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**Biology Department, College of Arts & Sciences, Valdosta State University**

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**FALL 2008----COURSE SYLLABUS\***

**BIOL 3100, Sections A & B. Microbiology (CRN 81145 & 81146) - 4 credit hours**

**BIOL 5100, Sections A & B. Microbiology (CRN 81165 & 81166) – 4 credit hours\*\***

<b>Class:</b>	<b>TR</b>		<b>8:00-9:15 am, 2022 Bailey Science Center</b>
<b>Laboratory:</b>	<b>TR</b>	<b>3100/5100 <u>Section A</u></b>	<b>10:00-11:25 am, 2068 Bailey Science Center</b>
	<b>TR</b>	<b>3100/5100 <u>Section B</u></b>	<b>2:00-3:25 pm, 2068 Bailey Science Center</b>

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**Office:** 2091 Bailey Science Center  
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**Course Description:**

**BIOL 3100 Microbiology 3-3-4 (4 credit hours)**

**Prerequisites:** BIOL 2010, BIOL 2230, BIOL 2270, CHEM 1212/1212L. **Recommended:** CHEM 3402.

**BIOL 5100 Microbiology 3-3-4 (4 credit hours)**

**Prerequisite:** Admission into the graduate program or permission of the instructor.

Survey of microbiology covering eubacteria, archaebacteria, protozoa, fungi, algae, and viruses. Includes fundamental techniques, microbial physiology and genetics, biotechnology, medical applications, and applied microbiology. Two 1.5 hour laboratory periods per week.

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**Required Materials:**

**Textbook:** **BROCK BIOLOGY OF MICROORGANISMS, Twelfth Edition**  
by Michael T. Madigan, John M. Martinko, Paul V. Dunlap, and David P. Clark  
Prentice Hall 2009

**Laboratory Manual:** **BENSON'S MICROBIOLOGICAL APPLICATIONS, LABORATORY MANUAL  
IN GENERAL MICROBIOLOGY (Complete Version), Eleventh Edition**  
by Alfred E. Brown  
McGraw-Hill, Inc. 2009

**Other Materials:** Calculator that is not integrated with a cell phone  
Permanent, fine-tip marking pen ("Sharpie") for labeling cultures in lab  
One CD (or jump drive) for oral presentation  
One thin, light-weight folder for handing in references & other assignments (Please do not  
use a 3-ring binder to hand in assignments.)  
paper clips or stapler/staples for organizing references & assignments

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**Special notes to students:**

1. In order to respect the privacy of each student, exam scores and grades will not be posted, given out by telephone, or sent to students by email.
  2. Students should consult the VSU Student Handbook, Undergraduate (or Graduate) Catalog, Fall Semester Calendar, Schedule of Classes, & Registration Guide for information about VSU policies and procedures regarding registration, drop/add, and withdrawal. October 9 is midterm. Students may not withdraw after midterm except in cases of hardship.
  3. 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, 1115 Nevins Hall. The phone numbers are 245-2498 (voice) and 210-1348 (tty).
  4. Cell phones may not be used during examinations or at any time in class or lab.
  5. Students must read and follow the Student Code of Conduct as outlined in the VSU Student Handbook. VSU policies regarding academic dishonesty are explained in Appendix A, Section 1.
  6. Students must read and follow the Biology Department policy on plagiarism (available online through the departmental web site). The instructor may use a variety of methods for detecting plagiarism.
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**\*This is a tentative syllabus. Changes to this syllabus will be announced during class or laboratory periods; alternatively, changes will be posted on WebCT.**

**\*\*Graduate students who are taking BIOL 5100 must meet with the instructor to discuss additional course requirements & grading.**

## **Course Objectives:**

(Page 3 shows how the objectives below are aligned with the VSU General Education Outcomes and the Biology Department Education Outcomes.)

### **After successful completion of this course, the student should be able to:**

- A. List and describe the three domains of living organisms.
- B. List and describe the three types of noncellular infectious agents.
- C. List several activities of microorganisms that are beneficial to humans and the environment.
- D. List and briefly explain several current challenges in medical microbiology and infectious diseases.
- E. Compare and contrast the structure and function of the microorganisms in the domains Bacteria, Archaea, and Eukarya.
- F. List and describe the various strategies used by microorganisms to obtain carbon, energy, and electrons.
- G. Describe the growth of a pure culture of bacteria in a closed system, and perform mathematical calculations related to the exponential growth phase. Explain several ways in which bacterial growth can be measured.
- H. Compare and contrast the following processes as they occur in Bacteria, Archaea, and Eukarya: DNA replication, transcription, and translation.
- I. Describe several mechanisms through which gene expression is regulated in bacteria.
- J. Describe in detail how viruses replicate.
- K. Describe the causes and consequences of mutations.
- L. Describe the three mechanisms of horizontal gene transfer in bacteria, and explain their significance.
- M. Describe specific examples of the use of microorganisms in genetic engineering and biotechnology.
- N. Briefly explain the role of microorganisms in the evolutionary history of life on earth.
- O. List and describe a variety of methods and approaches that are used to detect and identify various microorganisms and noncellular infectious agents.
- P. Explain how physical methods and chemical agents (antiseptics and disinfectants) are used for controlling microbes.
- Q. State the mechanisms of action of various antibacterial, antifungal, and antiviral medications.
- R. Discuss the problem of antimicrobial drug resistance, and explain several ways in which the emergence of drug resistant bacteria can be minimized.
- S. Give examples of beneficial interactions between: (i) microorganisms and plants, (ii) microorganisms and animals, and (iii) different types of microorganisms.
- T. Describe the role of microorganisms in the cycling of nutrients, using examples from the carbon cycle, the nitrogen cycle, and the sulfur cycle.
- U. Describe in detail: (i) the innate defenses of humans and (ii) the adaptive immune response of a human to a foreign antigen.
- V. Explain how infectious diseases are transmitted, giving specific examples.
- W. List the major types of virulence factors observed in pathogenic bacteria, giving specific, detailed examples.
- X. List and describe several human diseases that are due to specific bacteria, viruses, and fungi.
- Y. Describe the general course of the disease caused by human immunodeficiency virus (HIV).
- Z. Properly handle microorganisms in a biosafety level 2 laboratory.
- ZA. Use a compound light microscope to examine various types of microorganisms.
- ZB. Keep accurate records of microscopic observations, as well as other laboratory and field work.
- ZC. Use culture media to grow bacteria and fungi in the laboratory, and maintain stock cultures.
- ZD. Use staining techniques, physiological tests, and rRNA sequences as aids in bacterial identification.
- ZE. Use dilutions to determine the colony-forming units per milliliter in a bacterial suspension and the plaque-forming units per milliliter in a viral suspension.
- ZF. Work with others to formulate an answerable question, develop a hypothesis, design and conduct an experiment, collect and organize data, and write a formal report in the format used in a scientific journal.
- ZG. Use library and electronic resources to obtain formal scientific articles related to a particular topic in microbiology.
- ZH. Read the articles mentioned in objective ZG and give an oral presentation based on them.

