

LANCASTER GENERAL COLLEGE OF NURSING AND HEALTH SCIENCES

Course Syllabus – Spring Session 2007 BIOLOGY 185 Section (01)

- I. Title: **BIO 185 - Microbiology**
- II. Course Description: Biology 185 (Microbiology) is an introduction to Microbiology required of many allied health majors. An emphasis will be placed on the basic principles and concepts of Microbiology concerning anatomy, classification, physiology, and practical uses of microorganisms. The course encompasses both a lecture and laboratory format, allowing the students to gain a familiarity with the understanding of the role of microbes that affect our lives, either by causing disease, destroying things we consider important, or contributing to the improvement of our quality of life. The importance of the prevention of the transmission of infection will be emphasized. **LECTURE TOPICS:** detail the structure and function of each of the major groups of microorganisms, with emphasis on the bacteria, fungi/mold, and viruses. Current topics concerning the microbial activities within the environment and specifically related to man will be presented. Microorganisms, beneficial as well as detrimental, will be detailed. Microbial diseases, microbial control, and immunology will also be an integral part of the course. **LABORATORY TOPICS:** emphasize the techniques and procedures utilized in the study of Microorganisms. This is a basic course in Microbiology with an emphasis on the *Medical aspects of Microbiology*; advanced courses in the career tract will reemphasize appropriate Microbiological topics as necessary.
- III. Prerequisite: None
- IV. Co-Requisite: None
- V. Placement: Spring Session
- VI. Time Allotment: Lecture Monday 8-9:50AM Lab Monday 10-11:50AM
- VII. Faculty: Robert E. Brader
Office Location: **434 N. Lime Street, 2nd floor**
Office Hours: **Tuesday 8-10AM**
Wednesday 8-10AM
Friday 8-10AM
Other times by appointment
Contact: 717-569-6046 (home)
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Campus mailbox: contact is receptionist main lobby
- VIII. Credits: (3)

IX. Evaluation - **Grading Policy:**

A. Examinations and Laboratories:

1. 4 Lecture Examinations (100 points each).....400
2. 1 Laboratory Practical Examination..... 50
3. Laboratory unknown report..... 80
4. 10 Laboratory Reports (5 points each)..... 50
5. Lab attendance 20

(Extra credit current topic 5 points, organism topic 5 points) *not required & optional*
Total = 600

B. Letter Grades

Grade	Description	QP	Point Range	Percent
A	Excellent	4.0	561-600	93.5-100
A-	Excellent	3.7	537-560	89.5-93.4
B+	Excellent	3.3	519-536	86.5-89.4
B	Good	3.0	501-518	83.5-86.4
B-	Good	2.7	477-500	79.5-83.4
C+	Good	2.3	459-476	76.5-79.4
C	Acceptable	2.0	441-458	73.5-76.4
C-	Acceptable	1.7	417-440	69.5-73.4
D+	Acceptable	1.3	399-416	66.5-69.4
D	Acceptable	1.0	381-398	63.5-66.4
D-	Acceptable	0.7	357-380	59.5-63.4
F	Fail	0.0	<357	<59.4
I	Incomplete			
W	Withdrawal			

X. Textbooks and Required Materials:

A. Required Texts:

1. **Lecture:** Bauman, Robert, Microbiology with Diseases by Taxonomy, 2nd edition, Pearson Benjamin Cummings, San Francisco, CA, (2007)
2. **Lab & Lecture:** Brader, Robert, Biology 185 Student Study Guide and Laboratory Manual, 2nd edition, fifth printing (2006)

B. Supplemental texts for review or for personal reference file-library:

1. Tortora, Funke, & Case, Microbiology-an Introduction, 7th edition, Pearson Benjamin Cummings, (2001)
2. Berquist & Pogolian, Microbiology-Principles and Health Science Applications, 1st edition, W. B. Saunders Co. (2000)
3. Burton & Engelkirk, Microbiology for the Health Sciences, 7th edition, Lippincott, Williams & Wilkins, Philadelphia, PA, (2004)

C. Many excellent microbiology textbooks and related references can also be found in the library. These sources may be of benefit to students having difficulty in the course as well as those students wishing to read in a particular area of interest.

