

**ITT Technical Institute**

**SC2735**

**Microbiology**

**Onsite Course**

**SYLLABUS**

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**Credit hours:** 6

**Contact/Instructional hours:** 86 (34 Theory Hours, 52 Lab Hours)

**Prerequisite(s) and/or Corequisite(s):**

None.

**Course Description:**

This course introduces students to the microbial world, including the structure, functioning and diversity of microorganisms. This course includes a laboratory component.

## **Where Does This Course Belong?**

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### **Program Information**

#### **Program Scope and Core Content Areas**

General Education courses include courses in the humanities, composition, mathematics, the sciences, and the social sciences.

#### **Program Goals and Objectives**

General Education courses are designed to provide ITT Tech students with a well-rounded education in the context of their technical programs. Each course emphasizes one or more of ITT Tech's General Education Student Learning Outcomes.

1. Demonstrate personal responsibility.
2. Analyze information.
3. Solve complex problems.
4. Communicate effectively in oral, written and visual forms.
5. Contribute as a member of a team.
6. Pursue lifelong learning opportunities.

#### **Career Impact**

General Education courses provide breadth to a core technical program. Courses in General Education are intended to broaden a student's educational experience, and therefore, broaden his/her perspective.

**NOTE:** Refer to the catalog for the state-specific course and program information, if applicable.

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## Course Summary

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### Major Instructional Areas

1. History and development of experimental methods in microbiology
2. Diversity of microorganisms
3. Functional anatomy of prokaryotic and eukaryotic cells
4. Microbiology metabolism, growth, and genetics
5. Biotechnology
6. Microbial pathogenicity
7. Medical microbiology
8. Immune system

### Course Objectives

1. Summarize the major contributions and major contributors to the field of microbiology.
2. Evaluate how a microscope can be used to study microbes.
3. Compare simple, differential, and special stains according to their purpose, advantages, and chemicals used.
4. Explain the role biological chemistry plays in cellular physiology and metabolism.
5. Justify the use of various culture methods—selective and differential, enrichment, anaerobic media, and living host cells—to identify a microorganism.
6. Distinguish among the major groups of microorganisms.
7. Differentiate between the functional anatomy of prokaryotes and eukaryotes.
8. Categorize the various requirements for growth among microorganisms.
9. Describe the chemical and physical methods used in controlling microbial growth.
10. Compare and contrast the mechanisms of genetic transfer in bacteria.
11. Evaluate the various methods used in, and implications of, genetic engineering.
12. Summarize the process microorganisms use to enter hosts and cause diseases.
13. Explain how epidemiology contributes to understanding disease etiology and designing prevention strategies.
14. Describe the interaction between the human immune system and pathogenic microorganisms.
15. Grow and analyze cultures in a laboratory setting.
16. Describe the microorganisms found in the food supply.
17. Use the ITT Tech library to research various topics related to the course.

## Detailed Topical Outline

1. Introduction and History of Microbiology
  - 1.1. Introduction to Microbiology
  - 1.2. Biological Classifications
  - 1.3. Microscopy
  - 1.4. History of Microbiology
  
2. From the Atom to the Cell
  - 2.1. Chemistry
  - 2.2. Cellular Structure
  - 2.3. Prokaryotic Cells
  - 2.4. Eukaryotic Cells
  - 2.5. Cell Structure and Pathogenicity
  
3. Microbial Metabolism and Growth Requirements
  - 3.1. Enzymes and Metabolism
  - 3.2. Stages of Cellular Respiration and Fermentation
  - 3.3. Calculating Bacterial Growth
  - 3.4. Identifying Physical and Chemical Requirements for Growth
  - 3.5. Media Types
  
4. Control of Microbial Growth
  - 4.1. Enzymes and Metabolism
  - 4.2. Stages of Cellular Respiration and Fermentation
  - 4.3. Calculating Bacterial Growth
  - 4.4. Identifying Physical and Chemical Requirements for Growth
  - 4.5. Media Types
  
5. Microbial Diversity
  - 5.1. Prokaryote Taxonomy
  - 5.2. Viral Structure and Replication Strategies
  - 5.3. Protist Characteristics
  - 5.4. Fungal Characteristics
  - 5.5. Helminthes Characteristics
  
6. Genetics and Biotechnology

- 6.1. DNA Replication, Transcription and Translation
- 6.2. Horizontal Gene Transfer
- 6.3. Biotechnology
  
