

FAIRLEIGH DICKINSON UNIVERSITY
SCHOOL OF NATURAL SCIENCE

FALL 2003

BIOL. 1125/1126 MICROBIOLOGY FOR THE HEALTH SCIENCE

4 Credits

Laboratory (4 hours)	DH 5512	Biol 1126 21	M W 9:00 AM – 10:40 AM
		Biol 1126 22	M W 11:00 AM – 12:40 PM
Lecture (2 hours)	DH1104		M W 1:00 PM – 1:50 PM

Course Description:

Microbiology for the Health Sciences is an introductory course suitable for students planning a career in the health sciences and for liberal arts students with an interest in medical microbiology.

Lecture topics will include an introduction to the microbial world with emphasis on aspects of immunology, bacteriology, virology, mycology and parasitology which are relevant to the role of microorganisms in disease processes. The Laboratory will deal with the isolation and identification of common pathogenic and nonpathogenic organisms utilizing techniques of staining, culturing, fermentation reactions and microscopic inspection.

Instructor: Dr. Alice Benzecry
Office: Dickinson Hall, Room 4416
Phone # 692-2385 / E-mail: benzecry@fdu.edu
Office Hours : : Thursday 1:00 - 4:00 PM ☺

***** Any problem(s) you may have during this course should be communicated to the Instructor immediately, DO NOT wait until it is too late.**

Requirement:

- ❑ Lecture textbook: **MICROBIOLOGY for the Health Sciences.** 7th. Edition, By Gwendolyn Burton & Paul Engelkirk. Lippincott Williams and Wilkins. ISBN 0-7817-1844-9
- ❑ Laboratory manual: **MICROBIOLOGY LABORATORY Fundamentals and Applications.** 2th Edition; By George A. Wistreich. Prentice Hall. ISBN 0-13-010074-9
- ❑ **Lab Coat or Smock:** You must obtain a lab coat or smock - A garment to wear while working in the laboratory to protect clothing from **contamination** or discoloration by staining reagents.
- ❑ **Lab Notebook:** A small composition notebook to be used exclusively for this class.

Attendance: Students are required to attend all lecture and laboratory sections. Lateness or absence of greater than 10% is considered excessive and could result in a lowering of your course grade. Missed laboratory **can not** be made-up. You should consult your lab partner for the information missed and results.

Tape recorders are prohibited without written permission from instructor.

College regulations regarding cheating will be strictly enforced.

GRADING CRITERIA:

Lecture.....	60%	(Three lecture exams 20% each)
Laboratory.....	30%	10% Midterm exam 10% Final exam 10% Lab performance + notebook
Project.....	10%	Written report + Lab unknown. (The instructor will discuss the characteristics to be evaluated)

Lecture Exams: (20% each) Unless otherwise stated each lecture exam will be given during the assigned (see lecture schedule) lecture period. Exam will test your knowledge of material cover in class since the last exam. You will be expected to answer multiple choice questions as well as essay questions. If a student miss an exam, he or she will only be allowed to take a make-up exam the day of the final exam (Dec. 17).

Note: Please bring a # 2 pencil and eraser to all exams.

Lab Exams: (10% each) Mid term and final exams will consist of two parts:

A written part which will include multiple choice, filling and short answer questions.

And a practical portion where the student must perform specific laboratory techniques.

Note: Please bring lab coat, a # 2 pencil and eraser to all exams

No make-up exams will be allowed for this portion of the course.

Lab performance: Competence in performing laboratory procedures, adherence to safety measures, and interpreting experimental results will be considered as part of your laboratory grade. Your instructor will base the evaluation on the following objectives.

1. Follow all safety rules stated in the laboratory manual.
2. Demonstrate a working knowledge of the care and use of the microscope.
3. Use aseptic technique when handling cultures.
4. Demonstrate evidence of preliminary preparation (exercise outline) and organization when performing laboratory techniques.
5. Perform selected laboratory techniques safe and correctly.
6. Interpret laboratory results correctly.

7. Maintain records of all laboratory procedures, questions, explanations and experimental data obtained during lab – Lab notebook will be collected during the midterm and lab final exams.

Project: This project is performed in groups of 3 students. Each group will be given a microbiology study case. Students must research background information and try to solve their case study based on laboratory test done by the group during Lab. Specific guidelines will be given to the students at the beginning of the project.

