Hill College

Master Course Syllabus

BIOL2421

CIP#

Microbiology

Math, Science, Education and Services

Faculty Member___________________________________ Date_______________
Division Chair____________________________________ Date_______________
Administrator_______________________________________ Date_______________

Disabilities/ADA

In accordance with the requirements of the Americans with Disabilities Act (ADA) and the regulations published by the United States Department of Justice 28 C.F.R. 35.107(a), Hill College’s designated ADA coordinator, Debra Hargrove, Vice President, Human Resources and Organizational Development, shall be responsible for coordinating the College’s efforts to comply with and carry out its responsibilities under ADA. Students with disabilities requiring physical, classroom, or testing accommodations should contact Salley Schmid, Director of Counseling, at (254) 659-7651 or sschmid@hillcollege.edu
BIOL2421 Microbiology

Purpose Statement

This course is intended to fulfill the requirement for students in majoring in biology and other related fields and to meet four hours of the general education requirements for a laboratory science.

Through comprehensive educational programs and services, which include technical, occupational, general education and college transfer curricula, the college strives to enhance the educational, cultural, and economic development of our service area and to assist both individual and groups to prepare themselves for a more productive life.

The purpose of Hill College is defined in the Texas Education Code, Section 130 003. Hill College exists to serve these purposes as they relate first to the local service areas, then to the State of Texas, and finally, to the nation. It has accepted the challenge of providing the resource, curricula, instructional support, and personnel required to best serve the many educational needs of its students and adult clients.

Course Description:

Morphology, physiology, cultivation, identification and control of bacteria. Comparative study of the major groups of microorganisms. Consideration of the role of microorganisms in disease, food and milk, water sewage, air, soil and industrial areas.

1. Expanded Course Description
   A. Major areas to be covered in lecture are:
      1. Growth and control of microorganisms
      2. Microbial metabolism
      3. Bacterial genetics
      4. Biotechnology
      5. Diversity of microorganisms
      6. Viruses
      7. Immune response and host-microbe interactions
      8. Infectious diseases
      9. Applied microbiology
   B. Major areas to be covered in lab are:
      1. Aseptic technique and inoculation methods
      2. Colony morphology and growth patterns
      3. Environmental factors affecting microbial growth
      4. Control of pathogens
      5. Microscopy and staining
      6. Selective media
      7. Differential tests
      8. Quantitative techniques
      9. Medical, environmental, and food microbiology
      10. Identification of unknowns
2. Classroom Hours: Lecture Hours 3  Lab Hours 4
3. Credit Hours: Semester Credit Hours 4
4. Pre-Requisite: None
5. Core Course:
   
   A. Intellectual Competencies
      1) Reading: the ability to analyze and interpret a variety of printed material—
         books, documents, and articles—above 12th grade level
      2) Writing: the ability to produce clear, correct and coherent prose adapted to
         purpose, occasion, and audience—above 12th grade level
      3) Speaking: the ability to communicate orally in clear, coherent, and
         persuasive language appropriate to purpose, occasion, and audience above
         12th grade level
      4) Listening: the ability to analyze and interpret various forms of spoken
         communication, possess sufficient literacy skills of writing, reading—above
         12th grade level
      5) Critical Thinking: the ability to think and analyze at a critical level
      6) Computer Literacy: the ability to understand our technological society, use
         computer based technology in communication solving problems, acquiring
         information
   
   B. Exemplary Educational Objectives
      1) To understand and apply method and appropriate technology to the study of
         science.
      2) To recognize scientific and quantitative methods and the differences
         between these approaches and other methods of inquiry and to
         communicate findings, analyses, and interpretation both orally and in writing.
      3) To identify and recognize the differences among competing scientific
         theories.
      4) To demonstrate knowledge of the major issues and problems facing modern
         science.
      5) To demonstrate knowledge of the interdependence of science and
         technology.

Course Objectives and Student Learning Outcomes

At the completion of this course, the student should be able to:

1. Identify contributions of past and current microbiologists to the field of
   microbiology.
2. Demonstrate an understanding of basic biochemistry.
3. Demonstrate and understanding of the basis for simple and differential staining.
4. Demonstrate an understanding of cell structure of prokaryotes and eukaryotes.
5. Demonstrate an understanding of the growth requirements for prokaryotes and
   ways in which microbial growth is controlled.
6. Demonstrate an understanding of cellular processes including ways in which cells harvest energy, express genes, acquire genes, and how these processes can be used in biotechnology.
7. Demonstrate an understanding of the groups and classification of microorganisms.
8. Demonstrate an understanding of viruses, prions, and viroids.
9. Demonstrate an understanding of host-microbe interactions.
10. Describe the symptoms, causative agent, pathogenesis epidemiology, and treatment for selected diseases in the body.
11. Demonstrate knowledge of the roles of microorganisms in ecology, food production, public health, and immunology.
12. Perform laboratory procedures/techniques and be able to apply them to diagnostic microbiology.
13. Students will demonstrate the ability to report experimental results.