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### **Alignment of Assignments with Course Objectives:**

The course objective(s) aligned with each assignment are given on page 11.

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### **Alignment of Course Objectives with VSU General Education Outcomes & Biology Department Educational Outcomes:**

The VSU General Education Outcomes (1-8) are available online at

<http://www.valdosta.edu/academic/VSUGeneralEducationOutcomes.shtml>.

In this syllabus, the VSU General Educational Outcomes are designated as: VSU1-VSU8

The Biology Department Educational Outcomes (1-5) are in the Undergraduate Catalog on page 108. The catalog is available online through <http://www.valdosta.edu>. In this syllabus the Biology Department Educational Outcomes are designated as: B1-B5.

The course objectives that are aligned with the VSU General Education Outcomes and Biology Department Educational Outcomes are given below:

<u>VSU or Biology Objective</u>	<u>Course Objective(s)</u>
VSU1	D, R, V, X, Y
VSU2	D, R, V, X, Y
VSU3	ZF, ZG, ZH
VSU4	ZB, ZF, ZH
VSU5	all course objectives
VSU6	-----
VSU7	G, ZA, ZE, ZF, ZH
VSU8	-----
B1	Z, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH
B2	A, B, D, H, J, K, L, N, O, R, X, Y
B3	A, D, E, F, G, H, I, O, P, Q, U, W, X, Y
B4	D, H, I, J, K, L, M, O, X, Y
B5	C, D, S, T, V

### **BIOLOGY 3100/5100. Microbiology - Class and Lab Schedule**

<b>Date</b>	<b>Topics/Lab Exercises</b> (Additional notes for lab exercises)	<b>Related material in text</b>
Tues. Aug. 19	General course information Microorganisms and microbiology	<b>Chap. 1</b>
Tues. Aug. 19L	>Program #1, <i>The Microbial Universe</i> SUPPL. EX., HANDWASHING <b><u>Wash your hands before leaving lab!</u></b> >PLEASE READ THE FOLLOWING BEFORE AUGUST 26: SUPPL. EX., WINOGRADSKY COLUMN; EX. 54 WINOGRADSKY COLUMN (IN LAB MANUAL), AND PAGES 654-657 IN THE TEXTBOOK. <b>YOUR GROUP'S LAB REPORT ON THE WINOGRADSKY COLUMN PROJECT (DUE NOV. 25)</b> must be written in the style of a scientific paper and must contain the following sections: <u>Title, Authors, Abstract, Introduction, Materials and Methods, Results, Discussion, Literature Cited, and an Appendix.</u> The Results section must include your group's organized observations on the Winogradsky columns, selected drawings, and a written description of the results. The Appendix must contain each lab group member's <u>original</u> written notes and drawings for the project. The overall format for the report must follow the "Instructions for Authors" for the <i>Journal of Bacteriology</i> (available online at <a href="http://jb.asm.org/misc/ifora.shtml">http://jb.asm.org/misc/ifora.shtml</a> )	
Thurs. Aug. 21	Microorganisms and microbiology An overview of microbial life Cell structure/function <b><u>Independent study/review:</u></b> <b>Review of chemistry and biochemistry; DNA structure &amp; replication; transcription; translation</b>	<b>Chap. 1</b> <b>Chap. 2</b> <b>Chap. 4</b> <b>Chap. 3</b> <b>Chap. 7</b>
Thurs. Aug. 21L	>LABORATORY SAFETY (Read handout & p. ix-xv in lab manual before Aug. 26.) >EX. 19, CULTURE MEDIA PREPARATION (Preparation of nutrient broth and nutrient agar) Students should be able to explain how nutrient broth, nutrient agar plates, and nutrient agar slants are prepared. Complete questions, p. 139-140. >PLEASE READ THE FOLLOWING BEFORE AUGUST 28: EX. 1, MICROSCOPY, "MICROSCOPE CARE & USE" (in the course packet), and "MICROSCOPE CHECKLIST" (in the course packet)	
Tues. Aug. 26	Cell structure/function	<b>Chap. 4</b>