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Final letter grade will be assigned accordant to the following grade scale.

A+	98-100	C	73-76
A	93-97	C-	70-72
A-	90-92	D+	67-69
B+	87-89	D	62-66
B	83-86	D-	59-61
B-	80-82	F	0-58
C+	77-79		

BIOL 1125 Microbiology for the Health Sciences
(Lecture)
DH 1106 M W 1:00 – 1:50 PM

- **TEXT BOOK** **MICROBIOLOGY for the Health Sciences.** 7th. Edition,
 By Gwendolyn Burton & Paul Engelkirk.
 Lippincott Williams and Wilkins. ISBN 0-7817-1844-9

WEEK	TOPIC	Assigned Text Reading
1	Introduction to Microbiology: <ul style="list-style-type: none"> - Microbiology the Science - Role of Microorganisms <ul style="list-style-type: none"> ○ Beneficial uses ○ Disease - Scope of Microbiology - Historical developments 	CHAPTER 1
2	Cell Structure and Taxonomy: <ul style="list-style-type: none"> - Overview of cells <ul style="list-style-type: none"> ○ Eucaryotic cellular structures ○ Procaryotic cellular structures - Taxonomy <ul style="list-style-type: none"> ○ Overview ○ Importance ○ System of classification ○ Bacteria classification 	CHAPTER 3
3	Diversity of Microorganisms: <ul style="list-style-type: none"> - Acellular microorganisms – Origen, classification, charateristics and pathogenicity. <ul style="list-style-type: none"> ○ Viruses, Viroids, and Prions - Cellular microorganisms: <ul style="list-style-type: none"> ○ Domain Archaea - Charateristics 	CHAPTER 4
4	<ul style="list-style-type: none"> ○ Domain Bacteria – Characteristics, pathogenicity and genetic composition. <p style="text-align: center;">Domain Eukarya</p> <ul style="list-style-type: none"> ○ Algae and Protozoa – Characteristics & pathogenicity ○ Fungi - Characteristics, classification and fungal diseases. ○ Helmenths - Characteristics, classification and pathogenicity 	CHAPTER 4 CHAPTER 5

5	Basic Chemistry Concepts: <ul style="list-style-type: none"> - Atoms, Molecules, Elements, and Compounds - Chemical Bonding – Covalent, Ionic and Hydrogen bonds. - Importance of water in living cells and systems. 	CHAPTER 6
6	The Chemistry of Life: <ul style="list-style-type: none"> - Organic Chemistry – Carbon bonds and cyclic compounds - Biochemistry – Biological Molecules: <ul style="list-style-type: none"> Carbohydrates Lipids Proteins Nucleic Acids - DNA structure and replication - Gene expression 	CHAPTER 6
Oct.13	EXAM I : Chapters 1, 3, 4, 5 and 6.	
7	Microbial Physiology: <ul style="list-style-type: none"> - Nutrition - Nutritional Requirements and Types - Metabolism – Enzymes, Catabolism (energy production) and Biosynthesis (anabolism). - Growth – Culture Media, Population Growth Curve. 	CHAPTER 7
8	Microbial Genetics: <ul style="list-style-type: none"> - Conjugation - Transduction - Transformation - Genetic Engineering and Gene therapy. 	CHAPTER 7
9	Controlling the Growth of Microorganisms: <ul style="list-style-type: none"> - Factors influencing microbial growth - Physical and Chemical Antimicrobial Methods - Chemotherapy and bacterial resistance. 	CHAPTER 8 & 9
10	Microbial Ecology: Interactions between Humans and Microbes <ul style="list-style-type: none"> - Indigenous Microflora and its beneficial roles. - Symbiotic relationships – Mutualism, Commensalisms, parasitism, neutralism and antagonism. 	CHAPTER 10
Nov.10	EXAM II Chapters 7, 8, 9, & 10	
11	Epidemiology <ul style="list-style-type: none"> - Epidemiologic Terminology - Interactions among pathogens, hosts and the environment. - Chain of infection 	CHAPTER 11

