

North Central **Michigan College**

NCMC MASTER COURSE SYLLABUS FOR YEARS: 2001-2003

DIVISION/AREA: Natural Sciences, Health and Human Services DEPARTMENT: Natural Science

AREA DEAN: Dr. Dykstra

ORIGINATOR: Syverson

HOURS OF INSTRUCTION: 5 Lecture: 3 Lab: 2

COURSE NUMBER: BIO 226

CREDIT HOURS: 3

COURSE TITLE: Microbiology

TRANSFERABLE YES: X NO: TO: Most

PREREQUISITE(S)/COREQUISITE(S)/ADVISORY:

Prerequisite: BIO 235 or college biology background.

CATALOG DESCRIPTION:

An introduction to the world of microorganisms and the application of microbiology to the study of health and disease. The introductory portion of the course includes a survey of the microbial world with emphasis on the basic morphology, physiology, behavior and classification.

The application portion of the course covers the problems of the control of microorganisms, the concepts of parasite-host interaction and epidemiology. Representative diseases are used frequently as examples and case studies.

Prerequisite: BIO 235 or college biology background.

GENERAL EDUCATION OUTCOMES OR OCCUPATIONAL PROGRAM OUTCOMES:

Refer to college catalog (p.70) or specific occupational program outcomes and describe how this course meets those outcomes.

Gen Ed Outcome # 8. Examined knowledge from the humanities, social sciences, natural sciences and technology. For description, see next.

COURSE TITLE AND NUMBER: BIO 226 Microbiology

COURSE OBJECTIVES & OUTCOMES:

This course is designed to have six major student outcomes. At the completion of this course, the student should be able to:

1. Identify the important characteristics of the different groups of microorganisms and using these characteristics construct the basic formula used in their biological classification.
 2. Differentiate among the various forms of bacteria, viruses, fungi, protozoa and animal parasites based on morphology and physiology.
 3. Demonstrate the basic skills required for the culture and identification of bacteria and fungi in the laboratory.
 4. Identify the methods used in the control of microbes and state the advantages and disadvantages of various methods in different situations.
 5. Identify the basic concepts underlying the complex process of microbial infection and host-parasite interaction.
 6. List specific examples of microbial disease based on microbial type, mode of infection and symptoms produced.
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COURSE DELIVERY METHOD: Classroom

METHODS OF INSTRUCTION:

1. Lecture with students encouraged to ask questions and comment at any time.
 2. Laboratory independent study and small group work with instructor guidance as requested.
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METHODS OF EVALUATION:**4 LECTURE TESTS**

Each of the 4 major tests will consist of approximately 100 points. The format of the tests will consist of multiple choice and short answer questions that may require some diagramming.

Special test times must be arranged for BEFORE the regular test time. A penalty of 10% will be assessed for taking a test late. **LECTURE TEST #4 WILL INCLUDE REVIEW QUESTIONS.**

1 LAB PRACTICAL

The lab practical will consist of 50 pts and will be held at the end of the semester. It will be a hands on review of the principles and techniques learned during the course of the semester. Do to the difficulty in setting up the lab practical, **NO MAKEUPS WILL BE ALLOWED.**

10 LAB ASSIGNMENTS

10 laboratory assignments of 5 points each will be given during the course of the semester. They will require the turning in to the instructor successfully completed cultures, slide preparations, or lab results to be specified at the time of the assignment. **NOTE: Most assignments have to be completed in the week they are assigned as they involve the use of living cultures.**

COURSE TITLE AND NUMBER: BIO 226 Microbiology

REQUIRED TEXTS: (Representative List)

Control of Communicable Diseases Manual, 16th Ed., 1995, Benenson, ed., American Public Health Association

A Photographic Atlas for the Microbiology Laboratory, 1996, Leboffe and Pierce, Morton Publishing Co.