D. Books of interest for aspiring microbiologists (excellent reading):

1. De Kruif, Paul, Microbe Hunters, Harcourt, Brace edition, (1926)

2. Watson, James, The Double Helix: A Personal Account of the Discovery of the Structure of DNA, Atheneum, (1980)
 3. Preston, Richard, The Hot Zone, First Anchor Book edition, (1995)
 4. Tierno, Philip M., The Secret Life of Germs-Observations & Lessons from a Microbe Hunter, Pocket Books, (2001)
- E. Videos - very enjoyable and educational:
1. Intimate Strangers, 4-part series (A&E/Public Television). VHS (ask instructor)
 2. DNA – The Secret of Life, 4 part series DVD (in college resource room)
- F. Laboratory Materials:
1. Laboratory coat or old shirt recommended, **not required**.
 2. Permanent marking pen for marking cultures, supplied by college.
 3. Safety goggles recommended, not required, but if contact lenses worn, then safety goggles are required, supplied by college.
- G. Laboratory Rules: *Back cover of Brader, Student Study Guide & Laboratory Manual*

XI. Course Objectives:

Course and performance objectives for lecture portion of course:

Given the theoretical experiences, at the completion of microbiology, the student will demonstrate that he/she has the knowledge to:

- A. Recognize the basic vocabulary of microbiology.
- B. Explain how life is organized at the cellular and sub-cellular level.
- C. Discuss the fundamental biochemistry of cellular metabolism.
- D. Explain the basic principles of molecular genetics as they relate to cell division, mutation, genetic engineering, and antibiotic resistance.
- E. Describe the causative agents of common infectious diseases, their routes of spread, and possible mechanisms of control.
- F. Discuss the components of the human immune system and how they interact in generating an immune response.
- G. Define the principles of sterilization, disinfection, and aseptic techniques as well as the principles of antibiotic therapy.
- H. Appreciate the role that professionals play in the diagnosis, control, and prevention of infectious diseases.

Course and performance objectives for laboratory portion of course:

To provide an opportunity to become acquainted with some of the techniques, methods, equipment, and materials utilized in a microbiology laboratory. Most of the activities will have a direct relationship to the lecture material and should serve to enhance the understanding of microbiology. Good technique is a requirement of laboratory technicians; however, it is not the aim of this course to train microbiology laboratory technicians. Those individuals who choose the laboratory technician career path will have many hours of critical experience later in their training. At the completion of the laboratory portion of microbiology, the student will demonstrate that he/she has the knowledge to:

- A. Become familiar with a brightfield compound microscope.
- B. Be proficient at preparing organisms for observation with the microscope, including staining techniques.

- C. Perform food, water, and environmental microbiology testing.
- D. Perform antiseptic, disinfectant, and antibiotic sensitivity testing in order to determine their efficacies.
- E. Perform clinical microbiological testing similar to the hospital microbiology lab.
- F. Perform a cursory identification of an unknown organism including ability to describe the medical implications of that organism.

XII. School Policies:

*Students are held accountable for all policies in the **Student Handbook** and any revisions made to those policies during the academic year.*

XIII. Class Requirements:

A. **Examinations and Laboratories:**

- 1. 4 Lecture Examinations (100 points each).....400
- 2. 1 Laboratory Practical Examination..... 50
- 3. Laboratory unknown report..... 80
- 4. 10 Laboratory Reports (5 points each)..... 50
- 5. Lab attendance 20

(Extra credit current topic 5 points, organism topic 5 points) *not required & optional*

Total = 600

B. Examinations:

- 1. Exams will occur throughout the semester and on the approximate dates specified on the lecture and lab schedules. All lecture material, assigned study guide readings, case studies, and some critical lab material are testable material for the lecture exams. **All lab experiences, lab discussions, and lab readings are testable materials for the laboratory practical exam.**
- 2. Lecture exams will be primarily multiple choice, true/false, and some short fill in the blank questions.
- 3. Laboratory exam will be a practical exam.
- 4. The lecture exams **WILL NOT BE COMPREHENSIVE**; however, the lab practical will test your knowledge and skill acquired throughout the term and **WILL BE COMPREHENSIVE**.