Date	Topics/Lab Exercises	Related material in text
Tues. Aug. 26L	>LAB ORIENTATION >LABORATORY SAFETY >EX. 9, ASEPTIC TECHNIQUE <b><u>Wash your hands before leaving lab!</u></b> <ul style="list-style-type: none"> <li>• <i>Discuss the Winogradsky Column Project with your lab group. Decide on a question, formulate a hypothesis, and decide how you will conduct the experiment. Decide on your assignments for the Winogradsky Column Project, and bring any required materials to lab on Tuesday, Sept. 2. Each group of 4 students will build at least two columns.</i></li> </ul>	
Thurs. Aug. 28	Cell structure/function	<b>Chap. 4</b>
Thurs. Aug. 28L	>EX. 1, MICROSCOPY (read before lab) >MICROSCOPE CARE & USE ; MICROSCOPE CHECKLIST (read before lab) >SUPPL. EX., Examination of stained slides and wet mounts of the yeast <i>Saccharomyces cerevisiae</i> (a fungus) and the bacterium <i>Escherichia coli</i> ( <b>Hand in your drawings to the instructor at the end of lab.-8 points.</b> ) >FINISH EX. 9, ASEPTIC TECHNIQUE (Answer questions, p. 79-80.) >EX. 7, UBIQUITY OF BACTERIA Complete steps 1-7, but omit step 6.	
Tues. Sept. 2	Cell structure/function Eukaryotic microorganisms	<b>Chap. 4 &amp; 9 (pages 235-236) Chap. 18</b>
Tues. Sept. 2L	>EX. 8, THE FUNGI (Page 64, Fungi Study. You will prepare the plates we will use next week. Work in groups of 4 and expose 2 plates of Sabouraud dextrose agar to air for 45 minutes. Expose one plate inside the building and the other plate outside. Incubate the plates at room temperature until next week.) >SUPPL. EX., WINOGRADSKY COLUMN (WE WILL USE THE PROCEDURE IN THE SUPPL. EX., BUT PLEASE READ EX. 54 IN THE LAB MANUAL AS WELL.) <b><u>Discuss plans for the lab report with your group.</u></b>	<b>TEXT, P. 654-657</b>
Thurs. Sept. 4	Eukaryotic microorganisms	<b>Chap. 18</b>
Thurs. Sept. 4L	>FINISH EX. 7, THE BACTERIA (Complete table, p. 57. Answer short answer questions 1 & 2 on page 58.) <u>Ask instructor to save any plates you want to use for fungal slides on Sept. 9.</u> >EX. 11, SMEAR PREPARATION & EX. 12, SIMPLE STAINING (Prepare smears from 3 different bacterial colonies from Ex. 7 plates. Use the technique for preparing smears from a slant culture [see Ex. 11], & stain with methylene blue or crystal violet [see Ex. 12].) We will use paper towels instead of bibulous paper. Draw the organisms as they appear with the oil immersion objective on page 104 or 105. > <b><u>Additional simple stain:</u></b> Aseptically remove a sterile swab from wrapping paper & swab your gums and teeth. Gently rub swab onto a DRY slide. Allow smear to air dry; then heat fix. Stain with <b><u>methylene blue</u></b> , rinse, and blot dry. Examine with oil immersion objective. Draw epithelial cells and bacteria on page 104 or 105.	
Tues. Sept. 9	Eukaryotic microorganisms Nutrition, culture, & metabolism of microorganisms	<b>Chap. 18 Chap. 5 &amp; 21</b>
Tues. Sept. 9L	>FINISH EX. 8, THE FUNGI (Fungi Study – Do NOT open fungal cultures in the lab. Open them only in the biological safety cabinet. You will use transparent tape to prepare slides of two or more different molds. The instructor will describe this procedure. Examine the slides using the low power (10x) objective and the high dry (40x) objective. Draw the specimens on p.67, part A2. Also record a description of the appearance of the fungal colonies. Answer the questions on p. 68.) >EX. 13, NEGATIVE STAINING (We will use the method in Fig. 13.1); On page 102, follow steps 1-7, but <b>omit step #4.</b> Draw a few representative <i>Staphylococcus aureus</i> cells and <i>Bacillus subtilis</i> cells on page 104 or 105. Answer questions 1-5, page 106; and answer questions on page 107. (You may need to consult Ex. 14 to answer the questions about the capsule stain.) CONTINUED ON PAGE 5.....	

