SYLLABUS

DATE OF LAST REVIEW 02/2013
CIP CODE: 24.0101
SEMESTER: DEPARTMENTAL SYLLABUS
COURSE TITLE: Microbiology
COURSE NUMBER: BIOL-0261
CREDIT HOURS: Three (3)
INSTRUCTOR: DEPARTMENTAL SYLLABUS
OFFICE LOCATION: DEPARTMENTAL SYLLABUS
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PREREQUISITES: One of the following is required as a prerequisite for this course: CHEM0109, General Chemistry and Lab, or CHEM0111, College Chemistry I and Lab, or BIOL0121 General Biology; or BIOL0271 Physiology. Note: BIOL0262, Microbiology Lab is a recommended co-requisite.

REQUIRED TEXT: Please check with the KCKCC bookstore, http://www.kckccbookstore.com/, for the required texts for your particular class.

COURSE DESCRIPTION:
Microbiology is a basic inquiry into the significance of microbes in our environment, featuring sustainability issues, with emphasis on pathogenesis in humans. Students will investigate the cell structure of bacteria, the chemical nature of viruses, and the genetic flow of information within and between microbes. They will discover how infectious diseases are developed and transmitted and how the human immune system is designed to protect us from disease.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:
I. Microbes in Our Lives
   A. History of Microbiology
   B. Taxonomy - Biological Evolution
   C. Microbes and the Environment - Sustainability
II. Chemical Principles
   A. Functions and Locations of Biological Molecules
B. Hierarchy of Organization in Living Things
   1. Atoms, molecules, macromolecules
   2. Cell macro-structures, and organelles
   3. Cells, tissues, organism

III. Morphology of Prokaryotic Cells
   A. Simple and Arrangement Morphology
   B. Bacterial Cell macro-structures
      1. Cell Wall - peptidoglycan
      2. Capsule
      3. Flagella
      4. Plasma Membrane – phospholipids
      5. Cytoplasm
      6. Nucleic Acids - plasmids
      7. Ribosomes
      8. Endospores

IV. Microbial Growth and Control
   A. Physical and Chemical Growth Requirements
   B. Physical and Chemical Control of Microbes
   C. Antimicrobics (Pharmacology)

V. Microbial Genetics – binary fission
   A. Structure and Function of DNA and RNA
   B. DNA Replication, Transcription, and Translation
   C. Bacterial Methods for Creating Genetic Diversity
      1. Mutations
      2. Transformation
      3. Conjugation
      4. Transduction

VI. Viruses
   A. General Properties and Characteristics
   B. Mechanisms of Pathogenesis

VII. General Principles of Infectious Disease
   A. Symbiotic Relationships
   B. Modes of Disease Transmission
   C. Nosocomial Infections
   D. Epidemiology

VIII. Bacterial Mechanisms of Pathogenesis
   A. Exoenzymes
   B. Exotoxins
   C. Endotoxin

IX. Immunology
   A. The Lymphatic System
   B. Nonspecific Host Immunity
      1. Skin
      2. Phagocytosis
      3. Inflammation
      4. Interferon
   C. Specific Host Immunity
      1. Naturally Acquired Active Immunity
         a. Humoral Immunity
         b. Cell-Mediated Immunity
      2. Naturally Acquired Passive Immunity
      3. Artificially Acquired Active Immunity
4. Artificially Acquired Passive Immunity

X. Disorders of the Immune System
   A. Immediate Type Hypersensitivity
   B. Cytotoxic Type Hypersensitivity
   C. Immune Complex Type Hypersensitivity
   D. Delayed Type Hypersensitivity
   E. Autoimmunity
   F. AIDS

EXPECTED LEARNER OUTCOMES:

A. The student will be able to explain how microbes sustain life on our planet.
B. The student will be able to summarize the function and location of basic molecules.
C. The student will be able to identify and define macro-structures in bacterial cells.
D. The student will be able to identify methods for controlling the growth of bacteria.
E. The student will be able to define the natural mechanisms for microbial diversity.
F. The student will be able to distinguish properties of and diseases induced by viruses.
G. The student will be able to identify principles favoring infectious disease outbreaks.
H. The student will be able to identify mechanisms of pathogenesis in bacteria.
I. The student will be able to summarize principle components of the immune system.
J. The student will be able to identify four types of immunological disorders.

COURSE COMPETENCIES:

The student will be able to explain how microbes sustain life on our planet.
1. The student will be able to describe what vital organic and inorganic nutrients are recycled by bacteria as a measure of essential fundamental sustainability.
2. The student will be able to identify bacteria as foundational for biological evolution.
3. The student will be able to identify how microbiology changed medical history.

The student will be able to summarize the function and location of basic molecules.
4. The student will be able to define the function and location of biological molecules.
5. The student will be able to list component steps in the physical hierarchy of life.

The student will be able to identify and define macro-structures in bacterial cells.
6. The student will be able to identify bacterial simple and arrangement morphologies.
7. The student will be able to explain the function of macro-structures in bacteria.

The student will be able to identify methods for controlling the growth of bacteria.
8. The student will be able to explain how endospores necessitate sterilization.
9. The student will be able to describe methods of sterilization.
10. The student will be able to describe methods of disinfection and antisepsis.
11. The student will be able to identify the general modes of action for anti-microbics.

The student will be able to define the natural mechanisms for microbial diversity.
12. The student will be able to describe the function of three types of RNA.
13. The student will be able to describe conjugation and antimicrobial resistance.
14. The student will be able to distinguish types of mutations in bacteria.
15. The student will be able to describe the process of transformation in bacteria.

The student will be able to distinguish properties of and diseases induced by viruses.
16. The student will be able to recognize general categorical differences between viruses.
17. The student will be able to identify common diseases caused by viruses.
18. The student will be able to describe basic mechanisms of viral pathogenesis.

The student will be able to identify principles favoring infectious disease outbreaks.

19. The student will be able to explain the benefits of normal microbiota.

20. The student will be able to exemplify and explain the modes of disease transmission.

21. The student will be able to exemplify and explain nosocomial infections.

The student will be able to identify mechanisms of pathogenesis in bacteria.

22. The student will be able to exemplify and explain effects of exoenzymes.

23. The student will be able to exemplify and explain effects of exotoxins.

24. The student will be able to exemplify and explain effects of endotoxin.

The student will be able to explain principle components of human immune system.

25. The student will be able to describe immune functions of skin cells and skin glands.

26. The student will be able to describe how leukocytes perform phagocytosis.

27. The student will be able to describe components in three phases of inflammation.

28. The student will be able to describe antibodies and B cells in humoral immunity.

29. The student will be able to describe the role of T cells in cell mediated immunity.

30. The student will be able to exemplify and explain how antigens trigger immunity.

The student will be able to identify four types of immunological disorders.

31. The student will be able to identify descriptions of immediate type hypersensitivity.

32. The student will be able to identify classic cytotoxic hypersensitivity diseases.

33. The student will be able to identify immune complex hypersensitivity.

34. The student will be able to clinically describe delayed type hypersensitivity.

ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means of examinations, written assignments, and class participation.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student’s progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination.

Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the Director of Academic Resources in Room 3354 or call 288-7670.