

SYLLABUS BIOL 2900

Spring, 2014

Course: Microbiology in Health and Disease

Instructor: Prafull C. Shah

Office: BC 2092

Office Hours: After classes, or Wednesdays 3:30 PM to 5:00 PM or by appointment by Email.

Semester Begins on January 13, 2014 and ends on May 5, 2014

COURSE NO. 21944	BIOL	2900	A	4.00	Microbiology in Health/Disease	Main Campus		
LECTURE					TUE and THUR	03:30 pm - 04:45 pm	BC 1023	LECTURE
LAB					MON and WED	09:00 am - 10:25 am	BC 2068	LAB

COURSE NO. 21945	BIOL	2900	B	4.00	Microbiology in Health/Disease	Main Campus		
LECTURE					TUE and THUR	03:30 pm - 04:45 pm	BC 1023	LECTURE
LAB					MON and WED	11:00 am - 12:25 pm	BC 2068	LAB

COURSE NO. 21946	BIOL	2900	C	4.00	Microbiology in Health/Disease	Main Campus		
LECTURE					TUE and THUR	03:30 pm - 04:45 pm	BC 1023	LECTURE
LAB					MON and WED	02:00 pm - 03:25 pm	BC 2068	LAB

COURSE OBJECTIVES:

With a focus on healthcare majors, the objectives of this course are:

- (a) To introduce students to microbiology and the vital role microorganisms play in the well-being of higher forms of life, as well as in causing diseases, mostly as opportunists,
- (b) To learn various groups of microorganisms and what makes them infectious,
- (c) To learn most common infections caused by microorganisms, and
- (d) To learn the preventive and curative measures against common infections.

SPECIAL NOTES TO STUDENTS:

1. In order to respect the privacy of each student, exam scores and grades will not be posted, given out by telephone, or sent to students by email.
2. Students are advised to consult the VSU Student Handbook, Undergraduate Catalog, Semester Calendar, Schedule of Classes, & Registration Guide for information about VSU policies and procedures regarding registration, drop/add, and withdrawal. Students are not permitted to withdraw after midterm except in cases of hardship.
3. Students requesting classroom accommodations or modifications because of a documented disability should contact the Access Office for Students with Disabilities, 1115 Nevins Hall.
4. Cell phones are to be turned off during classes and examinations.
5. Students are responsible for reading and following the Biology Department policy on plagiarism.
- 6. Since important concepts are explained in the classroom, missing classes may seriously impact grades.**
7. Make-up examination or quiz WILL NOT BE OFFERED, except under a **verifiable** exceptional and unavoidable circumstance. If offered, it will be at the discretion of the Instructor, AND will not carry full earned points.
8. Changes to this syllabus may be made during the Semester.

GRADES:

- (1) There will be periodic quizzes, a mid-term examination and a final examination. Quizzes and exams typically consist of multiple choice, matching, fill-in blanks type of questions, including some open book. However, students may be challenged with questions that may require creative thinking and true understanding of concepts in order to answer them correctly.

- (2) Vocabulary, spelling and pronunciation of medical terms may be important parts of quizzes and examinations.
- (3) Lab. portion of testing will be merged with lectures.
- (4) Periodic quizzes will be worth a total of 200 points.
- (5) Mid-term examination will be worth 100 points.
- (6) Final examination will be worth 100 points.
- (7) Between quizzes, mid-term, and final examination, each student can earn a maximum of 400 points.

GRADING SCALE:

- Grade A = 90% and above
- Grade B = Between 80% and 89.99%
- Grade C = Between 70% and 79.99%
- Grade D = Between 65% and 69.99%
- Grade F = 64.99% or less

Week 1	
Subject(s)	Learning Objectives
General course information Introduction to Microbial World Safety in microbiology laboratory Personal and patient safety in healthcare environment Introduction to Microscopy	History of Microbiology. Role of microbes in nature, well-being of other living things, science, health and diseases. Introduction to Microbiology Laboratory Safety, hand hygiene Proper handling and use of microscope
Week 2	
The Molecules of Life Microscopy and Cell Structure Use of Microscope, Practice of focusing on human blood components Practice of using oil immersion lens	Characteristics of prokaryotic and eukaryotic cells Principles of microscopy, use of microscopes Distinction of various groups of bacteria
Week 3	
Microbial Metabolism, Physiology and Genetics Wet Examination of microscopic life in pond/swamp water - Protozoa, Algae, Cyanobacteria Culture of normal environmental and body flora	How microbes live and multiply Study of higher forms of microbial life What grows where?