Date	Topics/Lab Exercises	Related material in text
Tues. Sept. 9L	<p>.....CONTINUED FROM PAGE 4</p> <p>&gt;MONITOR WINOGRADSKY COLUMNS (Record information about the columns and make neat, detailed drawings of any microorganisms observed. Use the information in EX. 6 , PROTOZOA, ALGAE, &amp; CYANOBACTERIA to aid you in recognizing different groups of organisms. At some point during the semester, be sure you see and draw examples of protozoa, algae, &amp; cyanobacteria.) <b><u>Discuss plans for the Winogradsky lab report with your group.</u></b></p>	
Thurs. Sept. 11	<p>Nutrition, culture, &amp; metabolism of microorganisms</p>	<b>Chap. 5, 21, &amp; 20</b>
Thurs. Sept. 11L	<p>&gt;EX. 10, PURE CULTURE TECHNIQUES, STREAK-PLATE METHOD ONLY Prepare your own mixed culture of <i>Serratia marcescens</i>, <i>Staphylococcus aureus</i>, &amp; <i>Escherichia coli</i>, according to the instructor's guidelines. You will use a prepared nutrient agar plate for doing the quadrant streak (<b>method B</b> on page 85).</p> <p>&gt;EX. 15, GRAM STAINING, Prepare smears from nutrient agar slant cultures as described on p.96 of lab manual. Complete drawings/questions, p. 119-122; omit questions 1 &amp; 2 on p. 122.)</p> <p>&gt;DISTRIBUTION OF GENERAL UNKNOWN CULTURES (<b>RECORD THE GENERAL UNKNOWN #</b>) READ ABOUT STOCK CULTURES IN EX. 20. (Prepare subcultures &amp; gram stain the unknown. Record dates, work done, drawings, etc., on your own unknown record sheet. Also record your results on the descriptive chart on page 263.)</p> <p>&gt;<b>YOUR LAB REPORT ON THIS GENERAL UNKNOWN (which is due on Nov. 13)</b> should be organized in a thin folder that contains the following: (i) a well-organized and complete copy of your unknown record sheets, including your drawings, (ii) a <b>neat and complete</b> copy of the descriptive sheet (p. 263 in lab manual) with the results of all of the tests performed (do not make your own table—use the one in the lab manual or a photocopy of it), (iii) a statement of your conclusion about the identity of the unknown bacterium (based on EX. 44 and <i>Bergey's Manual of Determinative Bacteriology</i>, and (iv) a paragraph explaining &amp; discussing the following: how you arrived at your conclusion, any test results that are inconsistent with your conclusion, &amp; any additional tests that would allow you to more specifically identify your unknown. <b><u>Do NOT describe the methods used for performing the various tests in your report.</u></b></p> <p>&gt;<b>HAND IN REFERENCES FOR ORAL PRESENTATION (10 POINTS)</b></p>	
Tues. Sept. 16	<b>EXAM 1</b> (Material covered through Sept. 11)	
Tues. Sept. 16L	<p>&gt;FINISH EX. 10, EVALUATE STREAK-PLATE; PREPARE ANOTHER STREAK PLATE USING ONE OF YOUR UNKNOWN SUBCULTURES AS AN INOCULUM.</p> <p>&gt;EX. 22, ENUMERATION OF BACTERIA (POUR PLATE METHOD) (Omit p. 155-157)</p> <p>&gt;<b>WORK DILUTION PROBLEMS IN COURSE PACKET</b></p> <p>&gt;MONITOR WINOGRADSKY COLUMNS – <b><u>Discuss plans for lab report with your group.</u></b></p>	
Thurs. Sept. 18	Metabolic diversity of microorganisms	<b>Chap.15, 16, &amp; 17</b>
Thurs. Sept. 18L	<p><i>Program #3, Metabolism</i></p> <p>&gt;EXAMINE STREAK PLATE OF UNKNOWN. Measure diameter of colonies and record a description of colonies on your unknown record sheet and on the descriptive chart on p. 263. Consult p. 268 (Ex. 40).</p> <p>&gt;FINISH EX. 22, ENUMERATION OF BACTERIA (POUR PLATE METHOD)</p> <p>&gt;<b>WORK DILUTION PROBLEMS ON HANDOUT; ASK QUESTIONS ABOUT PROBLEMS</b></p> <p>&gt;<b>PICK UP 2 STERILE, 50 ML TUBES TO COLLECT FRESH WATER SAMPLE</b></p>	<b>Chap. 24 (p. 717-720); chap. 25 (p. 749-755), &amp; Chap. 36 (p. 1026-1032)</b>
Tues. Sept. 23	Metabolic diversity of microorganisms	<b>Chap.15, 16, &amp; 17</b>

