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BIOM 410.01: Microbial Genetics

James David Driver

University of Montana, Missoula, jim.driver@umontana.edu

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BIOM 410 Microbial Genetics Spring Semester 2022

Instructor: Dr. Jim Driver. Electron Microscopy Laboratory, ISB 017
Office Hour by appointment
Phone: 243-4669 Email: jim.driver@mso.umt.edu

Required text: L. Snyder, J.E. Peters, T.M. Henkin & W. Champness (2020) *Molecular Genetics of Bacteria*. ASM Press, 5th Ed. Available online for rental or purchase. Additional readings will be distributed in class or on Moodle.

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. 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 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.

Course Description

The course examines the transmission of heritable traits by microbes and the methods and principles used to study inheritance. The role of genetic variation in driving microbial evolution will be an underlying theme. We will also explore how knowledge of natural genetic processes in bacteria such as conjugation, transformation and transduction have been utilized under controlled conditions to produce desirable/valuable traits. We will learn about state-of-the-art concepts and approaches developed that are revolutionizing our ability to understand core genomes (essential genes necessary for life), comparative genomics, metagenomics and various drivers of genetic and physiological biodiversity.

Course Outcomes.

The major outcomes for the student will be:

- Sound understanding of the core principles, paradigms and unique aspects of microbial genetics
- Familiarity with historically important, contemporary, and state-of-the-art research techniques used in microbial genetics
- Development of skills in critical thinking, integration/synthesis of concepts and ideas and scientific problem-solving

Student Lecture Presentations

Each student will be assigned a section of the textbook material to present to the class as a Powerpoint lecture. The presentations will be designed to be 20-30 minutes long and will consist

of 12 to 20 slides. Each presentation will be graded 1/3 by the other members of the class and 2/3 by the instructor. The grading will be based on a rubric given to each grader and the presenter.

Seminar Attendance and writeups

Students will receive credit for attending three genetics-related research seminars during the semester. DBS-CMMB seminars are presented Mondays at 12:10 pm in ISB 110. Other relevant seminars (e.g. WBIO or OBE seminars on conservation genetics) can be included. To earn credit, students will concisely evaluate seminars they attend using the rubric provided. Write-ups will be worth 20 pts each (60 pts total).

Research Paper Analyses

Each student will choose 2 research papers from peer-reviewed journals to analyze following a rubric given to the students. The papers will be chosen with approval of the instructor. The instructor will make copies and hand them out to the other students prior to class presentation. The presenting student will give a synopsis of the research paper and the class will discuss the results and implications of the paper chosen. Grades will be based on the completeness of the synopsis and the relevance of the research to the course.

Exam Schedule.

Exam questions will come from topics and materials covered in the lectures and supplemented by material from the textbook and research papers assigned in class. There will be 2 1-hour lecture exams during the semester and a Final Exam that will be based on the last material covered in the course. Each lecture exam and the Final Exam will be worth 100 points.

Exam 1 – 11:00 am, Tuesday, February 22nd

Exam 2 – 11:00 am, Tuesday, April 5th

Final Exam – 8:00 – 10:00 am, Friday May 13th

Grading:

In this course there will be 2 regular semester exams and a Final Exam worth 100 points each. Exams will consist of short answer and multiple-choice questions. The 2 lecture presentations will be worth 60 points each. 20 points will come from peer grades and 40 points from instructor grades. The 2 research paper analyses will be worth 30 points each. Attending 3 CMMB or WBIO/OBE seminars will be worth 20 points each. Your grade will be calculated as a percentage of the 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 the Office of Disability Equity. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with ODE, please

contact the Office of Disability Equity in Lommasson Center 154 or 406.243.2243. I will work with you and ODE 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.