Antelope Valley College

General Microbiology

Spring 2011

Character and Persistence

Instructor: Dr. Bassam Michael Salameh (Dr. S)

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Office: T300G (Across from the Sherrif's Academy)

Office Hours: Wednesdays 4:00 – 6:30 pm and Thursdays 2 – 5:00 pm Others by appointment.

Course Number: BIOL 204 and BIOL 204L

Course Units: 5.0 (9 hours weekly; 3 hrs lecture, 6 hours lab)

Lecture: Wednesday 7:00 – 10:05 pm

Lab: Tues and Thurs 7:00 – 10:05 pm

Course prerequisites: Completion of BIOL 101 or 110 or 120 and CHEM 101

Textbook: Microbiology With Diseases by Taxonomy, 3rd ed. Robert Bauman. 2011.

Lab Manual: Microbiology: A photographic Atlas for the Microbiology Laboratory. M. Leboffe & B. Pierce 2005.

Laboratory Manual Supplement, Posted on Website www.Bulletworm.com or CD

Helpful Web Sites:
http://www.cdc.gov.
http://www.journals.asm.org/
http://www.asm.org/

Course Description: This course is designed to give an overview of the biology of microbes including bacteria, fungi, protozoa, helminthes, and viruses. Information is directed toward students in pre-professional programs for Nursing, Home Economics, Dental Hygiene, Surgical Technology, Physicians Assistant, Food Science, Environmental Monitoring, Animal and Crop Science, as well as Biological Science majors. Wherever possible, new developments in Recombinant DNA technology/Biotechnology, Virology and Immunology are discussed and expanded upon in both lecture and lab to provide students with updated technological knowledge and a solid foundation in classical Microbiology.

Course Objectives: Upon completion of this course successfully, students should be able to:

1. Define and classify microbes based on morphological and biochemical characteristics.
2. Define the physiology, genetics, and biochemical properties of microbes.
3. Identify the relationships between microbes and their environment/hosts.
4. Evaluate the roles of microbes in food production, water and sewage treatment.
5. Describe the role of the immune system in serological diagnostic tests, and body defenses.
6. Describe and evaluate the role of microbial genetics and the principles of molecular biology.
7. Evaluate and describe the pathogenic processes of microbes.
8. Describe the mechanisms of antimicrobial chemotherapy, antiseptics, and disinfectants.
9. Describe selected pathogens and the diseases they cause, diagnosis, and treatment.

10. In the laboratory, an integrated series of modules will introduce the student to a broad spectrum of microorganisms and a variety of techniques and methodologies. With the aid of these skills and knowledge, the student will be able to independently demonstrate his/her abilities to identify common bacteria based on morphological and biochemical characteristics.

Student Learning Outcomes

1. Demonstrate the ability to use laboratory techniques, perform laboratory skills, and practice safety procedures.
2. With the aid of these laboratory skills, the student will be able to independently investigate and identify unknown bacteria, and prepare a scientific report.
3. Explain the role of microbes ion the biogeochemical cycles, and as part of the ecosystem to maintain life on Earth.
4. Describe the characteristics of the Bacteria, viruses, protozoa, fungi, and parasitic worms and their interactions with the host organism, and how they cause diseases. Understand their role in food production and spoilage, water contamination, and sewage treatment.
5. Demonstrate the principles of microbial genetics and describe the structure of DNA, how mutations arise, and how they are used to evaluate chemicals released to the environment.
6. Explain the principles of genetic engineering and how Bacteria are used in recombinant DNA and gene technology.
7. Explain the role of the immune system in human health and recognize the applied uses of antibodies in the diagnosis and treatment of diseases.

Course Policies

Laboratory Safety

Laboratory safety rules will be strictly enforced. These are provided in a handout and discussed in the first laboratory session. If you have any questions related to safety, do not hesitate to ask. Please **read all materials related to safety** and make every effort to prevent lab accidents and promote safety to insure that labs will be an enjoyable educational experience for all.

