
Biology Department, College of Arts & Sciences, Valdosta State University
SPRING 2013----COURSE SYLLABUS*

BIOL 3100, Sections A & B. Microbiology (CRN 20694 & 20695) - 4 credit hours

BIOL 5100, Sections A & B. Microbiology (CRN 20725 & 20726) 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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| <u>Instructor:</u> | Dr. Jenifer Turco | Email: | jturco@valdosta.edu |
| <u>Telephone:</u> | 229-249-4845 | Office: | 2091 Bailey Science Center |
| <u>Office Hours:</u> | 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 1107K, BIOL 1108K, BIOL 3200, CHEM 1211/CHEM 1211L, 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, Thirteenth Edition**
by Michael T. Madigan, John M. Martinko, David A. Stahl, and David P. Clark.

The **VSU General Education Outcomes** (numbered 1-8) are available online at <http://www.valdosta.edu/pers/gened.shtml> ; in this syllabus they are referred to as VSU1-VSU8.

The **Biology Undergraduate Educational Outcomes** (numbered 1-5) are available in the VSU Undergraduate Catalog, and the **Biology Graduate Educational Outcomes** are available in the VSU Graduate Catalog and are numbered 1 through 4. Both catalogs are available online through <http://www.valdosta.edu>. In this syllabus the Biology Undergraduate and Graduate Educational Outcomes are designated as B1-B5 and GB1-GB4, respectively.

The course objectives that are aligned with the USG, VSU and Biology Department Educational Outcomes/Objectives are below.

| USG, VSU or Biology Objective | Course Objective(s) |
|--------------------------------------|---|
| Core Area A1 Learning Goal | ZF, ZG, ZH |
| Core Area A2 Learning Goal | G, ZE, ZF |
| Core Area B Learning Goal | C, D, M, R, U, V, X, Y |
| Core Area D Learning Goal | all course objectives |
| Core US Goal | C, D, M, R, U, V, X, Y |
| Core GL Goal | C, D, M, R, U, V, X, Y |
| Core CT Goal | E, G, H, R, ZB, ZD, ZE, ZF, ZG, ZH |
| VSU1 | C, D, M, R, U, V, X, Y |
| VSU2 | C, D, M, R, U, V, X, Y |
| VSU3 | ZF, ZG, ZH |
| VSU4 | ZB, ZF, ZH |
| VSU5 | all course objectives |
| VSU7 | C, D, G, H, M, O, R, ZA, ZB, ZD, ZE, ZF, ZH |
| VSU8 | 18.35 Tm[()] TJET EMC rMr4 |

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|--|--------------------------|
| Thurs. Jan. 10L | <p>.....continued from the preceding page</p> <p>>PLEASE READ THE FOLLOWING BEFORE NEXT WEEK:</p> <p>LABORATORY SAFETY (Read handout & p. xi-xvi in lab manual.)</p> <p>EX. 9, ASEPTIC TECHNIQUE</p> <p>SUPPL. EX., WINOGRADSKY COLUMN; EX. 52 WINOGRADSKY COLUMN (IN LAB MANUAL), AND PAGES 643-646 IN THE TEXTBOOK.</p> <p><u>Wash your hands before leaving lab!</u></p> | |
| Tues. Jan. 15 | Cell structure/function | Chap. 3 |
| Tues. Jan. 15L | <p><u>Please note that missing this particular lab period will result in a deduction of 25 points, except in the event of a documented, serious emergency.</u></p> <p>>LAB ORIENTATION & LABORATORY SAFETY</p> <p>>EX. 9, ASEPTIC TECHNIQUE</p> <p>PLEASE REMEMBER TO READ THE INFORMATION FOR EACH DAY'S LAB <u>BEFORE</u> COMING TO LAB.</p> <p>x Discuss the Winogradsky Column Project with your lab group. Decide on a question, formulate a hypothesis, and decide how you will conduct the experiment. Discuss your experiment design, plans for data collection, and plans for your lab report. Decide on your assignments for the Winogradsky Column Project, and bring any required materials to lab next Thursday, Jan. 24. Each group of 4 students will build <u>at least</u> two columns.</p> <p>x</p> | |

