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BIOB 486.01: Genomics

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BIOB 486: Genomics
Fall 2014
MWF, 11:10-12:00, Chemistry 102

INSTRUCTORS: Dr. John McCutcheon, john.mccutcheon@umontana.edu
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Office hours: Mondays 2:15-3:15, or by appointment.

Dr. Jeffrey Good, jeffrey.good@umontana.edu
HS 308A, 243-5771
Office hours: Fridays 11:00-12:00, or by appointment.

READING: There is no textbook for this course. We will assign various readings from the primary literature and assorted books.

INTRODUCTION – The field of genomics is transforming the study of biology and human health. Several exciting new technological advances are driving this genomics revolution, including the development of new methods of ultra high throughput DNA sequencing. This course will explore the foundations of this exciting field including the cutting-edge methods used to produce genomic data, the powerful computational techniques for their analyses, and the biological insights that can be gained from performing experiments on a genome-wide scale. As genomic data mean very little in isolation, particular emphasis will be placed on comparative genomic techniques, and in the application of evolutionary principles to genomic data.

OVERVIEW & EXPECTED OUTCOMES – This course will be a survey of the conceptual and methodological concepts involved in the study of genomes. Although genomics is a relatively new field, its growth has been explosive, and a complete study of genome biology is impossible in a single semester. We will therefore take an approach that combines traditional lectures with more focused explorations of selected topics from the recent scientific literature. The first half of the class will be focused on the fundamentals of genome biology and will take the traditional form of lectures, selected readings from review articles from the primary literature, and exams. The second half of the class will still have several lectures, but these lectures will be focused on more specific topics taken from current genomic research. The second half of the course will also add significant amounts of readings from the primary literature and in-class discussions. The lectures in the second half of the course will be designed to help you understand the primary literature articles as well as highlight broader themes that arise during the semester. Our overall goals for this course are to help you understand how genomes are studied, how they are structured and evolve, and how the study of genomics has revolutionized biology in the last decade. More specifically, the goals for this course are for you to:

- Understand the basic structural features of genomes
- Understand how genomes evolve
- Understand the basic methodological and computational methods used in genome biology
- Be able to understand and evaluate the primary scientific literature

LECTURES & DISCUSSION GROUPS – Attendance at lectures is an important part of this course, and all students are expected to attend lectures regularly. Points will be included in your grade for attendance and for participating during lecture. In addition to standard lectures, we will frequently have extended group discussions focused on the assigned readings and related homework questions. Most of your participation grade will come from the class meetings when we discuss the week's primary literature paper. In these discussions, different teams of students will explain various parts of that week's reading to the rest of the class. It will be impossible for you to get a decent grade in this class if you do not come prepared to discuss the assigned reading. The take home assignments will deal with both the lecture and primary literature material.

ASSESSMENT

Grades will be based on how many of **600 points** you earn over the course of the semester.

- (1) **Two mid-term exams** (100 points each; 200 points total, 33%)
- (2) **Participation in lecture and discussion groups** (100 points total, 17%)
- (3) **Homework** (150 points total, 25%).
- (4) **Comprehensive final exam** (150 points, 25%). 50% of the Final Exam will focus on material covered in the last half of the course, and the other half of the exam will be comprehensive.

Final grades will be based on your total points as a percentage of the 600 total points possible.

Pluses (+) and minuses (-) will be used (**A, A-, B+, B, B-, C+, C, C-, D+, D, and D-**) in the assignment of letter grades will be determined by the distribution of total scores, following these guidelines:

>90% of points (540): A- or better

>80% of points (480): B- or better

>70% of points (420): C- or better

>60% of points (360): D- or better

These cutoffs may be adjusted downward (in favor of the student).

MISCELLANEOUS INFORMATION

Accommodations to ensure accessibility of students with disabilities will be gladly made, but to qualify you must be registered with Disability Services for Students (DSS). Arrangements for accommodations on exams must be made through DSS.

Late work policy - This class will cover a lot of ground, and will require you to keep up with the assigned reading. If you have a problem understanding the material, or with turning an assignment in on time, we strongly encourage you to speak with us as early as possible. In general **we won't accept late work**, but we are sympathetic and reasonable if you deal with us in an upfront and honest manner and do not wait until the last minute to explain your situation.

Academic misconduct will be reported and handled as described in the University of Montana Student Conduct Code. 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: http://life.umt.edu/vpsa/student_conduct.php

The work you turn in should be your own. You are of course free to discuss any aspect of the course with us or your classmates, including questions on the take-home assignments. You may come to consensus conclusions on the questions as a group, but at the point when you begin formulating your answer on the computer, the work must become completely your own. If we see any evidence of a student copying the work of another we will ask the involved students about the incident; if no obvious explanation exists we will treat the matter extremely harshly. This may include receiving a failing grade for the entire course and filing a report with the Provost & Vice President for Academic Affairs. We don't expect this to be an issue with this course, but we do want you to know that we take plagiarism very seriously. If you are unsure about any of this, we urge you to ask us before turning something in.

Dropping course or changing grading status will strictly follow the University policies and procedures, which are described in the catalog. Please note that dropping the course or changing the grading status (to CR/NCR) is not automatically approved after the 30th day of the semester. These may be requested by petition, but the petition must be accompanied by documentation of extenuating circumstances. Requests to drop the course or change the grading status simply to benefit a student's grade point average will not be approved.