BIOL 2230
MICROBIOLOGY - LECTURE
Fall 2003

BOB REEDER
SH 216A
393-1704
Moore Co. Campus

COURSE OUTLINE

BIOL 2230 is an introductory microbiology course with the emphasis on bacteria. The lecture will cover lab equipment and procedures, cytology, genetics, morphology, and physiology of important microorganisms. The lectures will culminate in a unit on invasiveness, resistance and host immunity and the significance of microbes in everyday life.

TEXT: Talaro and Talaro. Foundations in Microbiology. 4th edition WCB/McGraw-Hill, 2002.
Computer Software: Microbes in Motion II; Hyperclinic 2

WEBSITE ACCESS: Go to http://www.mscc.edu/, select Personnel, select Faculty Web Pages under Headlines. Finally, click on my name to access my lecture material (Biol 2230 Test Outlines) sequenced in chronological order.

HYPERCLINIC DISEASE and CASE STUDY REPORT: each student will be assigned a disease to investigate using the Hyperclinic 2 software. All possible causes plus a case study will be explored. A written report will follow (worth: 50 pts).

LECTURE TOPIC OUTLINE	READING IN TEXT
A. Introduction and History	Chapter 1
B. Microscopy/Tools of the Trade/Basic Techniques	Chapter 3
C. Classification and Bacterial Morphology	Chapters 4,5
D. Chemistry of Biological Molecules	Chapter 2
Exam I	
E. Nutrition and Growth of Bacteria	Chapter 7
F. Enzymes and Metabolism	Chapter 8
G. Genetics	Chapters 9, 10
Exam II	
H. Unusual Procaryotes	Chapter 4
I. Viruses	Chapter 6
J. Control of Microorganisms	Chapter 11
1. Sterilization and inhibition	
2. Medical Asepsis	
K. Chemotherapeutic Agents	Chapter 12
Exam III	
L. Infection and Disease, Normal Flora	Chapter 13
M. Resistance (Nonspecific and Immune System Response)	Chapters 14,15
N. Immunization	Chapters 16, 17
O. Collection and Identification Techniques in Medical Microbiology	Chapter 16, 13, pages 556-562
P. Environmental and Applied Microbiology.	Chapters 26, 10
Final Exam	

ABSENCES: You are expected to attend both lecture and lab; ten points will be added to a student's total accumulated points at the end of the semester if there is no more than two absences. Absence on the day of a test results in a make-up of greater difficulty that is administered the week before finals. DON'T MISS! BE ON TIME! It is the student's responsibility to tell instructor at classes' end, if late. Three lates = 1 absence.

LECTURE TESTS: A total of four lecture exams given with each worth a total of 100 points. The fourth or FINAL lecture exam is not comprehensive over the entire semester. Extra points from the terminology definition packet from each exam period are added directly to each exam score. Exams are composed of multiple choice, true-false, and matching questions.

Students will be able to see their test outcome at the end of the next class period and are encouraged to come by my office during office hours for a more thorough review of their test; exams must be returned back to the instructor or a "0" grade is recorded.

TERMINOLOGY DEFINITIONS: Terminology packets will be available to each student prior to each test period (total of four). The first three packets are worth six points each, while the last one is worth eight points resulting in potentially twenty-six extra points by the semester's end. These definition packets are highly beneficial for the student but are strictly on a volunteer basis. Grading will be based on neatness, completeness, and adequate, thorough discussion relative to the class discussions.
Definitions straight out of the book are unacceptable and should include many examples and drawings or diagrams. Definitions are due each exam date with points added directly to the student's test score.

"MEDICALLY IMPORTANT ORGANISM EXAM": You will be given a list of microorganisms (bacteria, protists, fungi, viruses), their characteristics, & associated disease or condition to know etc.; exam will be given the week before finals. Total worth: 50 points

FINAL EXAM: 9:00 class – Wednesday, Dec. 10 – 8:00 AM – 9:00 AM

LAB EXAMS: Two lab exams are given with each worth 75 points. Lab will contribute 150 points to each student's total points accumulation and will be averaged with the lecture points. Lab schedule is discussed on a separate handout.

GRADING: At the end of the term, a possible 650 required points will be accumulated from which an average will be computed. The average is determined by dividing each student's total accumulated points by 650 at the end of the semester.

