BIOL461 Advanced Genetics

Course Description: This course explores genetics as both a science and toolbox of experimental approaches to study diverse biological processes. The course has two lectures, discussions, and readings of research and review articles. The goals of the course are to familiarize students with 1) genetics as the science of heredity, gene expression, developmental programs, and diseases, 2) the rationale and methodologies used in modern genetic analyses, 3) fundamental topics of genetics, 4) the history of major discoveries in genetics, and 5) relationships of genetics to other areas of the Biological Sciences (e.g. biochemistry, genomics, physiology, developmental biology).

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Prerequisite: Molecular Biology, BIOL367.

Course structure: Each week, the lecture on Wednesday introduces an area of genetics and typically at least one genetic approach. The lecture on Friday explores original research articles in that area through class discussions. One will be an article that revealed the problem using relatively simple approaches. At least one recent article will cover our current understanding of that problem and research approaches used at the forefront of the field. We will discuss research using eukaryotic model organisms: the fruitfly *Drosophila melanogaster*, the nematode *C. elegans*, the yeast *Saccharomyces cerevisiae*, the mouse *Musca domestica*, and the plant *Arabidopsis thaliana*. We will also see how modern techniques are allowing genetic analyses in human cell lines and the potential for curing of hereditary disease by genetic modification.

Office hours: I am available by appointment or immediately following lectures.

Readings: The course website provides links to review and research articles in the scientific literature. No textbook is assigned.

Grading:

1. Midterm Exam = 30%
2. Final Exam: = 40%
3. Class participation = 10%
4. Assignments (2) = 20%

Midterm Exam: TBA

Students are referred to Concordia's description of plagiarism at http://provost.concordia.ca/academicintegrity/plagiarism/

The final exam will cover concepts presented in lectures and readings and is scheduled by the Exams Office.

Class participation will be evaluated throughout the term. Students will be randomly selected to present aspects of the assigned readings, for example. Attendance may be taken and used as a criterion for participation.