Date	Topics/Lab Exercises	Related material in text
Tues. Sept. 23L	<p><b><u>REMEMBER TO BRING 2 TUBES WITH FRESH WATER SAMPLE FOR TODAY'S LAB.</u></b></p> <p>&gt;SUPPL. EX., VARIOUS MEDIA (CULTURES FOR DESOXYCHOLATE AGAR AND PHENYL ETHYL ALCOHOL AGAR: <i>Escherichia coli</i>, <i>Staphylococcus aureus</i>, <i>Pseudomonas aeruginosa</i>, &amp; unknown) (CULTURES FOR BLOOD AGAR: <i>E. coli</i>, <i>S. aureus</i>, <i>Bacillus cereus</i>, &amp; unknown)</p> <p>&gt;A <b>THROAT CULTURE</b> WILL ALSO BE PERFORMED ON A BLOOD AGAR PLATE.</p> <p>&gt;EX. 61, BACTERIOLOGICAL EXAMINATION OF WATER (You will use the water collected in 2 sterile, 50 ml tubes for this exercise.)</p> <p>&gt;<b>WORK DILUTION PROBLEMS ON HANDOUT; ASK QUESTIONS ABOUT PROBLEMS</b></p>	
Thurs. Sept. 25	Microbial growth	<b>Chap. 6</b>
Thurs. Sept. 25L	<p>&gt;FINISH SUPPL. EX., VARIOUS MEDIA -- Record results in the table provided with the exercise.</p> <p><b><u>ALSO, record results for your unknown on your unknown record sheet, and on the descriptive chart on p. 263.</u></b></p> <p><b><u>Consider the following question: Is the pattern of growth of your unknown on the selective media consistent with the results you obtained in the Gram stain?</u></b></p> <p>&gt;CONTINUE EX. 61, BACTERIOLOGICAL EXAMINATION OF WATER (MPN+EMB/MAC) We will use MacConkey agar instead of Endo agar.</p> <p>&gt;MONITOR WINOGRADSKY COLUMNS- <b><u>Work on lab report with your group.</u></b></p> <p>&gt;<b>WORK DILUTION PROBLEMS ON HANDOUT; ASK QUESTIONS ABOUT PROBLEMS</b></p>	
Tues. Sept. 30	Microbial molecular biology DNA structure & replication; transcription, translation	<b>Chap. 3, 7, &amp; 8</b>
Tues. Sept. 30L	<p>&gt;COMPLETE EX. 61, BACTERIOLOGICAL EXAMINATION OF WATER (We will omit the "completed test procedure" and the IMViC tests.) Answer questions 4-9 on p. 398-399.</p> <p>&gt;EX. 33, ULTRAVIOLET LIGHT: LETHAL EFFECTS</p> <p>&gt;PREPARE NEW STOCKS OF UNKNOWNNS</p> <p>&gt;EX. 16, SPORE STAINING (Modified Schaeffer-Fulton Method) On one slide prepare a smear of the <i>Bacillus</i> species provided as well as a separate smear of your unknown. Complete drawings/questions, p. 119-122; omit questions 1 &amp; 2 on p. 122. Record results for unknown culture on unknown record sheet, and on the descriptive chart on p. 263.</p> <p>&gt;EX. 40, CULTURAL CHARACTERISTICS (You will inoculate your unknown in/on the following: nutrient agar slant [use a straight inoculation line], nutrient broth, motility medium [deep], nutrient gelatin deep, &amp; fluid thioglycollate medium.)</p> <p>&gt;EX. 18, MOTILITY DETERMINATION (TUBE METHOD ONLY) (You will inoculate tubes of motility medium with <i>Staphylococcus aureus</i>, <i>Proteus vulgaris</i>, &amp; your unknown.</p> <p>&gt;EX. 21, CULTIVATION OF ANAEROBES – We will not do this exercise, but you should read it with particular attention to the information about fluid thioglycollate.</p>	
Thurs. Oct. 2	Microbial molecular biology DNA structure & replication; transcription, translation Regulation of gene expression	<b>Chap. 7 &amp; 8</b> <b>Chap. 9</b>
Thurs. Oct. 2L	<p>&gt;EX. 17, ACID-FAST STAINING (Ziehl-Neelsen Method) Use 0.1% albumin solution instead of water for preparing the smears. On one slide prepare a smear of a mixture of <i>Mycobacterium smegmatis</i> &amp; <i>Staphylococcus aureus</i>, as well as a separate smear of your unknown. Complete drawings/questions, p. 119-122; omit questions 1 &amp; 2 on p. 122. Record results for unknown culture on unknown record sheet, and on the descriptive chart on p. 263.</p> <p>&gt;FINISH EX. 40. (Record results on unknown record sheet and on descriptive chart on p. 263. Consult Ex. 21 for information about fluid thioglycollate medium.)</p> <p>&gt;FINISH EX. 18, MOTILITY (TUBE METHOD &amp; WET MOUNT) (On pages 127-128, draw the motility tubes and answer questions 3 &amp; 5 in part B. Prepare a wet mount of the nutrient broth culture of your unknown and examine for motility using the microscope. Record the results of the motility tube test and wet mount for the unknown on the record sheet and in the descriptive chart on p. 263.)</p> <p>&gt;MONITOR WINOGRADSKY COLUMNS- <b><u>Work on lab report with your group.</u></b></p>	

<b>Date</b>	<b>Topics/Lab Exercises</b>	<b>Related material in text</b>
Tues. Oct. 7	Regulation of gene expression Viruses	<b>Chap. 9</b> <b>Chap. 10 &amp; 19</b>
Tues. Oct. 7L	FINISH EX. 33, ULTRAVIOLET LIGHT: LETHAL EFFECTS (Observe demonstration; record results & answer questions on p. 223-224.) >PREPARE NEW STOCKS OF UNKNOWN >EX. 41, OXIDATION AND FERMENTATION TESTS (OMIT VP TEST) >EX. 35, EFFECTIVENESS OF ALCOHOL <b>STUDENT ORAL PRESENTATIONS</b>	
Thurs. Oct. 9	Viruses	<b>Chap. 10 &amp; 19</b>
Thurs. Oct. 9L	>FINISH EX. 41(OMIT VP test) Record information on unknown record sheet, and on descriptive chart on p. 263. >FINISH EX. 35, EFFECTIVENESS OF ALCOHOL >MONITOR WINOGRADSKY COLUMNS - <b><u>Work on lab report with your group.</u></b> <b>STUDENT ORAL PRESENTATIONS</b>	
FALL BREAK		
Thurs. Oct. 16	<b>EXAM 2</b> (material covered through Oct. 9)	
Thurs. Oct. 16L	There will be no formal lab meeting today. > <b><u>Do the following online exercise on your own:</u></b> >SUPPL. EX., USING RIBOSOMAL RNA GENE SEQUENCES TO LEARN ABOUT A MICROORGANISM (8 POINTS) > <b><u>MEET WITH YOUR LAB GROUP TO WORK ON YOUR WINOGRADSKY COLUMN PROJECT WRITTEN REPORT.</u></b>	
Tues. Oct. 21	Microbial genetics	<b>Chap. 11</b>
Tues. Oct. 21L	>EX. 41, VP TEST ONLY >EX. 43, OTHER BIOCHEMICAL TESTS (We will omit the inoculation of Kligler's iron agar; however, be sure to read about hydrogen sulfide production.) >EX. 42, HYDROLYTIC/DEGRADATIVE REACTIONS (Modification: we will use tributyrin agar rather than spirit blue agar for the lipid hydrolysis test.) EX. 32, WATER ACTIVITY AND OSMOTIC PRESSURE >MONITOR WINOGRADSKY COLUMNS – <b><u>Work on lab report with your group.</u></b>	
Thurs. Oct. 23	Microbial genetics Genetic engineering & Biotechnology	<b>Chap. 11</b> <b>Chap. 12 &amp; 26</b>
Thurs. Oct. 23L	>HAND IN SUPPL. EX., RIBOSOMAL RNA SEQUENCES (8 POINTS) >CONTINUE EX. 32, WATER ACTIVITY AND OSMOTIC PRESSURE >CONTINUE EX. 41, CONTINUE INCUBATING TUBES FOR VP TEST >CONTINUE EX. 43, RECORD RESULTS; CONTINUE INCUBATING LITMUS MILK >FINISH EX. 42, HYDROLYTIC/DEGRADATIVE REACTIONS Answer questions 4-9 in part B, p. 291-292. In addition, answer questions in part C, p. 293-294. Record results on unknown on record sheet, and in descriptive chart on p. 263. >READ EX. 44, USE OF BERGEY'S MANUAL, & EXAMINE <b>APPENDIX 2 (TEXT)</b> >BERGEY'S MANUAL OF DETERMINATIVE BACTERIOLOGY is on reserve in the library. Consult it to find out which additional tests would allow you to more specifically identify your unknown. You will need this information for your lab report. <b>STUDENT ORAL PRESENTATIONS</b>	

