
Biology Department, College of Arts & Sciences, Valdosta State University
SPRING 2011---COURSE SYLLABUS*

BIOL 3100, Sections A & B. Microbiology (CRN 21202 & 21203) - 4 credit hours

BIOL 5100, Sections A & B. Microbiology (CRN 21231 & 21232) – 4 credit hours**

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

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| Instructor: | Dr. Jenifer Turco | Email: | jturco@valdosta.edu |
| Telephone: | 229-249-4845 | Office: | 2091 Bailey Science Center |
| Office Hours: | Tues. 4:30-5:30 pm & Thurs. 12:30-1:30 pm; or by appointment. | | |

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.

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

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

Other Required Items: **A notebook for recording the results of laboratory work**
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

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, Catalog, Semester Calendar, Schedule of Classes, & Registration Guide for information about VSU policies and procedures regarding registration, drop/add, and withdrawal. March 3 is midterm. Students are not permitted to 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 located in Farber Hall. The phone numbers are 245-2498 (V/VP) and 219-1348 (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 Biology Department policy on plagiarism (available online through the departmental web site). The instructor may use a variety of methods for detecting plagiarism. Each student must be particularly careful to do his/her own writing on the oral presentations and on any assignments/reports that are to be completed individually. Plagiarism will result in a grade of "0" for the assignment. A student who plagiarizes on more than one assignment will receive a grade of "F" in the course.
 6. No disruptive behavior will be tolerated during class or lab. A student who engages in disruptive behavior will be asked to leave.
 7. Students who wish to use laptop computers as part of the class are required to sit in the first three rows of the classroom.
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***This is a tentative syllabus. Changes to this syllabus will be announced during class or laboratory periods; alternatively, changes may be posted on BlazeView.**

****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 BDCMEC and how it is used by a local culture.

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

| Date | Topics/Lab Exercises | Related material in text |
|------|----------------------|--------------------------|
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Tues. Jan. 18LCONTINUED FROM PAGE 3

- **YOUR GROUP'S LAB REPORT ON THE WINOGRADSKY COLUMN PROJECT (DUE APRIL 7)** must be written in the style of a scientific paper and must contain the following sections: Title, Authors, Abstract, Introduction, Materials and Methods, Results, Discussion, Literature Cited, and an Appendix. The Results section must include your group's organized data and observations on the Winogradsky columns, charts and/or graphs, selected drawings (or photographs), and a written description of the results.
- The Appendix must contain each lab group member's original written notes and drawings (or photographs) for the project. On a single slide, prepare a Tc 0 Tw T* ()j EMC 25an <</MCID 7t 1 Tf 0.0511 Tc 7.7190 Tw -35.323

| Date | Topics/Lab Exercises | Related material in text |
|---------------|--|--|
| Tues. Feb. 1 | Eukaryotic microorganisms Nutrition, culture, & metabolism of microorganisms | Chap. 18 Chap. 5 & 21 |
| Tues. Feb. 1L | >EX. 10, PURE CULTURE TECHNIQUES, STREAK-PLATE METHOD ONLY You will use a loopful of water from one of your | |

| Date | Topics/Lab Exercises | Related material in text |
|------|----------------------|--------------------------|
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Thurs. Feb. 10L

.....CONTINUED FROM PAGE 5

FINISH EX. 10, PURE CULTURE TECHNIQUES, STREAK-PLATE METHOD ONLY
 Examine plates from Tuesday. If your group hasn't yet established a general unknown nutrient agar slant culture, please do this today. If you are looking at a streak plate prepared **from** a well-isolated colony, pick a well-isolated colony and transfer it to a nutrient agar slant. This can be your group's general unknown culture; please label it clearly with "**UNKNOWN**", **your lab section, and seat numbers**. **If, for some reason, your group has no suitable colonies, please consult the instructor.**

> SUPPL. EX., ENUMERATION OF BACTERIA ASSOCIATED WITH FRESH PRODUCE (SPREAD-PLATE TECHNIQUE) WORK IN GROUPS OF 2 FOR THIS EXERCISE. **ALSO, PLEASE READ EX. 22 TO LEARN ABOUT THE POUR-PLATE TECHNIQUE, OMITTING P. 155-157.** ,(0 7.98 405. Tc -0.00178T-2(bD 0 Tc 0 Tw 0 0 10.02 453.36