Dress code: WEAR YOUR LAB COAT; You will not be allowed to attend lab without a lab coat. No open-toed footwear (no flip-flops, sandals, etc.) allowed in lab. Beware of loose shoelaces. Long hair is to be restrained or put up so it does not interfere with lab procedures. Avoid loose clothing, especially synthetic flammable material (polyester, nylon). Beware of the Bunsen Burners! No caps or sunglasses (dark glasses) are to be worn in lecture or labs. **Dress comfortably and professionally, with taste, in both class and lab. Think Safety First! Be safety-conscious!** You may be asked to leave if you are found in violation of safety policies.

Materials: The following supplies will be needed for the laboratory:

1. Lab coat
2. Safety goggles
3. Fine-tipped Sharpie permanent marker (Black or Blue only)
4. Wax pencil (Black – buy the good quality pencil – marks better on glass)
5. Coloring pencils
6. Laboratory notebook/diary
7. 3 ring binder file
8. Box of Disposable Gloves (optional)

Attendance & Participation: Attendance is expected in every class and lab meeting. It is very important for students to attend class to be successful in this course. However, I do understand that things happen and if you must miss a class, I'd ask that you let me know ahead of time when possible (in person, via phone or email). In the event of an absence, I strongly encourage you to contact a classmate to obtain missed materials. You may not make up a missed lab.

Class will start as scheduled unless noted otherwise. Attendance will be taken at the beginning of each session. Please arrive on time. If you are more than 10 minutes late, it may count as an absence. If you miss the quiz, you will not be allowed to make it up. No exceptions.

Withdrawing from the course: It is the responsibility of the student to withdraw from the course. Please be aware of all deadlines to drop this course with a "W". (Semester calendar). Any student enrolled in the course after the final drop date will receive a grade "F" for the course.

Please note: More than 2 absences from lecture/lab may cause you to be dropped from the course.

Reasonable Accommodations: If you have a legally protected disability under the ADA or the California discrimination law, and you believe you need reasonable accommodation to participate fully in this class, please make an appointment to see me during my private office hours to discuss your need, and bring documentation.

Exams: Four lecture exams will be given to include material from lecture (and lab when it applies). Exams will have multiple choice/written formats. Your lowest grade will be dropped. The final exam will be given on the last day of lecture, and will include mostly material from the last chapters covered and selected material from the lab modules.

Quizzes: Quizzes will be given at the beginning of the lab period, so be there on time. The quizzes may cover material from the previous lab, pertinent lecture material and background/procedural material for that day's lab. **If you come in late and the quiz is in progress, you may not take the quiz. There are no make-up quizzes.**

Make-up Exam Policy: If you miss an exam, then this will be the exam grade that will be dropped. There is no make-up for the final. If you do not show up to the final, you may receive an automatic "F" in the course. Material on the exams will come from both lecture and lab as they are closely associated. The use of dictionaries or calculators during the exam will not be permitted. Bring with you Scantron form# 882 to class on exam day, as well as 2 pencils, and an eraser. Do not rely on others to give you any.
If you leave class during an exam, you may not return to finish that exam.

Class Assignments Policy: Lab reports and other written assignments, must be completed on time for full credit. There is a 10% (per late day) deduction for late assignments with a valid documented reason such as illness. Otherwise, the material will not be accepted for grading.

Grades

This course operates on an objective point system. Grades will be assigned based on the following accumulated point scale. You may keep track of your own progress in the second column.

Total Points Possible = 650

582 – 650 = A
517 – 581 = B
452 – 516 = C
387 – 451 = D
0 – 386 = F

Exams, Quizzes, Lab Activity	Possible Points	Student Scores
Lecture Exam 1	100 pts*	
Lecture Exam 2	100 pts*	
Lecture Exam 3	100 pts*	
Lecture Exam 4	100 pts*	
* Lowest exam grade will be dropped: Only 3 exams count.		
Lecture Exam 5 – Final Exam Will include lecture and lab material Final exam cannot be dropped.	150 pts	
Lab Quizzes (10 quizzes)	100 pts	
Lab modules/exercises	80 pts	
Identification of Laboratory Unknown	20 pts	
Total Possible points for the course	**650 pts**	

Cell Phone Policy: TURN IT OFF during quizzes and exams. Silent or vibrate during lecture. No text messaging AT ALL while in lab or class. You may not answer a call in class or lab. Please leave the room to do so. No electronic entertainment devices may be used in class or lab. ALL cell phones will be turned OFF during any exam or quiz. You may receive a ZERO if your phone disrupts the class during an exam or quiz.

