

COURSE PREFIX/NUMBER: BIO 225
COURSE TITLE: Microbiology
LECTURE HOURS/WEEK: 3.0
LAB HOURS/WEEK: 3.0
CREDIT HOURS/SEMESTER: 4.0

[Distance Learning Attendance/VA Statement](#)
[Textbook Information](#)

COURSE DESCRIPTION

This is a detailed study of microbiology as it relates to infection and the disease processes of the body. Topics include immunity, epidemiology, medically important microorganisms, and diagnostic procedures for identification.

COURSE COMPETENCIES

Upon successful completion of this course, students should be able to:

Module 1: History, Classification, and Uses of Microbes

- Identify basic microbiological history, concepts, and classification
- Compare and contrast the general morphology and characteristics of bacteria, fungi, algae, protozoans, multicellular parasites, viruses, and prions
- Link a basic understanding of microbial characteristics with applications of the study of microbiology – medical treatments for disease, production of food, bioremediation, industrial microbiology, and ecology of soil

Module 2: Prokaryotic/Eukaryotic Cell Biology and Biochemistry

- Relate fundamental principles of chemistry to microbiology
- Recognize guidelines utilized in the visualization of microorganisms
- Compare and contrast the functional anatomy of prokaryotic and eukaryotic cells
- Explain the structure, function, and metabolic characteristics of different types of bacteria

Module 3: Microbial Growth, Death, and Control

- Describe nutritional requirements and growth characteristics of bacteria
- Calculate population size of bacteria using bacterial growth characteristics
- Recognize physical and chemical microbial control methods, such as disinfection, drugs, antiseptics, temperature, and pH
- Discuss antibiotic resistance, its causes, prevention, and importance

Module 4: Microbial Genetics

- Examine the fundamentals of microbial genetics
- Discuss the relationships between organisms and their hosts/environments and how

microorganisms evolve in response to their environments

- Link the study of microorganisms to biotechnology through recombinant DNA technology

Module 5: Pathogens and Host Defenses

- Identify the basic principles of disease and epidemiology
- Explain the human immune response to infection by microorganisms
- Interpret the relationship between health and disease, including specific and nonspecific defense mechanisms of the host, as well as the pathogenicity of microorganisms
- Identify harmful aspects of the immune system including immediate and delayed hypersensitivity reactions, as well as natural and artificial immunosuppression
- Discuss causative agents (bacteria, viruses, fungi, and other microbes), transmission, symptoms, diagnosis, and treatment of microbial diseases in the following systems: integumentary (including the eyes), nervous, cardiovascular, respiratory, digestive, urinary, and reproductive

Laboratory Component:

- The student who successfully completes the laboratory portion of this microbiology course will demonstrate the ability to:
- Properly operate a bright field microscope
- Properly prepare slides for microbiological examination
- Properly use aseptic techniques for the transfer and handling of microorganisms
- Employ appropriate microbiological media and test systems
- Estimate the number of microbes by serial dilution techniques
- Operate standard laboratory equipment correctly
- Follow experimental protocols
- Identify unknown bacterial samples, using proper techniques and analyzing results
- Prepare a laboratory report that communicates the laboratory experiments performed and results obtained in the identification of unknown samples
- Practice the safety precautions required in a microbiology laboratory.

(The lecture and laboratory competencies are based on the Undergraduate Microbiology Curriculum Recommendations of the American Society for Microbiology.)

MINIMAL STANDARDS

Minimal standards for performance of course competencies are indicated by achieving a 60% accuracy level on all evaluation instruments used in the course performance evaluation strategy.

COURSE REQUIREMENTS

Attendance Policy

Students are responsible for attending class and laboratory meetings in the course and for completion of all reading and writing assignments. If a student is absent from a class or laboratory meeting, it is the student's responsibility to obtain and complete any assignment that may have been made in the missed meeting. Students who are absent from more than 10% of the total contact class/laboratory hours may be withdrawn from the course, in accordance with the York Technical College attendance policy.

Withdrawal from a Course

A student may withdraw from a course after the drop/add period until midterm with a grade of "W" (withdrawn.) Students who withdraw after midterm may receive a "W" at the discretion of the instructor, if performance has been satisfactory to the point of withdrawal. Otherwise, such withdrawals will receive a grade of "WF" (withdrawn/failing.)

Student Conduct

Students are required to conform to all conduct codes as specified in the York Technical College Handbook and Catalog. Student found guilty of academic dishonesty, such as cheating or plagiarism, will be given a grade of zero and may be subject to further disciplinary action.

EVALUATION STRATEGIES/ GRADING

The competencies of each module may be evaluated by any of the following methods: examination (written or oral), presentation, written report, written assignment, daily quiz, laboratory quiz, homework, or other appropriate instruments.

The grading scale for the course will be as follows:

Module 1 10% of course grade
Module 2 10% of course grade
Module 3 10% of course grade
Module 4 10% of course grade
Module 5 10% of course grade
Laboratory Grade 25% of course grade
Final Comprehensive Exam 25% of course grade

Grades will be determined using the following scale:

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

The above requirements and topics are standard and required for the course. Individual instructors will provide statements of additional requirements and/or policies.

ENTRY LEVEL SKILLS: The student entering this course must possess reading comprehension and writing skills on a 10th grade level.

PREREQUISITES: BIO 101 or BIO 211

COREQUISITES: None.

Disability Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Office (SRO) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.

TOPIC/CONTENT OUTLINE

History of microbiology

Classification of microbes

Uses of microbes in the world today Biochemistry of microbes

Cell biology of prokaryotic and eukaryotic cells Microscopy and other techniques used to study microbes Growth characteristics of bacteria

Death and control of growth of microbes Microbial genetics

Evolution and ecology of microbes Biotechnology

Diseases and epidemiology

Host defenses and immunology

Pathogens