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BIOM 250N.01: Microbiology for the Health Sciences

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BIOM 250N - Microbiology for Health Sciences. Summer Semester 2022.
HS Room 411 7:30 - 9:20 am

Instructor: Dr. Jim Driver. Electron Microscopy Laboratory, ISB 017
Office Hour Monday 10:00 am or by appointment
Email: jim.driver@mso.umd.edu

Text: Required. Microbiology An Introduction. Tortora, Funke, and Case, 13th Ed. The cost of this textbook is included in your tuition. You may opt out of the textbook but I suggest that you keep it or get a copy from another vendor. This online textbook includes online videos and practice quizzes. The online videos and quizzes will not be a part of your grade for this class. They are only used as additional study materials.

Textbook Access: Login to Moodle for this course. Scroll down to the Access for textbook from Redshelf and click on that link. Click on View Course materials. Copy the publisher access code. You may have to open an account on the Pearson textbook site and enter that code.

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. Exam questions will come from the topics outlined in the Powerpoint slides and on additional material on those topics found in the textbook and covered in class. I encourage you to attend class regularly. The number one factor that will improve your grade is simply to attend the class. I will post all messages relevant to the class schedule, exam topics, and any changes to the class on Moodle as well as during lectures.

Coronavirus and Spring Semester 2022

Omicron and its lineages. This strain of the virus may have an effect on our class format and schedule. The University is planning to have in-person classes for the entire summer semester and this class will follow that format. However if you test positive for Covid-19 or have symptoms that indicate that you should not attend class until you get tested then you can be given a link to attend the class by Zoom, available upon request. Please do your best to attend class regularly. In this class we will cover material very quickly and it will be easy to fall behind.

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 to cause disease. Additionally, this course will focus on diseases caused by these organisms, the ability of our immune system 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. You will also have a broad understanding of immunology in general and the immune response in humans. You will understand the general variety of substances that scientists have discovered or developed that can help the immune system control and eliminate infectious organisms and their general mechanisms of action against microorganisms. Finally, you will become familiar with 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 in humans.

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.

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.

Exam Schedule.

Exams for this class will be a combination of multiple-choice and short answer questions. Exam questions will come from topics and materials covered in the lectures and supplemented by material from the textbook. There will be 5 1-hour lecture exams during the summer semester. Each lecture exam will be worth 100 points towards your final grade.

Exam 1 – 7:30 Wednesday, July 6th

Exam 2 – 7:30 Monday, July 11th

Exam 3 – 7:30 Monday, July 18th

Exam 4 – 7:30 Monday, July 25th

Exam 5 - 7:30 Thursday July 28th

Quiz Schedule

During the semester we will have 4 Quizzes worth 25 points each. The quizzes will cover some topics that can be complex or are of current interest such as immunology and COVID-19 and vaccination. The quizzes will consist of multiple-choice questions will be taken on Moodle. The quizzes will be open on Moodle for several hours so that students with various schedules may have time to take them

Quiz 1 – Thursday June 30th
Quiz 2 – Thursday July 7th
Quiz 3 – Thursday July 14th
Quiz 4 – Thursday July 21st

Grading:

In this course there will be 5 regular semester exams worth 100 points each. Exams will consist of multiple-choice questions and short answer questions. The quizzes will be worth 25 points each for a total of 100 points. Your grade will be calculated as a percentage of the total possible exam and quiz 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 Credit/No credit the University requirement for a Pass grade is the equivalent of a “D-” or 60% or better 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 the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at (406) 243-2243, ode@umontana.edu, or visit www.umd.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish. If you would like to request reasonable accommodations, you are advised to provide your ODE verification letter to your instructor in the first week of class so appropriate arrangements can be made. If you decide after the semester begins to disclose your disability and request accommodations, you should provide documentation, if possible, at least 10 days before the upcoming assessment so I may prepare appropriately. It is the responsibility of students to make sure they understand the types of modifications available to them before assessments.

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.