Academic Violations:
http://www.avc.edu/aboutavc/policies/code_conduct.htm
These policies and procedures are reprinted from the AVC Board Policies, Section 6032.
Includes, but is not limited to the following offenses:
Violation of the Academic Honesty Policy: Dishonesty, including but not limited to, cheating, or plagiarism. Plagiarism–from the Latin word for "kidnap"–involves using another's work without giving proper credit, whether done accidentally or on purpose. This includes not only words and ideas, but also graphs, artwork, music, maps, statistics, diagrams, scientific data, software, films, videos and the like.
Plagiarism is plagiarism whether the material is from published or unpublished sources. It does not matter whether ideas are stolen, bought, downloaded from the Internet, or written for the student by someone else–it is still plagiarism. Even if only bits and pieces of other sources are used, or outside sources reworded, they must still be cited.
To avoid problems, students should cite any source(s) and check with the instructor before submitting an assignment or project. Students are always responsible for any plagiarism in their work.

An instructor who determines that a student has cheated or plagiarized has the right to give an "F" grade, or numerical equivalent, for the assignment or examination.

General Advice: Please come by my office to discuss any difficulties with the course material, before it is too late! Make an appointment; come during office hours, phone, or e-mail a message. You are also welcome in the office outside of office hours for questions, especially unknowns. I expect you to have read the material, or at least, be familiar with the topic prior to your visit. There are no "dumb questions"; if you feel too embarrassed to ask a question in class, come by my office. All are ignorant at birth; some remain ignorant by choice; others choose to learn. The choice is yours, and I am here to help.

Please Keep In Mind:
NEVER postpone your work till the last minute, and give yourself time to read the lab material carefully, and make sure you understand what is being asked of you. Otherwise, you may become a burden to your lab partners, and will increase your chances of making costly mistakes. This is a very lab-intensive course. Since you will be dealing with LIVE organisms, these will usually need at least 24 hours to grow.

Expect to do a lot of independent work. If you are not sure of something, please ask BEFORE you mess it up. If you messed up, please let me know ASAP, so we can try to fix it.

NEVER, ever dry-lab any exercise. If the experiment is not working for some reason, please let me know ASAP.

Remember, you are here to enjoy Microbiology and learn to make it an important part of your everyday life.

Microbiology Tentative Lecture Schedule Spring 2011

Week	Lecture Topic	Textbook	Other
1 2/9	Course Introduction A Brief History of Microbiology	Chapter 1	
2 2/16	Review Chemistry Cell Structure and Function Microbial Nutrition and Growth (Lab presentation)	Chapter 2 Chapter 3 Chapter 6 (Lab)	
3 2/23	Microscopy, Staining, and Classification Microbial Metabolism Chapter	Chapter 4 Chapter 5	
4 3/2	**Exam 1** Class Activity (TBA)		
5 3/9	Microbial Genetics Recombinant DNA Technology	Chapter 7 Chapter 8	
6 3/16	Controlling Microbial Growth in the Environment Controlling Microbial Growth in the Body	Chapter 9 Chapter 10	
7 3/23	**Exam 2** Class Activity (TBA)		
8 3/30	Infection, Infectious Diseases, and Epidemiology Innate Immunity	Chapter 14 Chapter 15	
4/4 – 4/8	**Spring Break**		
9 4/13	Specific Defense: Adaptive Immunity Immunization and Immune Testing	Chapter 16 Chapter 17	
10 4/20	**Exam 3** Characterizing and Classifying Prokaryotes	Chapter 11	
11 4/27	Pathogenic Gram-Positive Cocci and Bacilli Pathogenic Gram-Negative Cocci and Bacilli	Chapter 19 Chapter 20	
12 5/4	Pathogenic Gram-Negative Cocci and Bacilli Mycoplasmas, Rickettsias, Chlamydias, Spirochetes, and Vibrios	Chapter 20 Chapter 21	
13 5/11	**Exam 4** Characterizing and Classifying Eukaryotes	Chapter 12	
14 5/18	Selected Pathogenic Fungi Parasitic Protozoa, Helminths	Chapter 22 Chapter 23	
15 5/25	Selected Pathogenic Viruses Applied and Environmental Microbiology	Chapter 24/25 Chapter 26	
16 6/1	**Final Exam**		

