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### BIOM 250N.01: Microbiology for the Health Sciences

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## **Microbiology for Health Sciences BIOM 250N**

**Instructor:** Dr. Jim Driver. Electron Microscopy Laboratory, ISB 017  
Office Hrs. 10:00 am – 11:00am Tuesdays or by appointment  
Email: [jim.driver@mso.umt.edu](mailto:jim.driver@mso.umt.edu)

**Text:** Required. Microbiology An Introduction. Tortora, Funke, and Case, 11<sup>th</sup> Ed.

**UMOnline – Moodle:** Lectures posted in units containing materials to be covered for each upcoming exam. I reserve the right to alter the amount of material that will be covered for each exam. Lectures posted on Moodle will be in Powerpoint format. In class I will explain the topics covered and add additional material not in the Powerpoint. Exam questions will come from the topics outlined in the Powerpoint slides and on additional material on those topics in the textbook. I encourage you to attend the class as I will .

### **Course description**

Microbiology for Health Sciences is designed to give students an overview of the cellular structures and molecular processes that are used by prokaryotic cells (Bacteria and Archaea) and eukaryotic cells (Protozoa, Algae, Fungi, and certain parasites) to grow and reproduce. Additionally, this course will focus on diseases caused by these organisms, the ability of our immune response to fight these diseases, and types of chemotherapies used to control or kill disease-causing organisms. I expect that by the end of this class you will have an understanding of the structures and processes that allow microorganisms to grow and thrive in a variety of environments. One of those environments is in or on an animal where some microorganisms are capable of causing disease. All animals studied to date have an immune system capable of killing invading microorganisms through a series of complex mechanisms. We will cover immunology and the immune response in some depth. Also we will study the substances that scientists have discovered or developed that can help the immune system control and eliminate infectious organisms. Finally, we will examine a selection of human microbial diseases to better understand the pathology of they cause in a variety of organs and systems. If time allows we will have an introduction to environmental microbiology.

### **Course Topics**

Part 1. Introduction, definition of microorganisms to be studied in class. Microscopy. Basics of inorganic and organic chemistry. Structure and function of prokaryotic and eukaryotic cells. Basics of metabolism in microbes and metabolic pathways. Introduction to microbial genetics. Growth and growth conditions for microbes.

Part 2. Phylogenetic classification of microorganisms, methods, and nomenclature. Various methods for identifying microorganisms. The Prokaryotic domains, Bacteria and Archaea (several selected species studied in detail). The Eukaryotes; characteristics of Fungi, Algae, Protozoans, and Helminths. Again several selected species will be studied in detail. Arthropods as vectors of disease. Characterization of viruses and study of viral infections.

Part 3. The study of immunology. Innate immunity. Adaptive immunity. Vaccination. Diagnostic immunology Disorders of the immune system; hypersensitivity, autoimmunity, and immunodeficiency. Antimicrobial chemotherapy. Antibiotics, their method of action and commonly used antimicrobial drugs. Antibiotic resistance and the mechanisms that lead up to it.

Part 4. Study of selected human diseases. As time allows we will cover a variety of common diseases found in or on various organs. The organisms we will study include bacteria, viruses, protozoans, fungi, and parasites. If time allows we will cover some topics in environmental and/or industrial microbiology.

### **Testing and Exam Schedule.**

Due to the large size of this class all exams will be in a multiple-choice question format. Exam questions will come from topics and materials covered in the lectures and supplemented by material from the textbook. There will be 3 1-hour lecture exams during the semester and a partially comprehensive Final Exam. Each lecture exam will be worth 100 points and the final exam will be worth 200 points.

Exam 1 – 9:10 am, Wednesday, February 18<sup>th</sup>

Exam 2 – 9:10, Monday, March 16<sup>th</sup>

Exam 3 – 9:10, Monday, April 13<sup>th</sup>

Final Exam – 10:10 – 12:10, Tuesday May 12<sup>th</sup>

### **Grading:**

In this course there will be 3 regular semester exams (100 points each) and a final exam which will be 50% comprehensive and 50% new material and will be worth 200 points toward your final grade. Exams will consist of true/false and multiple choice questions. Your grade will be calculated as a percentage of total possible exam points. The following grading scheme will be used:

100 – 90% = A; 89.9 – 80% = B; 79.9 – 70% = C; 69.9 – 60.0% = D; < 60% = F

If you are taking this course as Pass/No Pass the University requirement for a Pass grade is the equivalent of a “C” or 70% or higher cumulative average on exams.

### **Classroom attendance, make-up exams.**

Please attend class on a regular basis. Disruptive behavior such as talking or disturbing other students by leaving lecture early is not acceptable. If you expect to leave class early, please tell me before class begins. Make-up exams will be permitted only with compelling and supported reasons. Make-up exams will be scheduled at the convenience of the professor.