- 7. Epidemiology
  - 7.1. Infection and Disease
  - 7.2. Epidemiology
  - 7.3. Nosocomial Infections
  
- 8. Microorganisms and the Immune System
  - 8.1. Innate Immune System
  - 8.2. Adaptive Immune System
  - 8.3. Immunological Disorders
  
- 9. Microbial Diseases Part 1
  - 9.1. Skin Diseases
  - 9.2. STD's
  - 9.3. Respiratory Diseases
  - 9.4. Cardiovascular and Lymphatic Diseases
  
- 10. Microbial Diseases Part 2 and Applied Microbiology
  - 10.1. Oral and GI Diseases
  - 10.2. Nervous System Diseases
  - 10.3. Environmental Microbiology
  - 10.4. Food Production Microbiology
  
- 11. Course Review and Final Examination

## Learning Materials and References

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### Required Resources

Complete Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Black, J. (2012). <i>Microbiology: Principles and explorations</i> . (8 <sup>th</sup> ed.) Hoboken, NJ: John Wiley and Sons, Inc.	■		
Pollack, R., Findlay, L, Mondschein, W., and Modesto, R. (2013). <i>Laboratory exercises in microbiology</i> . (4 <sup>th</sup> ed.) Hoboken, NJ: John Wiley and Sons, Inc.	■		

### Recommended Resources

ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>)

#### Books

You may click “Books” or use the “Search” function on the home page to find the following books.

ITT Tech Virtual Library> Books> eBooks on EbscoHost>

- Crowley, Leonard V. *Introduction to Human Disease*. Boston: Jones & Bartlett Publishers, Inc., 1997.
- Hays, J. N. *Epidemics and Pandemics: Their Impacts on Human History*. Santa Barbara, CA: ABC-CLIO, 2005.
- Hopkins, Tracey. *Lab Notes: Guide to Lab and Diagnostic Tests*. Philadelphia: F.A. Davis Co., 2005.

ITT Tech Virtual Library> Books> Ebrary>

- Betsy, Tom, and James Keogh. *Microbiology Demystified*. New York: McGraw-Hill Professional, 2005.
- Evans, E.G., J. Heritage, and R.A. Killington. *Microbiology in Action*. New York: Cambridge University Press, 1999.
- Ryan, Kenneth J. and George C. Ray. *Sherris Medical Microbiology: An Introduction to Infectious Disease*. 4th ed. New York: McGraw-Hill Professional, 2003.

#### Reference Resources

You may click “Reference” or use the “Search” function on the home page to find the following reference resources.

ITT Tech Virtual Library> Reference > Grammar, Writing, and Style

- [APA Style](#)  
Style information from the American Psychological Association
- [Plagiarism: What It Is and How to Recognize and Avoid It](#)  
An article by the Writing Tutorial Services, Indiana University, Bloomington, IN

### Publisher Resources

#### Wiley Portal:

- Wiley Student Companion Sites

Wiley offers a Student Companion Site for the course’s required text. Log on to:

<http://bcs.wiley.com/he-bcs/Books?action=index&itemId=0470541091&bcsId=6873>

**Or** you can log on to [www.wiley.com](http://www.wiley.com), then type the text isbn (0470541091) in the search bar on the upper right hand side of the web page and click the search button. You will then be taken to a screen with the text cover image and title listed. Click on the “Visit the Companion Sites” link under the text title and then click on the “Student Companion Site” link from the drop down menu.

Wiley offers a Student Companion Site for the course’s required lab manual. Log on to:

<http://bcs.wiley.com/he-bcs/Books?action=index&itemId=1118135253&bcsId=6902>

**Or** you can log on to [www.wiley.com](http://www.wiley.com), then type the text isbn (1118135253) in the search bar on the upper right hand side of the web page and click the search button. You will then be taken to a screen with the text cover image and title listed. Click on the “Visit the Companion Sites” link under the text title and then click on the “Student Companion Site” link from the drop down menu.

- Wiley Media Site

There are many media elements included in this course, including interactivities, animations, and videos. You can access all of the links to the media on a specific web site set up for ITT Technical Institute at: <http://mywiley.info/ITTMICROSTU>

Click on the book. Then, click on Student Resources. Choose the Unit. Accept the Agreement, enter the password, and log in. Choose the Unit one more time. Click on the media element to begin.