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|---|--|
| Thurs. Feb. 24 | Microbial molecular biology DNA structure & replication; transcription, translation Regulation of gene expression | Chap. 7 & 8 Chap. 9 |
| Thurs. Feb. 24L | >CONTINUE WORK ON GRAM STAINING KNOWN AND UNKNOWN CULTURES. >EXAMINE STREAK PLATE OF UNKNOWN. Measure diameter of colonies and record a description of the colonies on your unknown record sheet and on the descriptive chart on p. 263. Consult p. 268 (Ex. 40). | |
| Tues. Mar. 1 | Regulation of gene expression Viruses | Chap. 9 Chap. 10 & 19 |
| Tues. Mar. 1L | >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> , & unknown) (CULTURES FOR BLOOD AGAR: <i>E. coli</i> , <i>S. aureus</i> , <i>Bacillus cereus</i> , & unknown) >A THROAT CULTURE WILL ALSO BE PERFORMED ON A BLOOD AGAR PLATE. >EX. 17, ACID-FAST STAINING (Ziehl-Neelsen method procedure) 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> & <i>Staphylococcus aureus</i> , as well as a separate smear of your unknown. Allow the smears to air dry, and then heat fix them. Put on gloves, and try to be neat. (You are responsible for cleaning up any spills of carbol fuchsin.) Cover the smears with a cut piece of paper towel that does not extend over the edges of the slide. Hold the slide with a clothespin or slide holder and soak the towel with carbol fuchsin. Heat the slide <u>intermittently</u> over the flame of the bunsen burner so that it “steams” for 5 minutes. Do NOT let the paper towel dry out—add more carbol fuchsin as needed. Allow the slide to cool and then remove the paper towel. Proceed with steps 2 through 7 as described in the lab manual in Figure 17.1 on page 118. Complete drawings/questions, p. 119-122; omit questions 1 & 2 on p. 122. Record results for unknown culture on unknown record sheet, and on the descriptive chart on p. 263. >MONITOR WINOGRADSKY COLUMNS. Work on lab report with your group. | |
| Thurs. Mar. 3 | Viruses | Chap. 10 & 19 |
| Thurs. Mar. 3L | >EX. 33, ULTRAVIOLET LIGHT: LETHAL EFFECTS >FINISH SUPPL. EXc 0 0.7489 353.94 Tm()TjEMC /P TJEMC /P RAdpM>uINISH SUPPL | |

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|--|--|
| Tues. Mar. 29 | Microbial genomics Microbial evolution & systematics Microbial identification & clinical microbiology Microbial growth control | Chap. 13 Chap. 14 Chap. 32 Chap. 27 |
| Tues. Mar. 29L | >Program #9, <i>Microbial Control</i> >EX 41, READ RESULTS OF VP TEST (See procedure on board. Record information on unknown record sheet, and on descriptive chart on p. 263. <u>THIS IS THE LAST DAY FOR LAB WORK ON THE GENERAL UNKNOWN.</u> >EX. 36, KIRBY-BAUER METHOD >EX. 37, EVALUATION OF ANTISEPTICS (PAPER DISK METHOD- this exercise will be slightly modified) >EX. 35, EFFECTIVENESS OF ALCOHOL > <u>Do the following online exercise on your own:</u> >SUPPL. EX., USING RIBOSOMAL RNA GENE SEQUENCES TO LEARN ABOUT A MICROORGANISM | |
| Thurs. Mar. 31 | >SUPPL. EX., <i>Staphylococcus aureus</i> EXPERIMENT (class work) Microbial growth control | Chap. 27 |
| Thurs. Mar. 31L | >VIDEO SEGMENTS >SUPPL. EX., <i>Staphylococcus aureus</i> EXPERIMENT >FINISH EX. 36, 37, & 35. Record data & answer questions in lab manual. Brief class discussion. > <u>Work on lab reports with your group.</u> | |
| Tues. Apr. 5 | Microbial ecology (selected topics) | Chap. 22-24, & 26 |
| Tues. Apr. 5L | >VIDEO SEGMENTS >CONTINUE SUPPL. EX., <i>Staphylococcus aureus</i> (Record results on board. We will omit Kirby-Bauer antibiotic sensitivity tests that are described in this exercise. Remember to streak presumptive <i>S. aureus</i> for isolation on a plate of tryptic soy agar. This plate will be used on Thurs. for EX. 73.) <u>STUDENT ORAL PRESENTATIONS</u> | |
| Thurs. Apr. 7 | Innate immunity; adaptive immunity | Chap. 29, 30, & 31 |
| Thurs. Apr. 7L | >SUPPL. EX., BACTERIOLOGICAL ANALYSIS OF URINE (RECORD UNKNOWN #) >FINISH SUPPL. EX., <i>Staphylococcus aureus</i> >EX. 73, LATEX AGGLUTINATION TEST FOR <i>S. aureus</i> identification. <u>STUDENT ORAL PRESENTATIONS</u> <u>HAND IN WINOGRADSKY LAB REPORT</u> | |
| Tues. Apr. 12 | Adaptive immunity Practical applications of immunology | Chap. 29, 30, & 31 Chap. 29-32 |
| Tues. Apr. 12L | >HAND IN SUPPL. EX., RIBOSOMAL RNA SEQUENCES (12 POINTS) | |

| Date | Topics/Lab Exercises | Related material in text |
|--|---|------------------------------------|
| Tues. Apr. 19 | Human-microbe interactions Epidemiology & public health | Chap. 28 Chap. 33 |
| Tues. Apr. 19L | <u>HAND IN LAB REPORT ON GENERAL UNKNOWN</u> <u>STUDENT ORAL PRESENTATIONS</u> | |
| Thurs. Apr. 21 | Human-microbe interactions Epidemiology & public health | Chap. 28 Chap. 33 |
| Thurs. Apr. 21L | <u>STUDENT ORAL PRESENTATIONS</u> | |
| Tues. Apr. 26 | Microbial diseases | Chap. 34-37 |
| Tues. Apr. 26L | <u>STUDENT ORAL PRESENTATIONS</u> | |
| Thurs. Apr. 28 | Microbial diseases | Chap. 34-37 |
| Thurs. Apr. 28L | <u>STUDENT ORAL PRESENTATIONS</u> | |
| Wed. May 4 | COMPREHENSIVE FINAL EXAM (EXAM 4) – 10:15 am – 12:15 pm | |
| ADDITIONAL IN3(---T.RM)TjEC ET158.4 50 s-----DENT | | |

