
Biology Department, College of Arts & Sciences, Valdosta State University
SPRING 2011----SUPPLEMENT TO COURSE SYLLABUS FOR BIOL 5100*

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

This supplement accompanies the course syllabus for BIOL 3100/5100, and is only for students taking BIOL 5100.

***This is a tentative supplement. Changes to this supplement will be announced during class or laboratory periods; alternatively, changes will be posted on BlazeView or discussed with the student(s).**

Instructor: Dr. Jenifer Turco

Course Objectives: (Page 2 shows how the objectives below are aligned with the VSU General Education Outcomes and the Biology Department Graduate Program Educational 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.
 - ZI. Read one or more primary scientific research articles and write a paper based on the articles.
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Alignment of Assignments with Course Objectives:

The course objective(s) aligned with each assignment are given below.

Alignment of Course Objectives with VSU General Education Outcomes & Biology Department Graduate Program 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 Graduate Program Educational Outcomes (1-4) are in the Graduate Catalog on pages 39-40. The catalog is available online through <http://www.valdosta.edu>. In this syllabus the Biology Department Graduate Program Educational Outcomes are designated as: GB1-GB4.

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, ZI
VSU5	all course objectives
VSU6	-----
VSU7	G, ZA, ZE, ZF, ZH
VSU8	-----
GB1	all course objectives
GB2	Z, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI
GB3	-----
GB4	-----

Grading: Points for the course are allocated as follows:

<u>EXAMS 1, 2, & 3</u> (Feb. 10, Mar. 10, & April 14) (185 points each x 3=555)	555	POINTS
<u>EXAM 4</u> (FINAL EXAM –May 4)	225	POINTS
LAB REPORT (Drawings) (Course objective ZA) - (Jan. 20)	10	POINTS
REFERENCES FOR ORAL PRESENTATION (Course objective ZG) - (Feb. 17)	12	POINTS
rRNA LAB REPORT (Course objective ZD) - (April 12)	12	POINTS
LAB REPORT ON GENERAL UNKNOWN (Course objectives ZC, ZD) - (April 19)	33	POINTS
LAB REPORT ON URINE UNKNOWN (Course objective ZD) - (April 14)	13	POINTS
FORMAL (EXTENSIVE) LAB REPORT (Course objective ZF) - (April 7)	65	POINTS
ORAL PRESENTATION (Course objective ZH) - (April 5-28)	75	POINTS
EXTENDED ORAL PRESENTATION OR LAB PROJECT**(GB2 and/or GB4)	200	POINTS

TOTAL FOR COURSE	1200	POINTS

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.

Students should read the entire syllabus carefully so they understand the course policies & procedures.

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). **GRADING SCALE (%): 90-100%, A; 80-89%, B; 70-79%, C; 60-69%, D; < 60%, F**

****EXTENDED ORAL PRESENTATION OR LAB PROJECT**– In consultation with the instructor, the student will decide whether to do an extended oral presentation or lab project. If an oral presentation is chosen, two or more closely-related, primary scientific articles in a particular area of microbiology will be chosen, along with one review article (in consultation with the instructor). After thoroughly reading the article(s), the student will give a 40-minute presentation on the papers during class. The presentation must show that the student has synthesized and analyzed the material from the three references. A suitable day for the presentation will be chosen after discussion with the instructor. If a lab project is chosen, the student will work closely with the instructor to study the interactions between *Shigella* bacteria and cultured mouse cells, or to develop another research project. The student will keep a complete and accurate lab notebook on the project and write a 3-page summary of the results. The notebook and summary will be due on April 28, 2011.