



**DOUGLAS COLLEGE**

**EFFECTIVE: JANUARY 2013  
CURRICULUM GUIDELINES**

**A.** Division: Academic Effective Date: January 2013

**B.** Department / Program Area: Faculty of Science & Technology / Biology Revision  New Course   
 If Revision, Section(s) Revised: A, H  
 Date of Previous Revision: March 2006  
 Date of Current Revision: June 2012

**C:** BIOL 2401 **D:** Introductory Microbiology for Health Sciences **E:** 3

Subject & Course No.	Descriptive Title	Semester Credits
<b>F:</b> Calendar Description:  A survey of the biology of microorganisms with an emphasis on bacteria. Topics include prokaryotic diversity, bacterial cell structure and metabolism, and microbial reproduction. Introductory virology and immunology, epidemiology and public health, and selected topics in medical microbiology. Laboratory activities introduce a wide variety of techniques in microbiology and immunology.		
<b>G:</b> Allocation of Contact Hours to Type of Instruction / Learning Settings  Primary Methods of Instructional Delivery and/or Learning Settings:  Lecture and laboratory  Number of Contact Hours: (per week / semester for each descriptor)  Lecture 3 hours Laboratory 2 hours  Number of Weeks per Semester:  15	<b>H:</b> Course Prerequisites:  BIOL 1103 with C- or better AND BIOL 1203 with C- or better or permission of the instructor	
	<b>I:</b> Course Corequisites:  None	
	<b>J:</b> Course for which this Course is a Prerequisite  None	
	<b>K:</b> Maximum Class Size:  27	
<b>L:</b> PLEASE INDICATE:  <input type="checkbox"/> Non-Credit <input type="checkbox"/> College Credit Non-Transfer <input checked="" type="checkbox"/> College Credit Transfer:  SEE BC TRANSFER GUIDE FOR TRANSFER DETAILS ( <a href="http://www.bctransferguide.ca">www.bctransferguide.ca</a> )		

**M:** Course Objectives / Learning Outcomes

Upon completion of this course, students will:

1. Understand the range of prokaryotic and eukaryotic organisms that are considered to be microorganisms and understand the historical context of microbiological science.
2. Be able to explain the components and cellular structure of bacterial cells.
3. Understand the principles of classification and be able to explain the classification of bacteria.
4. Be able to explain the process of bacterial cell division and relate it to the growth of bacterial populations and understand the principles involved in the control of bacterial growth.
5. Understand the structure of viruses, viral replication and the role of viruses in disease.
6. Be able to explain the difference between innate and acquired immunity to disease in humans and how they are affected by humoral and cell-mediated responses.
7. Understand the mechanisms of microbial pathogenesis.
8. Be able to explain the modes of transmission and mechanisms of infection by human bacterial diseases and strategies for management of transmission and infection in the context of public health.
9. Understand the basis of the development of bacterial resistance to antimicrobial agents.
10. Be familiar and competent with a wide variety of microbiological laboratory techniques including transfer, culture, isolation and identification techniques, growth rates and antibiotic sensitivity.

## Course Content:

The topics in the course include the following:

1. INTRODUCTION
  - 1.1. Introduction to microorganisms
  - 1.2. Historical overview of microbiology
  - 1.3. Prokaryotic and eukaryotic microorganisms
  - 1.4. Introduction to bacteria
2. INTRODUCTION TO CELL BIOLOGY
  - 2.1. DNA replication and protein synthesis
  - 2.2. Bacterial cell structure
3. BACTERIAL REPRODUCTION AND CLASSIFICATION
  - 3.1. Chemical and physical requirements for growth
  - 3.2. Phases of bacterial growth
  - 3.3. Gram + and gram – bacteria
4. CONTROL OF BACTERIAL GROWTH
  - 4.1. General antiseptics
  - 4.2. Antimicrobial drugs
  - 4.3. Drug resistance
5. INTRODUCTION TO VIROLOGY
  - 5.1. Introduction to viral structure
  - 5.2. Viral replication
  - 5.3. Viruses and disease
6. IMMUNOLOGY
  - 6.1. Innate and acquired immunity
  - 6.2. Humoral and cell-mediated responses
  - 6.3. Microbial pathogenesis
  - 6.4. Immunization

7. CLINICAL MICROBIOLOGY
  - 7.1. Epidemiology and public health
  - 7.2. Emergent diseases
  - 7.3. Transmission of disease
  - 7.4. Nosocomial infections
  - 7.5. Specific body system diseases
  
8. LABORATORY TOPICS
  - 8.1. Basic Techniques in Microbiology
    - 8.1.1. Laboratory operations and safety
    - 8.1.2. Laboratory reporting techniques
    - 8.1.3. Microscopy
  
  - 8.2. Bacteria: Transfer, culture and isolation techniques
    - 8.2.1. Aseptic techniques
      - 8.2.1.1. Preparation of media and plates
      - 8.2.1.2. Tube transfers
      - 8.2.1.3. Streak plate and spread plate techniques
  
  - 8.3. Colony and Cellular Morphology
    - 8.3.1. Agar plate colonial characteristic and agar slant growth
    - 8.3.2. Individual cell characteristics (coccus, bacillus and spirillum microscopic recognition)
  
  - 8.4. Differential Staining
    - 8.4.1. Negative staining
    - 8.4.2. Gram stain
    - 8.4.3. Acid fast staining
  
  - 8.5. Bacterial Growth
    - 8.5.1. Serial dilution
    - 8.5.2. Growth rate determination (direct/plate counts)
  
  - 8.6. Bacterial Sensitivity and Resistance
    - 8.6.1. Examination of bacterial sensitivity to a variety of antibiotics
    - 8.6.2. Plating and isolation of antibiotic resistant bacteria
  
  - 8.7. Antibody-Antigen reactions
    - 8.7.1. Agglutination reactions
    - 8.7.2. Immunoprecipitation in agar plates
  
  - 8.8. Practical Case Study
    - 8.8.1. Characterization and identification of a microorganism using the techniques learned throughout the laboratories, as well as the information given in the theory lectures.

**O:** Methods of Instruction

This course involves three hours of lecture per week and two hours of laboratory work. The content of lectures is integrated with laboratory experiments, and readings in the textbook and supplied articles.

**P:** Textbooks and Materials to be Purchased by Students

Tortora, G.J., Funke, B. R. and Case, C. L. (2005). Microbiology: an introduction. (Brief Edition)  
Pearson Benjamin Cummings  
ISBN: 0-8053-7753-0

**Q:** Means of Assessment

Class tests and assignments	25
Laboratory	25
Exams	
- Term exam(s)	20
- Final exam	30
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**R:** Prior Learning Assessment and Recognition: specify whether course is open for PLAR

There is no provision for PLAR, other than by examining transcripts of biology courses taken within the last 5 years and comparing them to the course content of BIOL 2401.

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Course Designer(s)

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Education Council / Curriculum Committee Representative

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Dean / Director

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Registrar