

BIOL 220: MICROBIOLOGY

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2025
Credits:	5
Total Contact Hours:	162
Lecture Hours :	54
Lab Hours:	108
Hours Arranged:	0
Outside of Class Hours:	108
Prerequisite:	BIOL 105 or BIOL 105H or BIOL 124; CHEM 103 or CHEM 104 or CHEM 110 or CHEM 111 or CHEM 112.
District General Education:	B1. Natural Sciences - Life Sciences, B3. Natural Sciences - Laboratory
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

Catalog Course Description

An introduction to the biology of microorganisms including bacteria, viruses, fungi, protozoa, and helminths. Metabolism, genetics, culture methods, identification, and control of common microbes are considered. Emphasis is placed on the virulence mechanisms and control of human pathogens and on the principles of immunology and host defense. Laboratory work includes techniques common to the control, culture, and identification of microbes. Required of pre-nursing students and medical technologists. 54 lecture hours, 108 lab hours.

Course Objectives

- demonstrate an understanding of the nature of microorganisms and their roles as non-pathogens and pathogens in the biological world
- demonstrate the "tools of the microbiologist," including microscope use, photometric instrumentation, centrifuge operation, filtration techniques, and uses of various diagnostic media and serological techniques
- conduct experimental procedures, gather and analyze data essential in identification of microbes
- apply an understanding of the biological characteristics of microbes to predicting or understanding successful control methods
- demonstrate an understanding of the virulence mechanisms and the basic principles involved in host resistance, and to apply this understanding to predicting the degrees of virulence in various infectious disease
- apply basic immunological principles to prevention of disease as well as identification of disease using tests based on these principles
- demonstrate an understanding of microbial genetics, and apply this understanding to an explanation of the diversity among microbes, the use of DNA probes in microbial identification, the resistance patterns of microbes, and the use of microorganisms in genetic engineering
- demonstrate the roles of microorganisms in natural biological cycles, and thus, predict potential problems resulting from disruption of

these cycles, and suggest uses of microbes in detoxifying hazardous waste

Major Course Content

1. Introduction and categories of microorganisms
2. Historical development of microbiology
3. Chemistry of microorganisms
4. Cell and structure and function
5. Microbial growth requirements
6. Metabolism
7. Genetics
8. Recombinant DNA technology
9. Chemical and physical control of microorganisms
10. Viruses
11. Atypical Bacteria
12. Eukaryotic microorganisms
13. Disease and Pathogenesis
14. Immunity
15. Infectious disease of major organ systems

Lab Content

1. Manipulation of microorganisms
2. Microscopy and staining
3. Isolation and quantification of microorganisms
4. Chemical differentiation of microorganisms
5. Anaerobic culture techniques
6. Bacterial genetics
7. DNA and electrophoresis
8. Control of microbial growth
9. Parasitology and mycology
10. Immunological aspects of blood
11. Immune system applications
12. Natural selection and evolution
13. Isolation and analysis of bacteria from the body
14. Case studies
15. Environmental microbiology

Suggested Reading Other Than Required Textbook

Laboratory manual and supplemental handouts.
Current news articles or on-line sources on infectious diseases.

Examples of Required Writing Assignments

Complete a lab report on 3 unknown bacteria specimens by filling in data sheets and constructing a flowchart of biochemical tests performed.

Examples of Outside Assignments

Study for exams

Answer laboratory discussion questions such as: Compare the effectiveness of various chemotherapeutics on gram positive and gram negative bacteria. Calculate the generation time of various bacterial

samples. Compare the effectiveness of lysozymes on gram positive and gram negative bacteria.

Read required materials

Complete unknown bacteria identification report by constructing a flow chart of biochemical tests performed in laboratory

Participate in activities related to course content

Instruction Type(s)

Lecture, Lab, Online Education Lecture, Online Education Lab

IGETC Area 5: Physical and Biological Sciences

5B. Biological Science, 5C. Science Laboratory