

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO113

MICROBIOLOGY FOR THE HEALTH SCIENCES

4 Credit Hours

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**Revised Date: December 2006
by
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**Arts and Science Education
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BIO113 MICROBIOLOGY FOR THE HEALTH SCIENCES

I. CATALOGUE DESCRIPTION

Prerequisite: High school biology and chemistry with a “C” or better within the previous year of registration date, or equivalent (BIO101).

4 semester hours credit

Microbiology for the Health Sciences explores microorganisms associated with health, disease, and stresses concepts associated with transmission, infection, control, and the immune system. Laboratory time is required. Microbiology for the Health Sciences meets for three hours of lecture per week. Microbiology for the Health Sciences will partially satisfy the science requirement for the Associate of Arts degree. Students cannot apply both BIO113 and BIO215 toward graduation. (F,S)

II. GENERAL COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- A. Explain how early historical events led to the formulation of the germ theory.
- B. Characterize representative members of the microbial kingdoms.
- C. Describe methods of isolation and cultivation of microbes.
- D. List basic methods of sterilization and disinfection.
- E. List commonly used antibiotics and tell how they work.
- F. Discuss the role of epidemiology for preventing the spread of disease.
- G. Understand basic principles associated with the immune system.
- H. List methods of testing for antibodies.
- I. Understand basic characteristics of allergy.
- J. Describe many of the classical diseases in terms of symptoms, spread, laboratory diagnosis, treatment and prevention.
- K. Understand the profound implications of HIV infection and spread.
- L. Perform basic laboratory methods associated with microbiology.
- M. Properly use a compound microscope.
- N. Understand the importance of microbiology for clinical diagnosis of disease.

III. COURSE OUTLINE

LECTURE OUTLINE

- A. Beginnings of Microbiology and the Germ Theory
- B. Survey of the Microbial World
- C. Growth and Control
- D. Epidemiology
- E. The Immune System
- F. Infectious Diseases

LABORATORY OUTLINE

- A. Using the Microscope
- B. Preparation and Staining Methods of Microscope Slides
- C. Methods of Growth and Cultivation
- D. Isolation Methods
- E. Antibiotics, Disinfectants and Antiseptics
- F. Identification Methods

IV. UNIT OBJECTIVES

- A. Beginnings of Microbiology and the Germ Theory
 1. Summarize the early history of microbiology.
 2. State the germ theory and summarize its development
 3. List contributions of Leewuenhock and other famous microbiologists.
- B. Survey of the Microbial World
 1. Describe general characteristics, structural components, shapes, sizes and microbes
 2. List differences between monerans and protistans.
- C. Growth and Control
 1. Explain the growth curve.
 2. List methods of sterilization and disinfection.
 3. Know methods used to determine microbial sensitivity to antibiotics.
 4. List the fine modes of action of antimicrobial agents.
 5. Define resistance and describe several mechanisms by which microbes acquire resistance to antibodies.
 6. List specific antibiotics and explain their action.
- D. Epidemiology
 1. Define epidemiology and list several terms used by epidemiologists.
 2. List and describe methods used to control communicable diseases.
 3. Describe the role of the CDC and other public health organizations.
- E. The Immune System
 1. Explain innate, acquired, active and passive immunity.
 2. List characteristics of antigens and antibodies.
 3. Describe methods used to titer antibodies.
 4. Describe the role of T and B cells.
 5. Explain hypersensitivity.
- F. Infectious Diseases

1. Explain the normal microbial flora of the various organ systems.
2. Know basic isolation procedures and laboratory methods of diagnosis for various diseases.
3. List major classical diseases associated with the different organ systems.
4. Know primary symptoms of the classical diseases.
5. Understand basic epidemiology, nature of microbe, methods of prevention and treatment.
6. Describe zoonotic disease and list common examples.
7. Develop a holistic basic understanding of HIV and be able to help educate the common public through conversation.

UNIT OBJECTIVES LABORATORY

- A. Microscopy Techniques
 1. Perform heat fixation.
 2. Prepare gram stains.
 3. Observe microbial morphology.
- B. Growth
 1. Be able to grow anaerobes in culture.
 2. Inoculate broths and solid media.
 3. Cultivate viruses.
- C. Control
 1. Use U.V. light sterilization.
 2. Use disinfectants and antiseptics.
 3. Test antibiotics.
- D. Microbial Metabolism
 1. List and describe sugar metabolism tests.
 2. List and describe protein tests.
 3. List and describe catalase and oxidase tests.
- E. Microflora of the Body
 1. Use selective media to isolate microbes from the body.
 2. Use differential media to isolate microbes from the body.
- F. Identification of an Unknown
 1. Isolate a microbe from a mixed culture.
 2. Perform the proper tests to identify the isolated microbe.

V. METHOD(S) OF INSTRUCTION

- A. Lectures
- B. Video Tapes
- C. Classroom Discussion
- D. Classroom Demonstrations
- E. Laboratory Exercises
- F. Reading Textbook

VI. REQUIRED TEXTBOOK(S) WITH PUBLICATION INFORMATION

LECTURE:

Nester, Eugene W. et. al. 2004 *Microbiology: A Human Perspective*. 4th Ed. Boston: McGraw-Hill.

LABORATORY:

Leboffe, Michael J. and Burton E. Pierce. 2005. *Photographic Atlas for the Microbiology Laboratory*. Englewood, Colorado: Morton Publishing Company.

VII. REQUIRED MATERIALS (STUDENT)

None.

VIII. SUPPLEMENTAL REFERENCES

Bergy's Manuals (Library Reserve Desk)

IX. METHOD OF EVALUATION (STUDENT)

- A. Written Exams
- B. Laboratory Exams
- C. Microbial Unknown Investigation
- D. Comprehensive Written Exam