**I. COURSE TITLE:** Microbiology

**COURSE NUMBER:** 2210 **CATALOG PREFIX:** BIOL

**II. PREREQUISITES:** BIOL 1101, BIOL 2205

**III. CREDIT HOURS:** 4 **LECTURE HOURS:** 3

**LABORATORY HOURS:** 1 **LAB CONTACT HOURS**: 3

**IV. COURSE DESCRIPTION:**

This course covers the morphology and physiology of microorganisms and selected human parasites. Topics covered include basic chemistry, cell structure and function, metabolism, genetics, biotechnology, growth and control of microbes, normal human microflora, mechanisms of disease production, transmission of infectious diseases, immune responses, and the action of specific pathogens in the production of human infectious disease. There is also a brief introduction to environmental microbiology and various career options in microbiology. There is also a laboratory component that exposes students to biosafety and the practice of good aseptic technique.

**V. ADOPTED TEXT(S):**

*Microbiology: A System Approach*

4th edition

Marjorie Kelly Cowan

McGraw-Hill Company, 2015

ISBN: 978-0-07-340243-7

or

*Microbiology with Diseases by Taxonomy*

5th edition, 2016, Pearson

Robert W. Bauman.

ISBN: 978-0-13-401919-2

*Microbiology Laboratory Theory and Application*

3rd edition, 2016

Michael J. Leboffe and Burton E. Pierce

Morton Publishing 2016

ISBN: 978-1-6173-1477-3

**VI. COURSE OBJECTIVES:**

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

1. Describe the achievements of key historical people and events important   
 to the development of microbiology

2. Describe the CDC biosafety guidelines in the Biosafety in Microbiological   
 and Biomedical Laboratories (BMBL) manual.

3. Effectively perform aseptic transfers including slants, broths, and streak   
 plates.

4. Use a microscope and perform basic microbiological lab techniques   
 including Gram staining.

5. Recognize the characteristics and classification of various bacteria.

6. Recognize the characteristics of potential disease-causing eukaryotes.

7. Recognize the characteristics of various viruses.

8. Explain and differentiate various sterilization and disinfection techniques.

9. Use standard microbiological tests to identify unknown bacteria.

10. Explain how various pathogens are transmitted, the symptoms   
 produced, treatment required, and preventive measures that may be used.

**VII. GRADING:**

Grading will follow policy in the College Catalog.

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **90** | **–** | **100** |
| **B** | **80** | **–** | **89** |
| **C** | **70** | **–** | **79** |
| **D** | **60** | **–** | **69** |
| **F** | **0** | **–** | **59** |

**VIII. COURSE METHODOLOGY:**

This course may use lecture, discussion, video, and overhead presentations. The course may include chapter and workbook assignments, hand-in assignments, computer assignments, work projects, research papers, and laboratory activities. Written quizzes and exams may be used as appropriate to the course objectives and online instruction.

**IX. COURSE OUTLINE:**

1. A brief history of microbiology

2. Chemistry of microbiology

3. Cell structure and function

4. Microbial metabolism

5. Microorganism growth

6. Microbial genetics and Biotechnology

7. Controlling microorganism growth

8. Microbial classification

9. Classification of eukaryotes

10. Viral classification and replication

11. Normal microbial flora and human health

12. The immune system

13. Immunization and immune testing

14. Human infectious diseases

15. Microorganisms and the environment

**SAMPLE** Course Calendar

Week 1 Brief History and Laboratory Safety

Chemistry Refresher

Lab #1 - Ubiquity of Microbes

Week 2 Cells

Lab #2 - Aseptic Transfers, Microscopy, and Staining

Week 3 Microbial Metabolism

Microbial Nutrition and Growth

Lab #3 – Microbial Enumeration

Week 4 Microbial Genetics

Recombinant DNA Technology and Gene Mapping

Lab #4 – Electrophoresis

Week 5 Growth Control

Antimicrobial agents and Resistance

Lab #5 – Selective Media and Kirby-Bauer Test

Week 6 Classification of Prokaryotes

Classification of Viruses and Eukaryotic Pathogens

Lab #6 – Classification of Bacteria Lab

Week 7 Normal Microbiota

Disease~~,~~ and Epidemiology

Lab #7 – Differential Tests

Week 8 Innate Immunity

Innate Immunity

Lab #8 – Unknown Identification

Week 9 Adaptive Immunity

Adaptive Immunity

Lab #9 – Unknown Identification

Week 10 Immunization

Serologic Testing

Lab #10 – Unknown Identification

Week 11 Immune Disorders with Serology Simulation

Gram Positive Bacterial or Cutaneous Infections

Lab #11 – Serologic Testing Lab

Week 12 Gram Negative Bacterial or Nervous System Infections

Miscellaneous Bacterial or Digestive Tract Infections

Lab #12 – Morbidity and Mortality Weekly Report Lab

Week 13 Fungal or Respiratory Infections

Miscellaneous Eukaryote or Urinary Tract Infections

Lab #13 – Morbidity and Mortality Weekly Report Lab

Week 14 DNA Virus or Sexually Transmitted Infections

RNA Virus or Multi-system Infections

Lab #14 – Presentation Preparation Lab

Week 15 Environmental Microbiology

Biological Warfare and Bioterrorism

Lab #15 – Presentations

Week 16 **Final Exam**

**X. OTHER REQUIRED BOOKS, SOFTWARE AND MATERIALS:**

Instructors may have specific requirements including   
 accessing online materials and materials on other media such as CDs.

**XI. EVALUATION:**

Knowledge of lecture and laboratory material will be evaluated with periodic exams, quizzes, instructor designated assignments, and a comprehensive final exam. Scores on laboratory activities including identification of unknown microbes will comprise approximately 20% of the final class grade. Below is a sample break down of graded items for the course:

Lecture exams, quizzes, and assignments = 55%

Lab activities = 20%

Final Exam = 25%

**XII. SPECIFIC MANAGEMENT REQUIREMENTS:**

At the discretion of the instructor

**XIII.** **OTHER INFORMATION:**

**FERPA:** Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes.

Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**DISABILITIES:** Students with disabilities may contact the Disabilities Service Office, Central Campus, at 800-628-7722 or 937-393-3431.