

Course Outline of Record

1. Course Code: BI-015
2. a. Long Course Title: General Microbiology
b. Short Course Title: GEN MICROBIOLOGY
3. a. Catalog Course Description:

This course is a comprehensive study of the microbial world. It is designed to develop an appreciation and understanding of microorganisms and their relationship to humans and their environment. A knowledge of the principles of microbiology and their practical applications is stressed. Subject matter includes: medical microbiology, microbial physiology, microbial genetics and industrial microbiology. The laboratory experience explores the development of current methods, techniques and skills necessary to culture, propagate and identify microorganisms.

b. Class Schedule Course Description:
This is a course designed for health science majors. The lecture and the laboratory topics offer a medical microbiology approach to organisms that cause human disease, their anatomy and physiology, and the body's response to infection.

c. Semester Cycle (if applicable): N/A

d. Name of Approved Program(s):

 - KINESIOLOGY Associate in Arts for Transfer Degree (AA-T)
 - REGISTERED NURSING-h AS Degree for Employment Preparation
4. Total Units: 5.00 Total Semester Hrs: 126.00
Lecture Units: 4 Semester Lecture Hrs: 72.00
Lab Units: 1 Semester Lab Hrs: 54.00
Class Size Maximum: 28 Allow Audit: No
Repeatability No Repeats Allowed
Justification 0
5. Prerequisite or Corequisite Courses or Advisories:

Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm1-A)

Prerequisite: BI 013 and
Prerequisite: CH 004 or
Prerequisite: CH 005
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
 - a. Tortora, Funke and Case. (2010). Microbiology, an Introduction (10th/e). Redwood City, CA Benjamin/Cummings Publishing Company.
College Level: Yes
Flesch-Kincaid reading level: 12.7
 - b. Benson, J.H. (2009). Microbial Applications, (short version) (11th/e). Dubuque, IA Wm. C. Brown Publishers.
College Level: Yes
Flesch-Kincaid reading level: 12.7
7. Entrance Skills: *Before entering the course students must be able:*
 - a. Demonstrate an understanding of basic chemistry concepts.
 - CH 005 - Describe the ways in which carbon forms bonds and the differences between inorganic and organic compounds.
 - CH 004 - Understand the major principles of inorganic and organic chemistry.
 - CH 004 - Understand the major categories of inorganic and organic chemical reactions.
 - CH 005 - Describe the chemical properties of the functional groups and compounds containing them.
 - CH 004 - Possess the ability to balance reactions coupled with the performance calculations based on balanced

reactions.

- CH 004 - Understand Metric measurement and its importance in the physical science domain.
- CH 004 - Understand inorganic and organic nomenclature as applies to compound compositions.
- CH 004 - Understand the major functional groups of organic compounds.
- CH 004 - Understand oxidation-reduction in the process of metabolism.
- CH 004 - Understand the major groups of biological molecules and their essential functions in metabolism and heredity.

b. Demonstrate an understanding and be able to employ exponent rules and scientific notation in laboratory calculations.

- CH 004 - Understand Metric measurement and its importance in the physical science domain.

c. Demonstrate an understanding of the major principles of inorganic and organic chemistry; particularly the structure and function of proteins, nucleic acids, lipids and carbohydrates

- CH 005 - Describe the physical and chemical properties of carbohydrates, lipids, amino acids, proteins, and nucleic acids.
- CH 005 - Delineate and explain the major catabolic and anabolic pathways of monosaccharides, lipids, amino acids, and their interrelationships.
- CH 004 - Understand the major groups of biological molecules and their essential functions in metabolism and heredity.

d. Demonstrate an understanding of oxidation-reduction in the process of metabolism and specific biochemical reactions.

- CH 005 - Describe the physical and chemical properties of carbohydrates, lipids, amino acids, proteins, and nucleic acids.
- CH 005 - Describe the process of energy production within the cell.
- CH 005 - Delineate and explain the major catabolic and anabolic pathways of monosaccharides, lipids, amino acids, and their interrelationships.
- CH 004 - Understand oxidation-reduction in the process of metabolism.

e. Demonstrate a knowledge and understanding of basic human anatomy, including areas of the body that open to the external environment.

- BI 013 - Use appropriate anatomical and physiological terminology in discussing principles and relationships.
- BI 013 - Explain the structure of skin, including important accessory structures.

f. Demonstrate the ability to successfully utilize a light microscope for biological examinations.

- BI 013 - Properly operate a compound light microscope.

g. Demonstrate a mastery of science vocabulary.

- BI 013 - Use appropriate anatomical and physiological terminology in discussing principles and relationships.

h. Demonstrate the ability to collect and analyze laboratory data in the preparation of laboratory reports.

- CH 004 - Learn how to collect and interpret data in the lab

8. Course Content and Scope:

Lecture:

1. FUNDAMENTALS OF MICROBIOLOGY
 1. Chemical Principles
 2. Functional Anatomy of Prokaryotic and Eucaryotic Cells
 3. Microbial Metabolism
 4. Microbial Growth
 5. Control of Microbial Growth
 6. Microbial Genetics
 7. Recombinant DNA and biotechnology
2. SURVEY OF THE MICROBIAL WORLD
 1. Classification of Microorganisms
 2. Bacteria
 3. Fungi, Algae, Protozoans and Multicellular Parasites
 4. Viruses
3. INTERACTION BETWEEN MICROBE AND HOST

1. Principles of Disease and Epidemiology
 2. Mechanisms of Pathogenicity
 3. Nonspecific Defenses of the Host
 4. Specific Defenses of the Host: The Immune Response
 5. Disorders Associated With the Immune System
 6. Antimicrobial Drugs
4. MICROORGANISMS AND HUMAN DISEASE
1. Microbial Diseases of the: Skin and Eyes, Nervous System, Cardiovascular System
 2. Respiratory System, Digestive System, Urinary System, and Reproductive System.