Course Requirements

Students will be required to attend lab and lecture as per Hill College’s attendance police. In addition, students will be required to actively participate in the lecture and lab environment. The student will also be required to complete weekly quizzes, major exams, written lab reports and practical exams.

Grading System:

Lecture grade 60%
Laboratory grade 20%
Final exam 20%

A series of major exams, quizzes, and homework assignments will be given. This work will be counted as 60% of the course grade. Exams may be both objective and essay in format.

Laboratory grades will be based on attendance, performance on the laboratory assignments, quizzes, unknowns and written lab reports. The lab grade will count 20% of the course grade.

A comprehensive final exam will be given and the end of the semester and counted as 20% of the course grade.

Letter grades for the course will be based on the following percentages:

90-100% A
80-89%  B
70-79%  C
60-69%  D
below 60%  F

Outcomes Inventory
Microbiology will be evaluated through the following methods:

**Microbiology Assessment Plan Statement #1**

**Intended Outcome #1** Students taking Microbiology will demonstrate an understanding of the structure of the prokaryotic cell and how that structure differs from eukaryotic cells.

Lecture Objective A; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

**Assessment Measure, Techniques, and Target Courses/Activities** Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results** 70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #2**

**Intended Outcome #2** Students taking Microbiology will demonstrate an understanding of the differences between Gram positive and Gram negative bacteria.

Lecture Objective B; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

**Assessment Measure, Techniques, and Target Courses/Activities** Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results** 70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #3**

**Intended Outcome #3** Students taking Microbiology will demonstrate an understanding of the role of protists, fungi, and helminthes in the microbial world.

Lecture Objective C; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

**Assessment Measure, Techniques, and Target Courses/Activities** Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results** 70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #4**
**Intended Outcome #4**  Students taking Microbiology will demonstrate an understanding of the structure and function of viruses.

Lecture Objective D; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

**Assessment Measure, Techniques, and Target Courses/Activities**  Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results**  70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #5**

**Intended Outcome #5**  Students taking Microbiology will demonstrate an understanding of selected metabolic processes.

Lecture Objective E; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

**Assessment Measure, Techniques, and Target Courses/Activities**  Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results**  70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #6**

**Intended Outcome #6**  Students taking Microbiology will demonstrate an understanding of the structure and function of viruses.

Lecture Objective F; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives

**Assessment Measure, Techniques, and Target Courses/Activities**  Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

**Assessment Criteria/Expected Results**  70 % of students will answer the embedded questions correctly on the final exam.

**Microbiology Assessment Plan Statement #7**

**Intended Outcome #7**  Students taking Microbiology will demonstrate an understanding of the growth requirements of microorganisms and how that growth is controlled.
Lecture Objective G; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

Assessment Measure, Techniques, and Target Courses/Activities  Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

Assessment Criteria/Expected Results 70% of students will answer the embedded questions correctly on the final exam.

Microbiology Assessment Plan Statement #8

Intended Outcome #8  Students taking Microbiology will demonstrate an overall understanding of role of the DNA molecule in the process of DNA replication and gene expression.

Lecture Objective 2A; Intellectual Competencies 1, 4, 5, and 6; Exemplary Educational Objectives 2, 3, 4

Assessment Measure, Techniques, and Target Courses/Activities  Students taking Microbiology will complete a final exam in which questions related to this topic will be embedded. Faculty will evaluate students’ answers in the embedded questions.

Assessment Criteria/Expected Results 70% of students will answer the embedded questions correctly on the final exam.

Microbiology Assessment Plan Statement #9

Intended Outcome #9  Students taking Human Anatomy and Physiology will demonstrate the appropriate communication skills required when reporting data and conclusions of lab experiments.

Lecture Objective B; Intellectual Competencies 1, 2, 5, and 6; Exemplary Educational Objectives 1 and 5

Assessment Measure, Techniques, and Target Courses/Activities  Students taking Anatomy and Physiology II will complete a final lab report, in which aspects of format, grammar, and the intellectual understanding of the material will be evaluated by the faculty.

Assessment Criteria/Expected Results  The results will be used as baseline criteria.

Materials

Textbook:  

Supplies: May include the following
Lab coat or apron
Sharpie or Wax pencil
Pencils
Paper
Scantron form 882-E
Disinfectant wipes
Distilled water—1 gallon