21 | LECTURE—Intro to bacterial metabolism DISEASE OF THE DAY—Viral gastroenteritis; amoebic dysentery | pp. 106-118 |
| 9-22-21 | LAB—Complete <i>Enumeration of virus particles</i> LAB—Set up <i>Identifications - Part I: Morphological Study of an Unknown Bacterium; Motility Determination; Cultural Characteristics</i> | handout exercise 24; exercise 18, 25 |
| 9-23-21 | UNIT EXAM II | |
| WEEK 7 | | |
| 9-27-21 | LAB—Complete <i>Identifications - Part I: Morphological Study of an Unknown Bacterium; Motility Determination; Cultural Characteristics</i> LAB—Set up <i>Identifications - Part II: Fermentations</i> | exercise 24 exercise 18, 25 exercise 26, 27 |
| 9-28-21 | LECTURE— Bacterial metabolism DISEASE OF THE DAY--Polio | pp. 192-218 |
| 9-29-21 | LAB—Complete <i>Identifications - Part II: Fermentations</i> LAB—Set up <i>Identifications - Part III: Fat & protein metabolism</i> LAB— <i>Gram stain of unknowns</i> | exercise 26, 27 exercise 27, 28 exercise 14 |
| 9-30-21 | LECTURE— Bacterial metabolism DISEASE OF THE DAY— Measles (Rubeola & Rubella) | pp. 192-218 |
| WEEK 8 | | |
| 10-04-21 | LAB—Complete <i>Identifications - Part III: Fat & protein metabolism</i> LAB— <i>Identification of Unknown Bacterium</i> | exercise 27, 28 handouts |
| 10-05-21 | LECTURE—Controlling metabolism DISEASE OF THE DAY—Mumps & Chickenpox | |
| 10-06-21 | LAB—Set up <i>Staphylococcus aureus Experiment: Inoculation of SM medium</i> LAB—Set up <i>RFLP-based DNA fingerprinting</i> LAB—Set up <i>DNA extraction -- unknowns</i> | exercise 52 handouts handouts |
| 10-07-21 | LECTURE—Controlling metabolism DISEASE OF THE DAY— Bacterial and viral meningitis | pp. 244-254 |
| WEEK 9 | | |
| 10-11-21 | FALL BREAK – NO CLASS | |
| 10-12-21 | FALL BREAK – NO CLASS | |
| 10-13-21 | LAB—Continue <i>Staphylococcus aureus Experiment: Streak onto Mannitol-Salt agar</i> LAB—Continue <i>RFLP-based fingerprinting (gel electrophoresis)</i> LAB—Set up <i>PCR-based analysis of unknown bacteria</i> | exercise 52 handouts handouts |
| 10-14-21 | UNIT EXAM III | |
| WEEK 10 | | |
| 10-18-21 | LAB—Continue <i>Staphylococcus Experiment: Streak onto DNA agar and Blood agar</i> LAB—Continue <i>PCR-based analysis of unknown bacteria (gel electrophoresis)</i> | exercise 52 handout handout |

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| 10-19-21 | LECTURE—Bacterial genetics DISEASE OF THE DAY--Influenza | pp. 225-244 |
| 10-20-21 | LAB--Complete <i>Staphylococcus</i> Experiment: Slide agglutination LAB—Set up <i>Antimicrobial Sensitivity Testing</i> | exercise 52 exercise 21 |
| 10-21-21 | LECTURE—Bacterial genetics DISEASE OF THE DAY—Coronavirus infections | pp. 225-244 |
| WEEK 11 | | |
| 10-25-21 | LAB—Complete <i>Antimicrobial Sensitivity Testing</i> LAB—Intro to <i>Prevalence of Antibiotic Resistance in the Environment (PARE)</i> project | exercise 21 handout |
| 10-26-21 | LECTURE—Host-microbe interactions and the disease process DISEASE OF THE DAY--Bacterial pneumonia | pp. 524-560 |
| 10-27-21 | LAB QUIZ I | |
| 10-28-21 | LECTURE—Defenses: Innate immunity DISEASE OF THE DAY— Tuberculosis | pp. 428-482 |
| WEEK 12 | | |
| 11-01-21 | LAB—Set up <i>PARE Project I: Counting</i> | handout |
| 11-02-21 | LECTURE—Defenses: Innate immunity DISEASE OF THE DAY— Diphtheria & Whooping cough | pp. 456-482 |
| 11-03-21 | LAB—Complete <i>PARE project I: Counting</i> LAB—Begin <i>PARE Project II: Transformation</i> | handout |
| 11-04-21 | UNIT EXAM IV | |
| WEEK 13 | | |
| 11-08-21 | LAB—Continue <i>PARE Project II: Transformation</i> | handout |
| 11-09-21 | LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY— <i>Rickettsia</i> infections | pp. 480-560 |
| 11-10-21 | LAB—Continue <i>PARE Project II: Transformation</i> LAB—Set up <i>Transformation of E. coli</i> | handout handout |
| 11-11-21 | LECTURE—Defenses: Adaptive immunity DISEASE OF THE DAY— <i>Chlamydia</i> & Gonorrhea | pp. 480-560 |
| WEEK 14 | | |
| 11-15-21 | LAB—Complete <i>PARE Project II: Transformation</i> LAB—Set up <i>ELISA</i> | handout handout |
| 11-16-21 | LECTURE—Applications DISEASE OF THE DAY-- Syphilis | pp. 842-872 |
| 11-17-21 | LAB QUIZ II | |
| 11-18-21 | LECTURE—Controlling disease (medications) DISEASE OF THE DAY—Viral hepatitis | pp. 397-422 |
| WEEK 15 | | |
| 11-22-21 | LAB—Student presentations (6) | |
| 11-23-21 | LECTURE—Controlling disease (medications) DISEASE OF THE DAY—Genital herpes & genital warts | pp. 397-422 |
| 11-24-21 | THANKSGIVING HOLIDAY—NO CLASSES | |
| 11-25-21 | THANKSGIVING HOLIDAY—NO CLASSES | |
| WEEK 16 | | |
| 11-29-21 | LAB—Student presentations (6) | |
| 11-30-21 | LECTURE—Epidemiology DISEASE OF THE DAY— HIV infections | pp. 878-902 |
| 12-01-21 | LAB—Student presentations (6) | |
| 12-02-21 | UNIT EXAM V | |
| WEEK 17 | | |
| 12-06-21 | LAB—Student presentations (6) | |
| 12-07-21 | COMPREHENSIVE FINAL EXAM @ 8:00 AM | |