SCALE:
91-100 = A
81-90 = B
71-80 = C
61-70 = D
below 60 = F

POINT BREAKDOWN:
300 points (First three lecture exams)
100 points (Final lecture exam)
150 points (lab)
50 points (Medically important microorganism exam)
50 points (Hyperclinic disease and case study report)
650 points

YOUR SCORES:
Exam 1: _____
Exam 2: _____
Mid Term Lab: _____
Exam 3: _____
Final Lab: _____
Organism Exam: _____
Report: _____
Final Exam _____

OBJECTIVES: The student who satisfactorily completes this course will be able to:

1. Discuss major contributions of nineteenth and twentieth century scientists to the developing science of microbiology.
2. Describe two general patterns of cellular organization found in microorganisms.
3. Identify the metric units used in measuring microorganisms.
4. Differentiate between cyanobacteria (blue-green algae) and bacteria.
5. Explain why viruses cannot be classified as procaryotes and eucaryotes.
6. Describe several benefits derived from microbial populations on earth.
7. Describe five types of microscopes and one purpose for which each is used.

8. Differentiate between the magnifying power and resolving power of a microscope.
9. Compare advantages of wet mounts, hanging-drop wet mounts, and stained smears in making observations of microorganisms.
10. Explain the significance of gram reactivity and acid-fastness.
11. Describe the morphology and cytology of bacteria.
12. Describe the major differences and similarities between procaryotic and eucaryotic cells.
13. Describe the sequence of events occurring in the replication cycle of viruses.
14. Differentiate between an obligate and a facultative parasite.
15. Differentiate between a primary and a intermediate host.
16. Describe the structure of a monosaccharide, an amino acid, and a fatty acid.
17. List the major classes of carbohydrates, proteins, and lipids.
18. Describe both asexual and sexual reproductive capabilities found in bacteria.
19. Describe the role of adenosine triphosphate (ATP) molecules in storing energy.
20. Compare the energy sources of autotrophic and heterotrophic microorganisms.
21. Distinguish between respiring and fermentative microorganisms.
22. Explain the influence of pH, temperature, enzyme concentration on enzyme reactions.
23. Describe the major groups of enzyme systems.
24. Differentiate between energy-liberating and energy-requiring reactions.
25. Compare the efficiency of aerobic and anaerobic respiration.
26. Explain why pyruvic acid is a key intermediate in microbial metabolism.
27. Identify the phases of growth on a normal growth curve.
28. Describe the classification of bacteria based on the metabolic use or non-use of atmospheric oxygen.
29. Identify growth patterns of bacteria in broth and on agar slants.
30. Compare formation and germination of endospores.
31. Define the terms pathogen and nonpathogen.
32. Differentiate between natural and acquired immunity.
33. Differentiate between active and passive immunity.
34. Define titer, antigenicity, and immunogen.
35. Describe several possible responses of the human host to infection.
36. Explain the significance of the inflammatory process to the immune response.
37. Differentiate between a communicable and an infectious disease.
38. Define epidemic, pandemic, and endemic.
39. Differentiate between virulence and pathogenicity.
40. List the microbial factors that contribute to pathogenicity.
41. Contrast the properties of exotoxins and endotoxins.
42. List the host factors that provide for colonization or spread of microorganisms within the human host.
43. List the major portals of entry and exit for microorganisms.
44. Explain why the skin constitutes a primary line of defense against invading microorganisms.
45. Describe how microorganisms gain entrance through the skin.

46. List the lesions associated with infections of the skin.
47. Explain how the respiratory tract is adapted to resist infections.
48. Differentiate between upper and lower respiratory tract infections.
49. Describe a pulmonary infection caused by a rickettsia.
50. Describe a pulmonary infection caused by a chlamydia.
51. Compare the symptoms and time of onset of three types of bacterial food poisoning.
52. Distinguish between the key features associated with cell-mediated and antibody-mediated immune responses.
53. List the major protozoa that cause disease in humans.
54. Describe the major helminthic infections found in humans.
55. Discuss the transmission and prevention of rickettsial disease.
56. Discuss the transmission and prevention of trypanosomiasis.
57. Explain the role of rats, ticks, and lice in the transmission of febrile diseases caused by bacteria.
58. Differentiate between disinfection and sterilization.
59. List the physical agents commonly employed for disinfection or sterilization.
60. Contrast the efficiency of moist heat, dry heat, and steam under pressure as microbicidal agents.
61. List the target site for the major antimicrobial agents.
62. Explain why specimens for microbiological examination should be sent to the laboratory promptly.
63. Explain why labeling and recording the time of collection are important in processing specimens.
64. List several personnel factors which contribute to hospital-acquired infections.
65. Describe a procedure for hand washing which prevents the spread of microorganisms.
66. List the environmental factors which contribute to hospital-acquired infections.
67. Explain how antimicrobial therapy, immunosuppressive therapy, and immobilization predispose patients to infection.
68. Explain the criteria necessary to classify infections as nosocomial in origin.
69. Describe AIDS and review current standards for prevention used by health practitioners.
70. Describe the minimal information needed, as well as various tests used in the identification of bacteria via laboratory diagnosis.