C. Make up examinations:

- 1. Physician's excuse and emergencies beyond the student's control are the only possible exceptions. A student who misses an examination will be required to make up the examination before the next lecture. Contact instructor as soon as possible prior to the next lecture day to make arrangements to take the exam.
- 2. Make up exam will probably be of a different nature (essay).
A student's grade on any exam or at any time in the course, can be determined by dividing the points achieved by the total points possible multiplied by 100 to get percentage, e.g., 70pts/100 total pts X 100 = 70%. The grade of "W" for Withdrawal will be assigned in accordance with college policy as identified in the Student Handbook. The discretion of the instructor may also determine the "W" grade assessment so it is important to contact the instructor if difficulties occur rather than just disappearing and receiving an "F" grade by default. The student must provide the proper paper work if a withdrawal is requested. Note: a withdrawal can be requested up to and including the last day of class, but not after the final exam is taken.

- D. Laboratory Format: At the beginning of each lab there will be a discussion of the laboratory activities to be performed that day. The remaining time will allow for the activities to be completed.
- E. Laboratory reports due the next week after completion of assigned lab session.
 - 1. Lab report shall consist of questions and observations at completion of experiment, as in notebook and explained by the instructor.
 - 2. Clarity and neatness taken into consideration. Artistic ability not considered.

XIV. Policies and Procedures:

A. Attendance Policy and Class Responsibilities:

- 1. Lecture: attendance is necessary, exam material will be covered in each lecture and it is the student's responsibility to obtain missed material.
 - a. Education comprises more than just private reading and passing of exams. Students should recognize that active and informed participation in class is essential to the development of their intellectual abilities and scholarly growth. Students must also recognize the importance, for both the present and the future, of achieving an academic record that reflects their intellectual ability. Such records are seldom achieved without regular attendance and participation in class activities.
 - b. **ATTENDANCE WILL ONLY BE TAKEN THE FIRST 4 WEEKS IN LECTURE, BUT WILL BE TAKEN IN EVERY LABORATORY SESSION**
- 2. Laboratory: **students must be present to have a graded lab report - laboratory sessions cannot be made up.** Students who choose to skip the majority of laboratory sessions also will not be allowed to identify an unknown organism (these are viable organisms and require technique & safety training prior to handling). This determination will be made by the instructor.
- 3. Class behavior:
 - a. The instructor has the prerogative not to admit students into lecture or lab.
 - b. Students will be dismissed from class for any inappropriate behavior.

B. Standards for Writing Assignments:

- 1. *Will be provided prior to Bacterial Unknown assignment*
- 2. *All written work submitted must follow the **College Writing Guidelines** as stated in the **Student Handbook**.*

C. Academic Dishonesty and Plagiarism:

- 1. Academic dishonesty violates the spirit and purpose of an academic community, and is therefore subject to disciplinary action. Academic dishonesty includes cheating on examinations and unauthorized duplicated submission of any work.
- 2. Plagiarism is an act of academic dishonesty. Any work submitted that is not your own is an act of plagiarism. In preparing assignments, you must acknowledge in writing, any use of outside sources or any assistance you received in preparing an assignment.
- 3. If an instructor believes that a student has committed an act of academic dishonesty or has plagiarized material, the instructor will award a failing grade for that assignment to the student. If the occurrence is during an examination, the student will receive a zero (0) for that portion of their grade and must leave the room.
- 4. If the student disagrees with any of these decisions, the student may follow the grievance procedure.

XV. Revisions:

This syllabus is subject to revision, either by me or any authorities of the Lancaster General College of Nursing and Health Sciences.

LECTURE SCHEDULE – Section (01)

(Subject to change)