<p style="text-align: center;">12</p>	<ul style="list-style-type: none"> - Reservoir of infection <ul style="list-style-type: none"> o Living reservoir o Non-living reservoir - Modes of transmission - Bioterrorist and biological warfare agents - Water supplies and swage disposal - Nosocomial Infections <p>Preventing the Spread of Communicable Diseases:</p> <ul style="list-style-type: none"> - - Control Measures and Control Procedures <p>Diagnosing infectious diseases</p>	<p style="text-align: center;">CHAPTERS 12 & 13</p>
<p style="text-align: center;">13</p>	<p>Pathogenesis of infectious diseases</p> <p>Pathogenicity and host defense mechanisms</p> <ul style="list-style-type: none"> - Infections – four phases in the course of an infection - Acute, subacute, and chronic diseases - Pathogenesis of infection diseases - Virulence and virulence factors. 	<p style="text-align: center;">CHAPTER 14</p>
<p style="text-align: center;">14</p>	<p>Human Defenses Against Infectious Diseases:</p> <ul style="list-style-type: none"> - Non-specific Mechanisms of defense – First and second line of defense. - Immune Response – Third line of defense - Immunodiagnostic procedures <p>Major infectious Diseases</p>	<p style="text-align: center;">CHAPTERS 15, 16, 17 & 18</p>
<p>*DEC 17 12:30PM</p>	<p>EXAM III Chapters.11, 12, 13, 14, 15, 16, 17, & 18</p>	

BIOL 1126 Microbiology for the Health Sciences (Laboratory)

**DH 5512 M W 9:00 – 10:40 AM / M W 11:00 –
12:40 PM**

- Laboratory manual: **MICROBIOLOGY LABORATORY Fundamentals and Applications.** 2th Edition; By George A. Wistreich. Prentice Hall. ISBN 0-13-010074-9
- **Lab Coat or Smock:** You must obtain a lab coat or smock - A garment to wear while working in the laboratory to protect clothing from **contamination** or discoloration by staining reagents.
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LABORATORY SCHEDULE

DATE	TOPIC	Assigned Exercise and reading
9/3	Introduction Laboratory safety and Protocol.	Section 1 -pp. 1-6
9/8	Introduction to Microscopy and Specimen preparation The use and care of the Microscope	Chapter 2 (text book) Exercise 1
9/10	Preparation of Bacterial and Oral smears - Simple Stains Hanging drop and Wet Mount	Exercises 2 & 3
9/15	Distribution of Microorganisms in the Environment Morphological Features of Bacteria	Exercises 9A & 12A-B
9/17	Differentiation of bacteria groups by Staining reactions Gram Stain, Acid Fast Stain	Section 4 –pp.139 Exercises 14 & 15A
9/ 22	Bacteria Anatomy : Spore, Capsules, Pili, and Flagella	Section 5 Exercises 16A, 17A, & 18A,D
9/24	Survey of the microbial world: Helminthes, Algae, Protozoa, Fungi: Mold, Yeast, and Mushrooms	Section 3 - pp. 89-92 Exercises 10A-B, 11A-B
9/29	Cultivation techniques Transfer and Colony Selection techniques	Section 2 –pp. 37-38 Exercise 4
10/1	Isolation of pure cultures – Pour plate and Streak Plate techniques	Exercise 5
10/6	Dilution techniques and colony counting	Exercise 6
10/8	Bacterial culture characteristics	Exercise 7
10/13	Selected Techniques for the Cultivation of anaerobes	Exercise 8
10/15	Biochemical Activities Selective and differential media	Section 6 – pp.187-190. Exercise 20

10/20	Results and Review for Mid-term exam	
10/22	MID – TERM EXAM	
10/27	Extracellular degradation of polysaccharides, proteins, lipids, and DNA. Intracellular Metabolism – Carbohydrate metabolism	Exercises 21 & 22
10/29	Nitrogen metabolism	Exercises 22 & 23
11/3	Oxygen utilization: Oxidase and Catalase Activities	Exercise 24
11/5	IMViC test and Enterotube®II System	Exercises 25 & 27B.
11/10	Multiple test media: Litmus Milk, TSI agar, and SIM	Exercise 26
11/17	Control of Microorganisms by Chemical and Physical Factors : Heat and Ultraviolet Radiation	Section 7 – pp.263 Exercises 29A-1, 30
11/19	pH, Osmotic pressure, and .Heavy metals	Exercises, 31, 32A, & 33B.
11/24	Disinfection of instruments	Exercise 34
	11/25 – 11/30 SPRING BREAK	
12/1	ID unknown Antibiotic resistance	Exercise 37
12/3	ID unknown	
12/8	ID unknown	
12/10	ID unknown	
12/15	LAB EXAM	