<b>Date</b>	<b>Topics/Lab Exercises</b>	<b>Related material in text</b>
Tues. Oct. 28	Microbial genomics Microbial evolution & systematics Microbial identification & clinical microbiology	<b>Chap. 13</b> <b>Chap. 14</b> <b>Chap. 32</b>
Tues. Oct. 28L	>COMPLETE EX. 32, WATER ACTIVITY AND OSMOTIC PRESSURE Record results and answer questions on p. 219. >FINISH VP TEST (EX. 41) & LITMUS MILK (EX. 43). Record information on unknown record sheets and in descriptive chart, p. 263. >SUPPL. EX., PLAQUE ASSAY OF A PHAGE SUSPENSION READ pages 173-175 in the lab manual. <b><u>Ask questions on dilution problems.</u></b> >MONITOR WINOGRADSKY COLUMNS	
Thurs. Oct. 30	Microbial growth control	<b>Chap. 27</b>
Thurs. Oct. 30L	>COMPLETE SUPPL. EX., PLAQUE ASSAY > SUPPL. EX., ENUMERATION OF BACTERIA ASSOCIATED WITH FRESH PRODUCE <b>STUDENT ORAL PRESENTATIONS</b>	
Tues. Nov. 4	Microbial ecology	<b>Chap. 22, 23, 24, &amp; 26</b>
Tues. Nov. 4L	>VIDEO SEGMENTS >COMPLETE SUPPL. EX., ENUMERATION OF BACTERIA ASSOCIATED WITH FRESH PRODUCE ; <b><u>Ask questions on dilution problems.</u></b> >EX. 37, EVALUATION OF ANTISEPTICS (PAPER DISK METHOD) >EX. 36, KIRBY-BAUER METHOD >MONITOR WINOGRADSKY COLUMNS – <b><u>Work on lab report with your group.</u></b>	
Thurs. Nov. 6	>SUPPL. EX., <i>Staphylococcus aureus</i> EXPERIMENT Innate immunity; adaptive immunity	<b>Chap. 29, 30, &amp; 31</b>
Thurs. Nov. 6L	> <i>Program #9, Microbial Control</i> >FINISH EX. 36 & 37; RECORD DATA & ANSWER QUESTIONS IN LAB MANUAL >SUPPL. EX., <i>Staphylococcus aureus</i> EXPERIMENT >SUPPL. EX., BACTERIOLOGICAL ANALYSIS OF URINE ( <b>RECORD UNKNOWN #</b> ) >EX. 72, GRAM NEGATIVE INTESTINAL PATHOGENS ( <b>RECORD UNKNOWN #</b> )	
Tues. Nov. 11	Adaptive immunity	<b>Chap. 29, 30, &amp; 31</b>
Tues. Nov. 11L	>CONTINUE SUPPL. EX., <i>Staphylococcus aureus</i> (Record results on board. Set up Kirby-Bauer antibiotic sensitivity tests. Also streak for isolation on a plate of tryptic soy agar using presumptive <i>S. aureus</i> isolate—plate will be used on Thurs. for EX. 73.) >CONTINUE SUPPL. EX., URINE (Set up Kirby-Bauer antibiotic sensitivity tests and inoculate Enterotube II)---See EX. 46, ENTEROTUBE II >CONTINUE EX. 72, INTESTINAL PATHOGENS (triple sugar iron agar) <b>STUDENT ORAL PRESENTATIONS</b>	
Thurs. Nov. 13	Practical applications of immunology > <b><u>WORK ELISA AND IMMUNOFLUORESCENCE PROBLEMS (SEE COURSE PACKET)</u></b> Human-microbe interactions Epidemiology & public health	<b>Chap. 29-32</b> <b>Chap. 28</b> <b>Chap. 33</b>
Thurs. Nov. 13L	> <b>HAND IN LAB REPORT ON GENERAL (FIRST) UNKNOWN</b> >FINISH SUPPL. EX., <i>Staphylococcus aureus</i> >EX. 73, LATEX AGGLUTINATION TEST FOR <i>S. aureus</i> identification. >FINISH SUPPL. EX., URINE & EX. 46 ENTEROTUBE II--- <b>HAND IN LAB REPORT</b> CONTINUED ON PAGE 9.....	