Week 4	
<p>Host Defense Mechanisms – Role of normal flora and physical barriers to infections Natural and Acquired Immunity Study of growth acquired from environmental and body flora Colony characteristics and simple stain of recovered bacteria</p>	<p>How physical make-up of human body defend against infections What are natural, acquired and artificial means of combating infections Are our counters, keyboards, drains, toilet seats, door handles AND our mouths, skin and noses STERILE? What do they grow?</p>
Week 5	
<p>Infectious Disease Process – How Microbes survive host defenses and cause infection Importance of Gram Stain Gram Stain of bacteria</p>	<p>Organism mutation, virulence, drug resistance, avoidance of phagocytosis Gram Stain as an important diagnostic tool</p>
Week 6	
<p>Control of Microbial Growth – Disinfection and Sterilization Demonstration of Steam sterilization and Sterility Check Gram Stain of common pathogenic bacteria</p>	<p>Levels of sanitization, disinfection, and sterilization under various situations</p>
Week 7	
<p>Aerobic Gram Positive Cocci and their clinical significance</p>	<p>What is available at the disposal of clinicians to diagnose infectious diseases?</p>
Week 8	
<p>Diagnosis of Infectious Diseases in clinical Laboratory - Methods for the direct and indirect, rapid and slow techniques employed in a clinical Microbiology laboratory Demonstration of rapid diagnostic techniques used in a POC or ED laboratory Differentiation of Gram Positive Cocci in a laboratory Introduction to Antimicrobial Agents</p>	<p>Introduction to Staphylococci, and their impact on humans Treatment options for microbial infections</p>

Week 9	
Continuation of Antimicrobial Agents Continuation of Aerobic Gram Positive Cocci Differentiation of Gram Positive Cocci in a laboratory	Treatment of microbial infections
Week 10	
Clinically significant aerobic Enteric Gram Negative bacteria – Escherichia, Salmonella, Shigella Differentiation of Gram Negative Bacilli in a laboratory	Introduction to Enterobacteriaceae, and their impact on humans
Week 11	
Clinically significant aerobic Non-Enteric Gram Negative bacteria – Pseudomonas, Acinetobacter, Haemophilus Antimicrobial Susceptibility testing – Principles and procedures Antimicrobial Susceptibility Results – Their Interpretation and Applicability to patient care	How the results from a Microbiology laboratory may be applied in patient treatment Introduction to non-enteric aerobic bacteria, and their impact on humans How antimicrobial treatment parameters are determined
Week 12	
Clinically significant: Gram Negative diplococci – Neisseria, Moraxella Gram Positive Bacilli - Bacillus, Listeria Spiral bacteria – Treponema, Leptospira	Introduction to Neisseria, Bacillus, and Spirochaetes, and their impact on humans
Week 13	
Clinically significant anaerobic bacteria – Clostridium, Bacteroides	Introduction to anaerobic bacteria , and their impact on humans
Week 14	
Clinically significant miscellaneous microorganisms – Viruses, Parasites, Chlamydia, Mycobacteria, Fungi, Yeasts Etiology of common human infections: Urinary tract, Respiratory, Gastro-intestinal, Genito-urinary, Skin and Wound infections	Introduction to non-bacterial Microbial pathogens Agents responsible for most common infections

Week 15

Review and interpretation of important laboratory results
Epidemiology, Emerging Diseases and Public Health
Role of Infection Control Personnel
Review

Challenges posed by MRSA – “The Superbug”,
CDAD, EHAC and other emerging, important
infections and how to control them

Week 16

Final Examination
End of Semester