

**COURSE TITLE:** Microbiology

**COURSE NUMBER:** BIO1245300

**CREDIT HOUR:** 5 Credit hours

**INSTRUCTOR:** Mr. Mike Rush

**OFFICE LOCATION:** Osawatomie High School Room B5

**PREREQUISITE(S):** General Biology

**REQUIRED TEXT** Microbiology A Human Perspective, E.W. Nester et al., 2007 (5<sup>th</sup> edition)

**COURSE DESCRIPTION:** This course is an introduction to the characteristics of microorganisms and methods of studying and controlling them.

**EXPECTED LEARNER OUTCOMES:** The content of the course will provide the student with a good working knowledge of the microbial world and their impact on the human population. The material will be taught as it relates to preparation for a medical professional major. Emphasis will be on applied and environmental microbiology.

**ASSESSMENT OF OUTCOMES:**

- Unit tests – objective and subjective questions covering the entire unit of study.
- Daily labs
- Comprehensive Final
- Lab Practicals
- Lab Assignments and Report
- Lab Final
- Research Project

**GRADING POLICY:**

**Your final grade will be based on the following criteria:**

**Tests** at the end of each unit. I may break up some units to lighten your load.

**Comprehensive lab final** showing you have learned proper sterile and staining techniques.

**In class, practice exercises and labs** that will be evaluated on a pass/fail basis. These may reduce your grade by ½ letter if not satisfactorily completed.

**Weekly** you will be assigned an organism to research.

**5-page research paper** about a relevant microbe.

Your grade will be based on satisfactory completion (minimum 80%) of each unit, along with attendance. Everyone has an A when they start this class. Each test that is not completed to the 80% level or above will reduce your grade by one letter.

**Academic integrity:**

Any student cheating on a quiz, test, lab report, paper, etc. will receive a zero for that assignment/test. This includes calling someone else's work your own or sharing work with another student. Using unauthorized assistance on an evaluation is considered cheating.

**ATTENDANCE:**

Students are expected to attend class regularly and to be on time. Each absence will drop your grade by ½ letter. A record of attendance will be kept for each student. If a student must be absent, it is the student's responsibility to do the work they missed and turn it in before the next unit test. It is also the student's responsibility to schedule a time for a make-up lab. If the student has never missed class or has only one unexcused absence, they will be eligible to drop their lowest test score. Three tardies equals one absence when determining this eligibility.

The student will not be dropped from the class due to absences. It is up to the student to drop the class in any circumstance.

**SPECIAL NOTES:**

This syllabus is subject to change at the discretion of the instructor. Material included is meant to provide an outline of the course and rules that the instructor will adhere to in evaluating the student. However, this syllabus is not intended to be a legal contract.

**METHOD OF INSTRUCTION:**

Textbooks, visual/audio-visu-als/tapes, classroom activities, labs, research and comprehensive final.

## **COURSE OUTLINE:**

1. Main themes of microbiology
  - a. History of microbiology
  - b. Taxonomy of microbes
  - c. Use and care of the microscopes
2. Cells and cell chemistry
  - a. Cell metabolism
  - b. Prokaryotic/eukaryotic cells
  - c. Survey of the eukaryotes
3. Introduction to the viruses
  - a. Viral replication
  - b. Viral disease, detection and control
4. Microbial Nutrition, Ecology, Growth and Control
  - a. Environmental influence on microbes
  - b. Microbial reproduction
  - c. Media production in the laboratory
  - d. Physical and chemical control of microbes
  - e. Chemotherapy use
5. Infection, disease, and the human immune system
  - a. Infection processes and epidemiology
  - b. The immune system, specific and non-specific immune response
  - c. Immune disorders
6. Bacteria that cause disease
  - a. Cocci
  - b. Bacilli
  - c. Miscellaneous agents
7. Other microbial diseases and causative agents
  - a. Fungal disease
  - b. Parasites of the human body
  - c. Viral disease
8. Environmental microbiology
  - a. Soil and water microbes
  - b. Food industrial microbes
  - c. Genetic engineering and microbes

## **COMPETENCIES:**

1. Recall main events in the history of microbiology.
2. Have an understanding of taxonomy and classification of microorganisms.

3. Know the primary chemical components and reactions of living cells.
4. Outline the characteristics, similarities and differences of prokaryotic and eukaryotic cells.
5. Demonstrate general knowledge of viral morphology and replication procedures, and viral disease.
6. Have an understanding of microbial metabolism and physiological needs of the microbe.
7. Have general knowledge of the genetics of microbes and biotechnical applications.
8. Be able to discuss several methods by which microbes are controlled.
9. Know how to use chemotherapy to control microbes.
10. Recall select organisms that cause disease, be able to describe the symptoms, cause and cure of the disease, and review the characteristics of the pathogenic microbe.
11. Have an understanding of the human immune system and both nonspecific and specific immune reactions of the body.
12. Be able to perform lab procedures including negative stains, gram stains, acid-fast stain, spore stain, capsule stain, motility test, prepare media, do a count, and isolate pure cultures of bacteria.
13. Know the importance of microorganisms to us in our daily lives as part of the ecosystem, as tools for genetic engineering, and as producers of chemicals used in food production.
14. Review the general characteristics of select microorganisms such as viruses, rickettsia, bacteria, and yeast, protozoa, fungi, algae, and parasitic worms.