<b>Date</b>	<b>Topics/Lab Exercises</b>	<b>Related material in text</b>
Tues. Nov. 13L	.....CONTINUED FROM PAGE 8 >CONTINUE EX. 72, INTESTINAL PATHOGENS (remaining inoculations) >MONITOR WINOGRADSKY COLUMNS (LAST TIME)M – <b><u>Work on lab report with your group.</u></b>	
Tues. Nov. 18	<b>EXAM 3</b> (Material covered through Nov. 13)	
Tues. Nov. 18L	>COMPLETE EX. 72, INTESTINAL PATHOGENS--- <b>HAND IN LAB REPORT</b> <b>Work on Winogradsky Column Project Report with Lab Group</b> <b>STUDENT ORAL PRESENTATIONS</b>	
Thurs. Nov. 20	Human-microbe interactions Epidemiology & public health	<b>Chap. 28</b> <b>Chap. 33</b>
Thurs. Nov. 20L	<b>STUDENT ORAL PRESENTATIONS</b>	
Tues. Nov. 25	Person-to-person microbial diseases	<b>Chap. 34</b>
Tues. Nov. 25L	<b><u>Hand in Winogradsky Column Project Lab Report</u></b> <b>LAB EXAM</b>	
THANKSGIVING HOLIDAY		
Tues. Dec. 2	Person-to-person microbial diseases Other microbial diseases	<b>Chap. 34</b> <b>Chap. 35, 36, &amp; 37</b>
Tues. Dec. 2L	<b>STUDENT ORAL PRESENTATIONS</b>	
Thurs. Dec. 4	Other microbial diseases	<b>Chap. 35, 36, &amp; 37</b>
Thurs. Dec. 4L	<b>STUDENT ORAL PRESENTATIONS</b>	
<b>Wed. Dec. 10</b>	<b>COMPREHENSIVE FINAL EXAM (EXAM 4) – 10:15 am – 12:15 pm</b>	

### ADDITIONAL INFORMATION

**Course content:** We will not be covering all of the material in the textbook and lab manual. Please read the sections of the textbook and lab manual that pertain to the topics covered, and make use of the tables and illustrations. Study questions and online resources for the textbook may also be useful. **Specific assigned readings may be announced in class or lab.**

### Laboratory:

- Laboratory exercises are an integral part of microbiology. Students are expected to attend ALL laboratory sessions, to be on time at the beginning of the period, and to complete all assigned laboratory exercises. There will be no makeups for the laboratory exercises.
- Microscopes will be assigned and spot checks will be made to ensure that they are clean and properly stored. Misuse or mishandling of the microscopes will result in the loss of points (20 points per occurrence). After you have finished using your microscope, please consult the "microscope checklist" to be certain that you have followed the proper procedures.
- Each student must **read the laboratory exercises for the day, any additional required readings from the lab manual (noted in the syllabus), and any notes pertaining to the lab exercises (in the syllabus) before coming to the laboratory.** This will allow the student to complete the exercises in an efficient and informed manner.
- Each student must record the results of the lab exercises and answer the related questions, as noted in the syllabus. In some cases, **lab reports** are due as indicated in the course schedule. If a student misses a portion of the lab work relating to a required lab report, the student's report will be worth a maximum of 85% of the points allotted for the report. Each student must turn in his/her own drawings (Aug. 28). However, the Winogradsky Column Project report must be prepared with your lab group (Nov. 25). For the remaining reports [general unknown (Nov. 13), urine unknown (Nov. 13), and intestinal unknown (Nov. 18)], students may prepare their lab reports individually, or they may work with their lab partners and turn in joint reports.

5. One **lab exam** will be given. It will include dilution problems as well as other material covered during the lab. If a student misses the lab exam, the instructor should be notified promptly. Arrangements for a make-up exam must be made within one week after a student misses the lab exam; otherwise, a make-up will not be given. The make-up exam will be worth 85% of the points allotted for the regularly-scheduled exam.

6. **Oral Presentations.** During the laboratory portion of the course, each student will give an 8- to 10-minute **oral report** on a primary scientific article or case study selected from a list provided by the instructor. Students will draw numbers to indicate the order in which they will select articles and give their presentations. Once a topic is chosen it may not be changed. Students should search databases in GALILEO to find related, formal scientific articles. Some peer-reviewed, scientific journals are available in the Odum library and/or online. At least three formal articles (including the original article chosen) from PEER-REVIEWED, PROFESSIONAL JOURNALS must be used to prepare the presentation. Only one of these articles may be a review article. Complete, stapled (or paper-clipped) copies of these articles must be placed in a folder & handed in on Sept. 11. The folder with the articles must again be provided to the instructor on the day of the presentation. Articles must list references at the end. Informal articles, Web sites, Internet articles or fact sheets, newspaper articles, magazine articles, book reviews, and letters to the editor are NOT acceptable. Students should make every effort to ensure the accuracy of the information in their reports. Should a report contain inaccurate information, the presenter should expect to be questioned about it as well as about the source of the information.