Lab: *(if the "Lab Hours" is greater than zero this is required)*

- a. Brightfield Microscopy
- b. Bacteria
- c. Negative Staining (theory)
- d. Smear Preparation
- e. Simple Staining
- f. Capsule Staining – handout
- g. Spore Staining (Schaeffer-Fulton)
- h. Gram Staining
- i. Gram Unknown (turn in report)
- j. Acid Fast Staining
- k. Pure Culture Techniques (set-up)
- l. Staining Review
- m. Evaluate of pure culture technique
- n. Selective & Differential media unknown (set-up)
- o. Antiseptic Evaluation (set-up)
- p. Morphological Study of Unknown
- q. Cultural Characteristics (set-up)
- r. Physiological Characteristics of Unknown
 - i. Biooxidations
 - ii. Hydrolysis
- s. Antimicrobial Sensitivity (set-up)
- t. Physiological Characteristics

9. Course Student Learning Outcomes:

1.
Describe the structure and characteristics of different types of microorganisms, including both prokaryotic and eukaryotic microbes.
2.
Describe different types of viruses and their respective life cycles.
3.
Demonstrate an understanding of the relationships between microorganisms and humans and describe the role of microorganisms in human disease.
4.
Relate principles of biochemistry and molecular biology to microorganisms.
5.
Practice standard laboratory techniques in microbiology including staining, culturing and, identification of unknown organisms using biochemical testing.

6.

Demonstrate proper laboratory safety protocols, including aseptic technique.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Demonstrate a knowledge and understanding of basic anatomy and physiology of microorganisms.
- b. Read and analyze information about medically important microorganisms.
- c. Demonstrate the skills necessary to culture, propagate and identify microorganisms.
- d. Apply the concepts of epidemiology and immunology to demonstrate an understanding of the relationship of microorganisms to human health and disease.

11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*

- a. Demonstration, Repetition/Practice
- b. Discussion
- c. Laboratory
- d. Lecture

12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*

In Class Hours: 126.00

Outside Class Hours: 144.00

a. In-class Assignments

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|---|
| <ol style="list-style-type: none">a. Evaluate selective & differential plates (hand in report in lab)b. Evaluate and turn in report on antiseptic platesc. Evaluate and turn in report on unknown biooxidation and hydrolysis reactions |
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b. Out-of-class Assignments

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| <ol style="list-style-type: none">a. Write one (1) research paper (The Unknowns) |
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13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- College level or pre-collegiate essays
- Written homework
- Laboratory projects
- Presentations/student demonstration observations
- True/false/multiple choice examinations
- Weekly laboratory quizzes (multiple choice, true/false, matching questions)
- Mid-term and final evaluations
- Other
 - a. Lecture exams incorporating both objective style questions and essays
 - b. Identification of laboratory “unknown” microorganisms
 - c. Written analysis of laboratory experimental data pertaining to unknown microorganisms

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

B: Biological Science with a Lab

B: Biological Science without a Lab

B: Biological Science, Lab only

CSU GE Area B: Physical and its Life Forms(mark all that apply)

B2 - Life Science

B3 - Laboratory Sciences

PO-GE C1-Natural Sciences

Explain concepts and theories related to physical, chemical, and biological natural phenomena.

Make critical judgments about the validity of scientific evidence and the applicability of scientific theories.

IO - Scientific Inquiry

Collect and analyze data. Skills of data collection include an understanding of the notion of hypothesis testing and specific methods of inquiry such as experimentation and systematic observation.

Predict outcomes utilizing scientific inquiry: using evidence and assertions determine which conclusions logically follow from a body of quantitative and qualitative data.

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

a. Text and laboratory manual b. Laboratory marker pen c. Laboratory covering (coat or shirt) d. Colored pencils
e. Hair tie-back if necessary

18. Materials Fees: Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

Prerequisite change to include CHEM 5 as an alternate prerequisite.

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*
b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000267347
- b. T.O.P. Code [CB03]: 40300.00 - MicroBiology
- c. Credit Status [CB04]: D - Credit - Degree Applicable
- d. Course Transfer Status [CB05]: A = Transfer to UC, CSU
- e. Basic Skills Status [CB08]: 2N = Not basic skills course
- f. Vocational Status [CB09]: Not Occupational
- g. Course Classification [CB11]: Y - Credit Course
- h. Special Class Status [CB13]: N - Not Special
- i. Course CAN Code [CB14]: *N/A*
- j. Course Prior to College Level [CB21]: Y = Not Applicable
- k. Course Noncredit Category [CB22]: Y - Not Applicable
- l. Funding Agency Category [CB23]: Y = Not Applicable
- m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): *N/A*

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 84
Third Year: 84

24. Resources - Faculty - Discipline and Other Qualifications:

- a. Sufficient Faculty Resources: Yes

BI 015-General Microbiology

b. If No, list number of FTE needed to offer this course: N/A

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Alexa Sawa Origination Date 10/07/15