

Spring 2-1-2019

# BIOM 250N.01: Microbiology for Health Sciences

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## **BIOM 250N - Microbiology for Health Sciences Spring Semester 2019**

**Instructor:** Dr. Jim Driver. Electron Microscopy Laboratory, ISB 017  
Office Hrs. 10:00 am – 11:00am Wednesdays or by appointment  
Phone: 243-4669 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 or 12<sup>th</sup> Ed.

**UMOnline – Moodle:** Lectures will be 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 necessarily in the Powerpoints in order to better explain the topic. Exam questions will come from the topics outlined in the Powerpoint slides and on additional material on those topics found in the textbook or during my lectures. I encourage you to attend the class. Class attendance has been shown to be a critical factor in a student's final grade.

### **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, reproduce, and in some cases cause disease. 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. We will cover immunology and the immune response in humans in some depth. We will also 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 common human microbial and viral diseases to better understand the pathology they can cause in a variety of organs and organ systems.

### **Learning outcomes**

**Part 1.** Definition of types of microorganisms to be studied in class. Light and Electron Microscopy. Basics of inorganic and organic chemistry. Structure and function of prokaryotic and eukaryotic cells. Basics of metabolism in microbes and their metabolic pathways. Introduction to microbial genetics. Growth and growth conditions for microbes and control of microbial growth.

**Part 2.** Phylogenetic classification of microorganisms, methods for classification, and nomenclature. Methods for identifying microorganisms by morphology, physiology, and genetics. The Prokaryotic domains, Bacteria and Archaea with several selected species studied in detail. The Eukaryotes; characteristics of Fungi, Algae, Protozoans, and Helminths as time permits. 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 including innate and adaptive immunity. Vaccination and vaccine preparation and effectiveness. Diagnostic immunology. Disorders of the immune system including hypersensitivity, autoimmunity, and immunodeficiency. Antimicrobial chemotherapy; antibiotics, their method of action, and commonly used antimicrobial drugs. Antibiotic resistance and the mechanisms that can cause its development in microorganisms.

**Part 4. Study of selected human diseases.** This course will cover a variety of common diseases found in or on various human organs or organ systems. The organisms we will study include bacteria and viruses and if time allows protozoans, fungi, and parasites. Each disease studied will focus on the responsible pathogen, disease symptoms, treatment, and epidemiology.

### **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 4 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 – 9:00, Monday, February 5<sup>th</sup>

Exam 2 – 9:00, Monday, February 26<sup>th</sup>

Exam 3 – 9:00, Monday, March 19<sup>th</sup>

Exam 4 – 9:00, Monday, April 16<sup>th</sup>

Final Exam – 10:10 – 12:10, Tuesday, May 8<sup>th</sup>

### **Grading:**

In this course there will be 4 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 instructor.

### **Instructor’s policy for accommodating disabilities**

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

### **Instructor’s policy on academic honesty and plagiarism.**

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code.