Password: ittstu

### Other References

The following resources may be found **outside** of the ITT Tech Virtual Library.

#### Web sites

- Atlas of Medical Parasitology

<http://www.cdfound.to.it/HTML/atlas.htm>

Information on various parasites affecting the body

- Big Picture Book of Viruses

[http://www.virology.net/Big\\_Virology/BVHomePage.html](http://www.virology.net/Big_Virology/BVHomePage.html)

Photomicrographs of viruses

- Cells Alive

<http://www.cellsalive.com>

Interactive models and animations of various cells

- Centers for Disease Control & Prevention

<http://www.cdc.gov>

Home page for the Centers for Disease Control & Prevention in Atlanta, GA

- Infectious Disease Articles

<http://www.emedicine.com/infectiousdiseases/index.shtml>

Articles on various infectious diseases

- Infectious Diseases/Bacterial Diseases/Microbiology Links

<http://www.lib.uiowa.edu/Hardin/MD/micro.html>

Links to various microbiology-related sites

- Microbiology Information Portal

<http://www.microbes.info>

Links to various microbiology-related sites and articles

- Mycology Online

<http://www.mycology.adelaide.edu.au>

Information related to medical mycology

- Photo Gallery of Bacterial Pathogens

<http://www.kcom.edu/faculty/chamberlain/Website/gallery.htm>

Photographs of various bacterial pathogens



- Photomicrographs of Bacteria from Buckman Laboratories

<http://www.buckman.com/eng/micro101/bacteria.htm>

Photographs of various bacteria

- World Health Organization

<http://www.who.int/en/>

Home page for the World Health Organization

**NOTE:** All links are subject to change without prior notice.

### **Information Search**

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Microorganisms
- Prokaryotic cells
- Eukaryotic cells
- Metabolism
- Biotechnology
- Motivation
- Immune system
- Microbial pathogenicity
- History and development of experimental methods in microbiology
- Diversity of microorganisms
- Functional anatomy of prokaryotic and eukaryotic cells
- Microbiology metabolism, growth, and genetics
- Biotechnology
- Microbial pathogenicity
- Medical microbiology
- Immune system

## Suggested Learning Approach

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In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none"> <li>▪ Do take a proactive learning approach</li> <li>▪ Do share your thoughts on critical issues and potential problem solutions</li> <li>▪ Do plan your course work in advance</li> <li>▪ Do explore a variety of learning resources in addition to the textbook</li> <li>▪ Do offer relevant examples from your experience</li> <li>▪ Do make an effort to understand different points of view</li> <li>▪ Do connect concepts explored in this course to real-life professional situations and your own experiences</li> </ul>	<ul style="list-style-type: none"> <li>▪ Don't assume there is only one correct answer to a question</li> <li>▪ Don't be afraid to share your perspective on the issues analyzed in the course</li> <li>▪ Don't be negative about the points of view that are different from yours</li> <li>▪ Don't underestimate the impact of collaboration on your learning</li> <li>▪ Don't limit your course experience to reading the textbook</li> <li>▪ Don't postpone your work on the course deliverables – work on small assignment components every day</li> </ul>

### Instructional Methods

The curriculum is designed to encourage a variety of teaching strategies that support the course objectives while fostering higher cognitive skills. This course will employ multiple methods to deliver content and inspire and engage you, including lectures, collaborative learning options, and hands-on activities. This course is composed of theory and laboratory components. Your progress will be regularly assessed through assignments, labs, exercises, quizzes and a final exam.