Microbiology Lab Schedule Spring 2011
Tentative Schedule

Week/ Date		Lab Exercises and Activities	Lab Atlas Readings	Textbook Readings	Other
Week 1	2/8	Exercise 1 Introduction to the Microbiology Laboratory Sign contract, Quiz Exercise 2 The Compound Light Microscope		Chapter 4	
	2/10	Exercise 2 The Compound Light Microscope (Continued)		Chapter 4	
Week 2	2/15	Exercise 3 The Omnipresence of Microorganisms Microbial Nutrition and Growth (Lab presentation) Exercise 4 The Preparation of Culture Media		Chapter 6	
	2/17	Exercise 3 The Omnipresence of Microorganisms Exercise 4 The Preparation of Culture Media			
Week 3	2/22	Exercise 5 The Preparation of a Bacterial Smear for Staining			
	2/24	Exercise 5 The Preparation of a Bacterial Smear for Staining	Ch. 5		
Week 4	3/1	Exercise 6 Streaking for Isolation Exercise 7 Bacterial Growth and Colony Morphology	Ch. 2 Ch. 1		
	3/3	Exercise 6 Streaking for Isolation Exercise 7 Bacterial Growth and Colony Morphology Prepare Thioglycollate Tubes	Ch. 1		
Week 5	3/8	Exercise 8 Oxygen Requirements of Bacteria Exercise 9 The Effects of Ultraviolet Light on Bacteria	Ch. 1 p. 109–111		
	3/10	Exercise 10 The Effects of Temperature on Bacteria Exercise 11 The Effects of Disinfectants on Bacteria	P. 89-90		
Week 6	3/15	Bacterial Transformation Kit	Handout		
	3/17	Bacterial Transformation Kit Preparation of Media for Exercise 12 and Unknowns	Handout		
Week 7	3/22	Exercise 12 Selected Selected Biochemical Reactions Used to Identify the Physiological Characteristics of Bacteria	Ch. 6		
	3/24	Exercise 12 Selected Selected Biochemical Reactions Used to Identify the Physiological Characteristics of Bacteria	Ch. 6		
Week 8	3/29	Exercise 12 Continued Gram Negative Enteric Rods – Test Battery (Set up)	Ch. 6		
	3/31	Gram Negative Enteric Rods – Test Battery (Identify)	Ch. 6		
4/4 – 4/9		Spring Break			

Microbiology Lab Schedule Spring 2011 (Continued)

Week/ Date		Lab Exercises and Activities	Lab Atlas Readings	Textbook Readings	Other
Week 9	4/12	Exercise 13 Serology: Agglutination Testing of Specific Bacteria Preparation of Media for Gram Positive Cocci	p. 115-116		
	4/14	Exercise 14 Gram Positive Cocci	Ch. 6	Chapter 19	
Week 10	4/19	Exercise 14 Gram Positive Cocci (Continued)	Ch. 6	Chapter 19	
	4/21	Exercise 14 Gram Positive Cocci (Continued) Media for unknown	Ch. 6		
Week 11	4/26	Exercise 15 Urine Culture Exercise 16 Throat Culture			
	4/28	Exercise 17 Antimicrobial Susceptibility Testing	p. 89-90		
Week 12	5/3	Begin Unknowns Exercise			
	5/5	Unknowns			
Week 13	5/10	Unknowns			
	5/12	Unknowns Exercise Due Water / Food Testing TBA	p. 92-93		
Week 14	5/17	Exercise 18 Parasitology – Protozoa	Ch. 15-16	Chapter 23	CDC Web site
	5/19	Exercise 18 Parasitology – Protozoa	Ch. 15-16	Chapter 23	CDC Web site
Week 15	5/24	Exercise 18 Parasitology – Helminths	Ch. 15-16	Chapter 23	CDC Web site
	5/26	Exercise 19 Fungi	Ch. 14	Chapter 22	
Week 16	5/31	Exercise 19 Fungi	Ch. 14	Chapter 22	
	6/2	TBA - Lab Clean Up			