For their presentations, students are encouraged to use Powerpoint software. Students using Powerpoint must use a version that is compatible with the version available in the microbiology lab. If you are in doubt, please bring your Powerpoint presentation to the lab at least one week before the day of your presentation to verify that it will run. If you do not check your presentation ahead of time, you are responsible for having a backup method for showing your illustrations. Full-size print-outs of your Powerpoint slides are useful as backups, since they may be shown using the ELMO projector. Students electing not to use Powerpoint should use other illustrations. Illustrations may be placed on a large poster or they may be shown on the ELMO projector. Transparencies may also be used. There will be no makeups for the oral presentations. **On the day of the presentation, the student must turn in a copy of any illustrations (including text) used during the presentation, as well as copies of the three references used.**

**ADDITIONAL EMPHASIS:** IF YOU WANT A GOOD SCORE ON YOUR PRESENTATION, YOU MUST FOLLOW THE GUIDELINES ON THE PROVIDED EVALUATION FORM. A STUDENT WHOSE REPORT DOES NOT FOCUS ON THE PRIMARY SCIENTIFIC ARTICLE OR CASE STUDY WILL RECEIVE A SCORE OF ZERO.

**Attendance, participation, and tardiness:** In accordance with VSU policy, attendance and participation will be checked in the laboratory and in class. The remainder of this paragraph outlines the lab/oral report attendance policy. Attendance is required during ALL labs and oral report periods. A student who has perfect attendance during laboratory/oral report periods will receive 20 bonus points. A student who misses (or fails to complete) only one laboratory/oral report period will receive 10 bonus points. Missing (or failing to complete) additional laboratory/oral report periods will result in the **loss of points** as follows. Ten points will be deducted for the fourth missed (or incomplete) laboratory/oral report period; 20 additional points will be deducted for the fifth missed (or incomplete) laboratory/oral report period; 40 additional points will be deducted for the sixth missed/incomplete laboratory/oral presentation period, and 50 additional points will be deducted for each subsequent missed/incomplete period. Students who are habitually late for lab or oral report periods will be marked late. Coming late to lab or oral report periods three times will be counted as one absence. A student with more than 6 absences (or a student who fails to complete more than 6 laboratory or oral report periods) will not pass the course. **There will be no makeups for the laboratory exercises or student presentations.**

**Examinations given during class periods:**

1. Examinations 1-4 will cover material presented during both the class and laboratory portions of the course. The first three exams will be worth 175 points each. The final exam will be worth 190 points. Examinations will begin promptly at the times and dates indicated on the class schedule. The final examination will be comprehensive in that it will include material covered throughout the course. Exams 2 and 3 will be comprehensive in that up to 25% of the points on the exam may cover material presented before any earlier examination. Exams may include questions of the multiple-choice, matching, true-false, short-answer, and essay formats. A student who misses an examination should notify the instructor promptly. Arrangements for a make-up exam must be made within one week after the exam date; otherwise, a make-up exam will not be given. Make-up examinations may consist entirely of questions of the short answer and essay formats. Make-up examinations for exams 1, 2, and 3 will be worth 150 points rather than 175 points each.

2. **STUDENTS ARE REQUIRED TO BRING TWO #2 PENCILS AND ERASERS TO ALL EXAMINATIONS. THE INSTRUCTOR WILL NOT PROVIDE PENCILS.**

**Late Assignments & Failure to Turn in Assignments:**

Please make a calendar noting when assignments and lab reports are due. Turning in an assignment/report 1-4 days late will result in a deduction of 20% of the points for that assignment. Turning in an assignment 5-9 days late will result in a deduction of 50% of the points for that assignment. **No points will be awarded for an assignment that is late by more than 9 days.** Students

will not be notified by the instructor for failing to turn in course assignments. Late assignments must be given DIRECTLY to the instructor. They may NOT be placed in the instructor's mailbox. It is also NOT ACCEPTABLE to slide late assignments under the instructor's office door.

**Grading:** Points for the course are allocated as follows:

<u>EXAM 1</u> (Sept. 16)	175	POINTS
<u>EXAM 2</u> (Oct. 16)	175	POINTS
<u>EXAM 3</u> (Nov. 18)	175	POINTS
<u>EXAM 4</u> (FINAL EXAM -Dec. 10)	190	POINTS
LAB REPORT (Drawings) (Course objective ZA) - (Aug. 28)	8	POINTS
REFERENCES FOR ORAL PRESENTATION (Course objective ZG) - (Sept. 11)	10	POINTS
rRNA LAB REPORT (Course objective ZD) - (Oct. 23)	8	POINTS
LAB REPORT ON GENERAL UNKNOWN (Course objectives ZC, ZD) - (Nov. 13)	20	POINTS
LAB REPORT ON URINE UNKNOWN (Course objective ZD) - (Nov. 13)	12	POINTS
LAB REPORT ON INTESTINAL UNKNOWN (Course objective ZD) - (Nov. 18)	12	POINTS
LAB REPORT ON WINOGRADSKY COLUMN (Course objective ZF) - (Nov. 25)	70	POINTS
LAB EXAM - (Nov. 25)	80	POINTS
ORAL PRESENTATION (Course objective ZH) - (Oct. 7-Dec. 4)	65	POINTS
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TOTAL FOR COURSE	1000	POINTS

Students should carefully read the "Attendance, Participation, and Tardiness" and the "Late Assignments and Failure To Turn in Assignments" sections of the syllabus.

There are **FOUR REQUIREMENTS TO PASS** the course:

1. Do not miss (or fail to complete) any more than 6 laboratories or oral report periods.
2. Complete and turn in all assignments and lab reports.
3. Obtain at least 40% of the points for **EACH** assignment and lab report.
4. Have a total of 600 or more points for the course.

The grade is "F" for a student who obtains less than 600 total points **or** fails to meet one of the other requirements for passing the course (see above list).

<b>GRADING SCALE:</b>	<b>900-1000, A</b>	<b>800-899, B</b>	<b>700-799, C</b>
	<b>600-699, D</b>	<b>&lt; 600, F</b>	