### Out-of-Class Work

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a

“time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

## Course Outline

<b>Unit 1: INTRODUCTION AND HISTORY OF MICROBIOLOGY</b>				<b>Total outside work:</b> 8 hours
Upon completion of this unit, the students are expected to: <ul style="list-style-type: none"> <li>▪ Describe the five major types of microorganisms; algae, fungi, protozoa, virus and bacteria.</li> <li>▪ Explain taxonomy and binomial naming.</li> <li>▪ Compare and contrast the cell theory and the germ theory of disease.</li> <li>▪ Describe current microbiological research.</li> <li>▪ Differentiate acidic versus basic stains and a wet mount versus a smear.</li> <li>▪ Describe the purposes of the Gram stain, Schaeffer-Fulton spore stain, Negative stain and Flagella stain.</li> <li>▪ Explain how light microscopes work.</li> <li>▪ Use a microscope.</li> </ul>				
<b>READING ASSIGNMENT</b>	<b>Author</b>	<b>Chapter/Title</b>	<b>Pages (if necessary)</b>	<b>Total Pages</b>
	Black	Chapters 1 and 3		50
		Chapter 9	pp. 240-253	14
Pollack	Exercise 1		14	
<b>OUT-OF-CLASS WORK</b>	<b>Activity</b>			<b>Estimated Time</b>
	Complete the reading assignment			4 hrs
	Complete Unit 1 Assignment 1			2 hrs
	Complete Unit 1 Lab 1			2 hrs
<b>GRADED ACTIVITIES / DELIVERABLES</b>	<b>Grading Category</b>	<b>Activity/Deliverable Title</b>		<b>Grade Allocation (% of all graded work)</b>
	Assignment	Unit 1 Assignment 1: Microbiology in the News		3%
	Lab	Unit 1 Lab 1: Microscopes and Simple Stains		2%

<b>Unit 2: FROM THE ATOM TO THE CELL</b>				<b>Total outside work: 9 hours</b>
Upon completion of this unit, students are expected to:				
<ul style="list-style-type: none"> <li>▪ Define terms from basic chemistry, including atomic structure, chemical bonds, chemical reactions, and pH.</li> <li>▪ Compare and contrast the major organic compounds: carbohydrates, lipids, proteins and nucleic acids.</li> <li>▪ Identify the basic shapes and arrangements of bacteria.</li> <li>▪ Compare and contrast prokaryotic and eukaryotic cells.</li> <li>▪ Explain how Peptidoglycan impacts a gram stain.</li> <li>▪ Describe cellular transportation methods.</li> <li>▪ Explain how cellular structures affect the ability of bacteria to cause diseases.</li> <li>▪ Perform a gram stain.</li> </ul>				
<b>READING ASSIGNMENT</b>	<b>Author</b>	<b>Chapter/Title</b>	<b>Pages (if necessary)</b>	<b>Total Pages</b>
	Black	Chapters 2, 4		61
	Pollack	Exercise 5		10
<b>OUT-OF-CLASS WORK</b>	<b>Activity</b>			<b>Estimated Time</b>
	Complete the reading assignment			3 hrs
	Complete Unit 2 Assignment 1			2 hrs
	Complete Unit 2 Lab 1			1 hr
	Study for the Quiz in Unit 3			3 hrs
<b>GRADED ACTIVITIES / DELIVERABLES</b>	<b>Grading Category</b>	<b>Activity/Deliverable Title</b>		<b>Grade Allocation (% of all graded work)</b>
	Assignment	Unit 2 Assignment 1: Cellular Structures and Pathogenicity		3%
	Lab	Unit 2 Lab 1: Gram Stain and the Cell Wall		2%

**Unit 3: MICROBIAL METABOLISM AND GROWTH REQUIREMENTS**

Upon completion of this unit, students are expected to:

- Distinguish between photoautotroph, chemoautotroph, and photoheterotroph.
- Describe the role of enzymes in metabolism.
- Describe the process of cellular respiration (Glycolysis, Krebs's Cycle, Electron transport system) and fermentation.
- Define microbial growth, binary fission and budding.
- Describe methods of measuring bacterial growth.
- Calculate growth rates.
- Identify physical requirements for growth.
- Identify nutritional requirements for growth.
- Describe methods to obtain a pure culture.
- Differentiate between culture methods including selective and differential, enrichment, anaerobic and living host cells.
- Transfer bacteria using aseptic techniques.

**Total  
outside  
work:**  
6 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapter 5	pp. 114-132	19
		Chapter 6		32
	Pollack	Exercise 13		10
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 3 Assignment 1			2 hrs
	Complete Unit 3 Lab 1			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 3 Assignment 1: Bacterial Growth Rates		3%
	Lab	Unit 3 Lab 1: Bacteria Media		2%
	Quiz	Unit 3 Quiz 1		5%

**Unit 4: CONTROL OF MICROBIAL GROWTH**

Upon completion of this unit, students are expected to:

- Define disinfectant, antiseptic, sterilization and sanitization.
- Describe methods for evaluating antimicrobial agents.
- Describe chemical and physical methods for controlling growth.
- Define modes of actions of common antibiotics.
- Describe antibiotic resistance and how it occurs.
- Describe antifungal and antiviral agents.
- Compare physical, chemical and antibiotic methods of controlling bacteria growth.
- Explain how chemical agents operate at a cellular level.
- Prepare a sterilization/sanitation plan.
- Explain how to prevent antibiotic resistance

**Total  
outside  
work:**  
9 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapters 12-13		60
	Pollack	Exercise 10		14
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 4 Assignment 1			2 hrs
	Complete Unit 4 Lab 1			1 hr
	Study for the Quiz in Unit 5			3 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Exercise	Unit 4 Assignment 1: Modes of Action		3%
	Lab	Unit 4 Lab 1: Antibiotics, Antiseptics and Disinfectants		2%

<b>Unit 5: MICROBIAL DIVERSITY</b>				
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>▪ Define criteria used to classify bacteria.</li> <li>▪ Describe the components of a virus.</li> <li>▪ Identify viral replication strategies for RNA viruses, DNA viruses and Bacteriophages.</li> <li>▪ Explain how prions cause diseases.</li> <li>▪ Differentiate between plant like protists and animal like protists.</li> <li>▪ Describe the characteristics of fungi and the diseases they cause.</li> <li>▪ Describe the characteristics of helminthes and the diseases they cause.</li> <li>▪ Compare and contrast different types of microorganisms.</li> <li>▪ Create a microbe.</li> <li>▪ Design and implement an experiment to examine microbial content.</li> </ul>				<b>Total outside work:</b> 11 hours
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapter 9	pp. 255-265	11
		Chapter 10		94
		Chapter 11	pp. 308-331	24
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 5 Assignment 1			2 hrs
	Complete Unit 5 Lab 1			1 hr
	Study for the Midterm in Unit 6			5 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 5 Assignment 1: Taxonomy–Create Your Own Microbe		3%
	Lab	Unit 5 Lab 1: Microbes All Around (ePortfolio)		2%
	Quiz	Unit 5 Quiz 2		5%



**Unit 6: GENETICS AND BIOTECHNOLOGY**

Upon completion of this unit, students are expected to:

- Define common genetic terminology.
- Describe DNA replication, transcription and translation.
- Differentiate between mRNA, tRNA and rRNA.
- Explain the types of mutations and their effects on the genome.
- Describe how horizontal gene transfer occurs.
- Describe plasmids.
- Describe the application of recombination DNA technology.
- Describe common technology used in biotechnology including Restriction Fragment Length Polymorphism (RFLP) and Polymerase Chain Reaction (PCR).
- Evaluate the effectiveness of using DNA for bacterial typing in a medical setting
- Formulate an opinion on genetic engineering.

**Total  
outside  
work:**  
5 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
		Black	Chapters 7-8	
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			2 hrs
	Complete Unit 6 Assignment 1			2 hrs
	Complete Unit 6 Lab 1			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 6 Assignment 1: Biotechnology		3%
	Lab	Unit 6 Lab 1: DNA Fingerprinting		2%
	Exam	Unit 6 Midterm Exam		10%

<b>Unit 7: EPIDEMIOLOGY</b>				<b>Total outside work:</b> 9 hours
Upon completion of this unit, students are expected to:				
<ul style="list-style-type: none"> <li>▪ Define parasitism, infection and disease.</li> <li>▪ Define normal microflora and microbial antagonism.</li> <li>▪ Define infectious, noninfectious, communicable and noncommunicable diseases.</li> <li>▪ Explain how microbes cause diseases and the stages of a disease.</li> <li>▪ Describe diseases in a population and epidemiological studies.</li> <li>▪ Identify portals of entry and modes of disease transmission.</li> <li>▪ Develop a plan to prevent transmitting nosocomial infections.</li> </ul>				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapters 14-15		129
	Pollack	Exercise 15		10
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 7 Assignment 1			2 hrs
	Complete Unit 7 Lab 1			1 hr
	Study for the Quiz in Unit 8			3 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Exercise	Unit 7 Assignment 1: Portals of Entry		3%
	Lab	Unit 7 Lab 1: Epidemiology		2%

**Unit 8: MICROORGANISMS AND THE IMMUNE SYSTEM**

Upon completion of this unit, students are expected to:

- Describe the physical and chemical barriers of the innate immune system.
- Describe the stages of inflammation.
- Explain the benefits of fever.
- Define active and passive immunity.
- Compare and contrast humoral and cell-mediated immunity and describe how they are linked.
- Describe the different types of immunization.
- Compare and contrast immunological disorders.
- Explain blood grouping systems and transfusion reactions.
- Describe immunodeficiency disorders.