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|---|--|
| Tues. Jan. 22L | >EX. 13, NEGATIVE STAINING (We will use nigrosin & the method in Fig. 13.1. On page 100, follow steps 1-7, but omit steps 2 & 4 . Draw a few representative <i>Staphylococcus aureus</i> cells and <i>Bacillus subtilis</i> cells in your lab notebook. Answer questions 1-5, page 104; and answer questions on page 105. (You may need to consult Ex. 14 to answer the questions about the capsule stain.) > If necessary, complete 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> (Hand in your drawings to the instructor at the end of lab, 15 points) | |
| Thurs. Jan. 24 | Eukaryotic microorganisms | Chap. 20 & additional pages-see Jan. 22 |
| Thurs. Jan. 24L | >EX. 7, UBIQUITY OF BACTERIA Complete steps 1-7, but omit step 6. >EX. 8, THE FUNGI (Page 62, 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 outdoors. Incubate the plates at room temperature until next week.) >SUPPL. EX., WINOGRADSKY COLUMN (WE WILL USE TEXT, P. 643-646 THE PROCEDURE IN THE SUPPL. EX., BUT PLEASE READ EX. 52 IN THE LAB MANUAL AS WELL.) <u>Discuss your experimental design, plans for data collection, and plans for the lab report with your group.</u> > If necessary, complete 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> (Hand in your drawings to the instructor at the end of lab, 15 points last day) | |
| Tues. Jan. 29 | Eukaryotic microorganisms Nutrition, culture, & metabolism of microorganisms | Chap. 20 & additional pages-see Jan. 22 Chap. 4, 14, 13, 17, & 18 |
| Tues. Jan. 29L | >EX. 10, PURE CULTURE TECHNIQUES, STREAK-PLATE METHOD ONLY You will use a loopful of water from one of your Winogradsky columns as the mixed sample of microorganisms in this exercise. Use a prepared plate of MacConkey agar, desoxycholate agar, or Eosin methylene blue agar for doing the quadrant streak (method B on page 83). Each person will do his/her own streak plate. Begin keeping records for your general unknown today (in your lab notebook). >CHECK WINOGRADSKY COLUMN SLIDES FOR BIOFILM OBSERVATION, 2nd COLUMN, AND COLUMN 17 >> BDC BT/F1 information. Observe biofilm slides. You may also prepare wet mounts, if desired. Make neat, detailed drawings of any microorganisms observed in your lab notebook. Use the information in EX. 6 , PROTOZOA, ALGAE, & 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, & cyanobacteria. Keep in mind that you may also see some microscopic invertebrate organisms in your samples. <u>Discuss issues related to data collection & organization with your group members.</u> OPTIONAL: EXAMINE PREPARED SLIDES OF <i>Plasmodium falciparum</i> in blood smear; <i>Trichomonas vaginalis</i> , <i>Trypanosoma cruzi</i> , & <i>Entamoeba histolytica</i> | |
| Thurs. Jan. 31 | Nutrition, culture, & metabolism of microorganisms | Chap. 4, 14, 13, 17, & 18 |
| Thurs. Jan. 31L | > FOR EX. 59, YOU WILL WORK IN GROUPS OF 4. | |

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|--|--------------------------|
| Thurs. Jan. 31L | <p style="text-align: center;">age</p> <p>>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 clear cellophane tape to prepare slides of two or more different molds. The instructor will demonstrate this procedure, which is described in the lab manual on p. 64. Examine the slides using the low power (10x) objective and the high dry (40x)</p> | |

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|-------------------------------|--|
| Thurs. Feb. 14L | <i>Program #3, Metabolism</i> | Chap. 35 (p. 1007-1010); Chap. 15 (p. 425-427), |

Date

Topics/Lab Exercises

Date

Topics/La4(o)43S

| Date | Topics/Lab Exercises | Related material in text |
|-----------------|--|--------------------------|
| Tues. Apr. 2L | <p>>HAND IN LAB REPORT ON GENERAL UNKNOWN (W)TJETBT/F2 8.04 Tf1 0 T/F6(S)4(KY)7()ues. >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 for an agglutination test on Thursday.) >SUPPL. EX., BACTERIAL CONJUGATION > MONITOR WINOGRADSKY COLUMNS, <u>LAST TIME</u></p> | |
| Thurs. Apr. 4 | Innate immunity; adaptive immunity | Chap. 28-31 |
| Thurs. Apr. 4L | <p>>FINISH SUPPL. EX., <i>S. aureus</i> >LATEX AGGLUTINATION TEST FOR <i>S. aureus</i> IDENTIFICATION – There is no writeup for this test. In the lab manual, Ex. 74 describes a similar agglutination test; however we will use reagents from a different manufacturer. The instructor will summarize the principle of the test and will give directions at the beginning of the lab. RECORD RESULTS from <i>S. aureus</i> EX. & latex test on board & in chart. FINISH SUPPL. EX., BACTERIAL CONJUGATION – Answer the questions with this exercise & be sure you understand what happened and why it happened. <u>WORK ON WINOGRADSKY COLUMN PROJECT LAB REPORT</u> <u>STUDENT ORAL PRESENTATIONS</u></p> | |
| Tues. Apr. 9 | Adaptive immunity | Chap. 28-31 |
| Tues. Apr. 9L | <p><u>STUDENT ORAL PRESENTATIONS</u> Practical applications of immunology >WORK ELISA AND IMMUNOFLUORESCENCE PROBLEMS (SEE COURSE PACKET) <u>WORK ON WINOGRADSKY COLUMN PROJECT LAB REPORT</u></p> | Chap. 28-31 |
| Thurs. Apr. 11 | EXAM 3 (will include both class and lab material) | |
| Thurs. Apr. 11L | <p><u>STUDENT PRESENTATIONS</u> Practical applications of immunology</p> | |

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, or they may be posted on BlazeView.**

Laboratory:

1. 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.
2. 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.
3. 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.
4. 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 and rRNA report. However, the Winogradsky Column Project report must be prepared with your lab group. **For this report, each group member will evaluate the percentage of the work contributed by each of the group members, and individual scores will reflect the average percents.** For the general unknown lab report, students may prepare their lab reports individually, or they may work with their lab groups and turn in joint reports. If a joint report is submitted, each student must include his/her own individual records and drawings that are labeled with his/her name.
5. One **lab exam** will be given. It will include material covered during the lab

classes of a course will be subject to receiving a failing grade in the course. The remainder of this paragraph outlines the laboratory/student oral presentation period attendance policy, except that there is a special policy for the lab period on Jan. 15 (see note in schedule). Attendance is required during ALL labs and student presentation periods. A student who has perfect lab attendance or who misses only one laboratory/student presentation period will receive 20 bonus points. A student who misses (or fails to complete) two to three laboratories/student presentation periods will receive 10 bonus points. Missing (or failing to complete) additional laboratories/student presentation periods will result in the **loss of points** as follows. Ten points will be deducted