Week	Subject Matter	Text Chapter (Required Reading)
Week # 1 Jan 8	General Introduction to Microbiology - Microbe Hunters-Paul DeKruif	
Week # 2 Jan 15	Introduction, Microscopy, Cell Structure Prokaryotes vs. Eukaryotes	Chapter 1, 4, & 3 <i>Robert Bauman</i>
Week # 3 Jan 22	Microbial Taxonomy & Cell Structure, Characterizing Prokaryotes	Chapter 3, 11 <i>Robert Bauman</i>
Week # 4 Jan 29	Characterizing Eukaryotes, Characterizing Acellular Agents Review for Exam #1	Chapter 12, 13 <i>Robert Bauman</i>
Week # 5 Feb 5	EXAMINATION # 1 (Continue with next lecture – 2 nd half of period)	(1, 3, 4, 11, 12, 13, & Introduction)
Week # 6 Feb 12	Chemistry & Biochemistry <i>Case Studies # 1 Skin and Eyes</i>	Chapter 2, 5 <i>Robert Bauman</i> <i>R. Brader</i>
Week # 7 Feb 19	Metabolism, Nutrition, & Growth <i>Case Studies # 2 Nervous System</i>	Chapter 5, 6 <i>Robert Bauman</i> <i>R. Brader</i>
Week # 8 Feb 26	Nutrition and Growth Review for Exam #2	Chapter 6 <i>Robert Bauman</i>
Week # 9 Mar 5	EXAMINATION # 2 (Continue with next lecture – 2 nd half of period)	(2, 5, & 6)
Week # 10 Mar 12	SCHOOL CLOSED Spring Break	SCHOOL CLOSED Spring Break
Week # 11 Mar 19	Genetics & Microbial Growth <i>Case Studies # 3 Cardiovascular System</i>	Chapter 6, 7 <i>Robert Bauman</i> <i>R. Brader</i>
Week # 12 Mar 26	Controlling Microbial Growth In-Vitro & In- Vivo <i>Case Studies # 4 Digestive System</i>	Chapter 9, 10 <i>Robert Bauman</i> <i>R. Brader</i>
Week # 13 Apr 2	Controlling Microbial Growth In-Vitro & In- Vivo Review for Exam #3	Chapter 9, 10 <i>Robert Bauman</i>
Week # 14 Apr 9	EXAMINATION # 3 (Continue with next lecture – 2 nd half of period)	(6, 7, 9, 10)
Week # 15 Apr 16	Epidemiology, Infections, & Diseases <i>Case Studies # 5 Respiratory System</i>	Chapter 14 <i>Robert Bauman</i> <i>R. Brader</i>
Week # 16 Apr 23	Immunology-Non-Specific & Specific Defense Mechanisms, Immune Testing <i>Case Studies # 6 Reproductive System</i> Review for Final Exam (Exam #4)	Chapter 15, 16, 17 <i>Robert Bauman</i> <i>R. Brader</i>
Final Exam Week Apr 30-May 4	EXAMINATION # 4 Final Exam	(14, 15, 16, 17)

Text Chapters:

Bauman, Robert, *Microbiology with Diseases by Taxonomy*, 2nd edition, Pearson Benjamin Cummings, San Francisco, CA, (2007)

Web Site:

www.microbiologyplace.com

LABORATORY SCHEDULE Section (01)

(Subject to Change and Revision)

Week	Subject Matter
Week # 1 (Jan 8)	Lab # 1 Microscope and Lab Introduction <i>Lab Safety</i>
Week # 2 (Jan 15)	Lab # 2 Microscopy & Microorganisms
Week # 3 (Jan 22)	Lab # 3 Microscopy-Motile Cultures
Week # 4 (Jan 29)	Lab # 4 Simple Stain Technique
Week # 5 (Feb 5)	Lab # 5 Differential Stain Technique (Gram Stain)
Week # 6 (Feb 12)	Lab # 6 Aseptic Techniques Fermentation Lab – Kombucha, Kimchi, Yogurt
Week # 7 (Feb 19)	Lab # 7 Environmental Microbiology Changing Incubation Environment – Aerobes/Capnophiles/Anaerobes
Week # 8 (Feb 26)	Lab # 8 Beginning Enzyme Profiles <i>Tour of Lancaster Brewing Company-Fermentation</i>
Week # 9 (Mar 5)	Lab # 9 Clinical Microbiology Throat Cultures, Skin Samples, & Hand Washings
Week # 10 (Mar 12)	SCHOOL CLOSED Spring Break
Week # 11 (Mar 19)	Lab # 10 Food & Water Microbiology
Week # 12 (Mar 26)	Lab #11 Genetics Lab
Week # 13 (Apr 2)	Lab # 12 Chemical Methods of Microbial Control
Week # 14 (Apr 9)	Lab # 13 Unknown Bacterial Identification <i>Haunted Cemetery Tour-Infectious Diseases</i>
Week # 15 (Apr 16)	Lab # 13 Unknown Bacterial Identification
Week # 16 (Apr 23)	Lab # 12 Continuation Unknown <i>Hospital Lab Tour- If time available</i>
Week # 17 (Apr 30-May 4)	Hand in Unknown Report – LAB PRACTICAL