**Total  
outside  
work:**  
6 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapter 16	pp. 462-476	15
		Chapters 17-18		152
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 8 Assignment 1			2 hrs
	Complete Unit 8 Lab 1			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 8 Assignment 1: The Immune System		3%
	Lab	Unit 8 Lab 1: Antibodies and You		2%
	Quiz	Unit 8 Quiz 3		5%

<b>Unit 9: MICROBIAL DISEASES PART 1</b>				<b>Total outside work:</b>
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> <li>▪ Describe the common diseases of the skin.</li> <li>▪ Describe common sexually transmitted diseases.</li> <li>▪ Describe the common diseases of the respiratory system.</li> <li>▪ Describe the common diseases of the cardiovascular and lymphatic system.</li> <li>▪ Investigate the normal microbiota of a human.</li> </ul>				10 hours
<b>READING ASSIGNMENT</b>	<b>Author</b>	<b>Chapter/Title</b>	<b>Pages (if necessary)</b>	<b>Total Pages</b>
	Black	Chapter 19	pp. 574-588	15
		Chapter 20	pp. 609-632	24
		Chapter 21	pp. 644-668	25
Chapter 23		pp. 724-727, 729-740, 745-755	27	
<b>OUT-OF-CLASS WORK</b>	<b>Activity</b>			<b>Estimated Time</b>
	Complete the reading assignment			4 hrs
	Complete Unit 9 Assignment 1			2 hrs
	Complete Unit 9 Lab 1			1 hr
Study for the Quiz in Unit 10			3 hrs	
<b>GRADED ACTIVITIES / DELIVERABLES</b>	<b>Grading Category</b>	<b>Activity/Deliverable Title</b>		<b>Grade Allocation (% of all graded work)</b>
	Assignment	Unit 9 Assignment 1: Emerging Infectious Diseases		3%
	Lab	Unit 9 Lab 1: Microbes of the Body		2%

<b>Unit 10: MICROBIAL DISEASES PART 2 AND APPLIED MICROBIOLOGY</b>				<b>Total outside work:</b> 12 hours
Upon completion of this unit, students are expected to:				
<ul style="list-style-type: none"> <li>▪ Describe common diseases of the oral and gastrointestinal systems.</li> <li>▪ Describe common diseases of the nervous system.</li> <li>▪ Explain how microbes can be used in sewage waste treatment and bioremediation.</li> <li>▪ Explain how microorganisms can affect food spoilage and production.</li> <li>▪ Investigate the amount of microbes found in the food supply.</li> </ul>				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Chapter 22	pp. 683-705	23
		Chapter 24	pp. 761-776	16
		Chapter 25	pp. 807-816	10
		Chapter 26	pp. 820-840	21
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Complete Unit 10 Assignment 1			2 hrs
	Complete Unit 10 Lab 1			1 hr
	Study for the Final Exam			6 hrs
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 10 Assignment 1: Environmental Microbiology		3%
	Lab	Unit 10 Lab 1: Microbes in Food		2%
	Quiz	Unit 10 Quiz 4		5%

<b>Unit 11: COURSE REVIEW AND FINAL EXAMINATION</b>				<b>Total outside work:</b> 4 hours
Upon completion of this unit, students are expected to:				
<ul style="list-style-type: none"> <li>• Demonstrate mastery of all course objectives</li> </ul>				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Black	Review all assigned reading		822
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hrs
	Study for the Final Exam (cont)			1 hr
GRADED ACTIVITIES / DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Exam	Unit 11 Final Exam		20%

Note: Your instructor may add a few learning activities that are ungraded.

## Evaluation and Grading

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### Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	In-Class	Out-of-Class	Weight
Assignment	5%	25%	30%
Lab	18%	2%	20%
Quiz	20%	0%	20%
Exam	30%	0%	30%
<b>TOTAL</b>	<b>73%</b>	<b>27%</b>	<b>100%</b>

### Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

## Academic Integrity

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All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

*(End of Syllabus)*