Optional supplementary Materials:

SCANTRON FORMS 882 (You will need 4)

MICROSCOPE SLIDE PACKAGE (You will need 1)

APPROXIMATE TIME ALLOWANCE AND SEQUENCE OF INSTRUCTION (Course Outline):

LECTURE

- 1 COURSE INTRODUCTION
 - A. Course Syllabus
 - B. Branches of Microbiology
 - C. Microbial Sizes
- 2 THE BEGINNINGS OF MICROBIOLOGY
 - A. Development of the microscope and Leeuwenhoek
 - B. Spontaneous generation and Fermentation
 - C. Germ Theory of Disease and Pasteur
 - D. Koch's Postulates
 - E. Semmelweis and Lister
- 3 CLASSIFICATION OF MICROBES
 - A. Phylogenetic relationships of living things
 - B. Methods of Classification
 - C. Development and use of Bergey's Manual
- 4 MORPHOLOGY OF PROCARYOTES AND EUKARYOTES
- 5
 - A. Comparison of Cell Structure
 - B. Cell Membranes and Cell Walls
 - C. Bacterial Genome
 - D. Motile Structures
 - E. Reproduction and Spore Formation
 - F. Bacterial size, shape and arrangement
- 6 GROWTH AND CULTURE OF BACTERIA
 - A. Physical Growth Requirements
 - B. Nutritional Growth Requirements
 - C. Stages of Growth
- 7 SELECTED BACTERIAL DISEASES
- 8
 - A. Gram-Negative Pathogens
 - B. Gram-Positive Pathogens
- 9 TEST #1
- 10 MYCOLOGY

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- 11 A. Morphology of Yeasts, Molds and Fruiting Bodies
 - B. Classification of Kingdom Fungi
 - C. Medical Classification of Mycoses
- 12 PROTOZOOLOGY
- 13 A. Characteristics of Protista
 - B. Major Classes of Pathogenic Protozoa
- 14 ANIMAL PARASITES
- 15 A. Characteristics of Animals
- 16 B. Pathogenic Platyhelminths
 - C. Pathogenic Nematodes
- 17 TEST #2
- 18 VIROLOGY
- 19 A. History of Virology
 - B. Morphology of Viruses
 - C. Culture of Viruses
 - D. Viral Replication Cycle
- 20 VIRAL TAXONOMY AND SELECTED DISEASES
- 21 A. DNA Animal Viruses
- 22 B. RNA Animal Viruses
- 23 CONTROL OF MICROORGANISMS
- 24 A. Levels of Control
 - B. Physical Agents
 - C. Chemical Agents
- 25 TEST #3
- 26 THERAPEUTIC AGENTS
- 27 A. History and Development
 - B. Mode of Action
 - C. Drug-Resistant Bacteria
 - D. Bacterial Antibiotics
 - E. Anti-Fungal, Anti-Viral Agents
- 28 HOST-PARASITE INTERACTION
 - A. Types of Symbiosis
 - B. Indigenous Microflora
 - C. Infection and Disease
- 29 IMMUNOLOGY
 - A. Review of Principles
 - B. Microbial Strategy
- 30 PRACTICAL APPLICATIONS OF IMMUNOLOGY
 - A. Vaccines
 - B. Antiserums and Antitoxins
 - C. Diagnostic Testing
- 31 EPIDEMIOLOGY
 - A. Snow and the Broad Street Pump
 - B. Dynamics of Populations and Pathogens
 - C. Organizations of Epidemiological Study
- 32 TEST #4

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Week	Lab
1	1A - MICROSCOPE TYPES
1	1B - MICROSCOPE USE
2,2	2 - BACTERIAL MORPHOLOGY
3	3 - LIVING PROTOZOA
3	4A - GROWTH MEDIA TYPES
4	4B - MEDIA PREP
4	5A - ASEPTIC TECHNIQUE
4	5B - STREAK PLATE
5	6 - M. BLUE SLIDE
5	7 - GRAM STAIN
6	8 - ENDOSPORE STAIN
6,7	9 - BIOCHEMICAL SCREENING
7,7	10 - ANTIBIOTIC SENSITIVITY
8	11 - YEAST BUDDING
8	12 - MOLD CULTURES
9,9,10	13 - PROTOZOAN PARASITES
10,11	14 - ANIMAL PARASITES
11,12	15 - VIRAL CULTURE
13,13	16 - ELISA TEST
14,14	- REVIEW WEEK
15	- LAB PRACTICAL

Reasonable accommodations may be provided for students with documented physical, sensory, cognitive, systemic and psychiatric disabilities. Please contact the Educational Opportunity Program (231) 348-6687 to arrange serves for this course.

APPROVED FOR ADOPTION BY THE CRD/AP COMMITTEE ON _____