BCH 705

Molecular Genetics

Fall 2013 (3 credit hours); Lecture presentations: T, Th. 11AM-12:15 pm; Fleischmann Agriculture 109.

Please note: an electronic version of this document is available on the WebCT web site at: https://webct.unr.edu/webct/.

You are responsible for consulting this site for updates, reading assignments, and scheduling of oral presentations.

Course coordinator:	**David Shintani, Ph.D.** Tel: 775-784-1095, Fax: 775-784-4227, E-mail: shintani@cabnr.unr.edu; office hours: by appointment.

Prerequisites:	BCH 400; two semesters of general biology; Pre- or corequisites BCH 413, 613 or consent of the instructor. It is highly recommended that students have taken an undergraduate Molecular Biology course prior to enrolling in BCH 705.
Course Objectives:	The major goal of this course is to provide you with an overview of molecular genetics in microbial, plant, and animal systems with a special emphasis on methods and applications of molecular cloning and relevant functional genomics methodologies to define the structure, expression, regulation of genes and their function. Specific examples will be drawn from the primary literature.

Student Learning Outcomes:

SLO1: Through written examination, students will demonstrate the ability to design experimental strategies using state-of-the-art methods/approaches to address biological questions.

SLO2: Through written examination, students will demonstrate a working understanding of advanced topics in molecular genetics.

SLO3: Students will demonstrate the ability to critically evaluate the salient points of primary research articles through written summaries.

SLO4: Students will demonstrate the ability to present an oral summary of a research paper and effectively lead a discussion of the paper.

Graded Class Assignments

Class Participation (100 points): You will be required to participate in class discussions. 10% of your grade will reflect the degree to which you participated in class. To facilitate participation you will be required to submit a short summary (one paragraph) that describes the take home message of assigned paper. The summary should be submitted to the course WebCampus site prior to the start of class.

Oral presentation (100 points): You will prepare an oral presentation (15 min.) on a special topic of interest from the list of lecture topics. Presentations should be presented in Powerpoint. Copies of the paper or papers used during your presentation will be distributed in electronic (preferred) or printed form to the class at least two days prior to the class meeting. The presentation should be based on current examples (less than 2 years old) of molecular genetics research projects. *To avoid recycling of old materials, failure to present current information will result in a reduction in grade.*

Abstract of Oral Presentation (100 points): You will prepare a short abstract (no more than 2 pages in length) and literature citation list (unlimited number of pages) to be distributed to each class member and instructor at the start of your presention. The goal of this assignment is to summarize the state-of-the-art in a particular topic area citing and summarizing both seminal historical and modern, cutting edge references that have defined the major advances and breakthroughs in a particular field. This abstract should serve as both a "mini-review" of the topic area and a summary of recent developments with a discussion of the specific paper(s) to be presented in your oral presentation.

Exams (Midterms 200 points each, Final 300 points): There will be two midterms and a final exam associated with this course. The midterm and 2/3s of the final exam will cover approximately 9 lectures worth of material. The remaining 1/3 of the final exam will be comprehensive.

Attendance: You are required to attend lecture/oral presentation/discussion sessions. If you cannot attend due to circumstances beyond your control, the instructor kindly requests the professional courtesy of being notified of your absence.

Style/Mode of Teaching: Lectures, discussion, student presentations, and critiqueing.

Basic Texts:

Lewin's (2000) **Genes X,** 10th edition, Jones and Bartlett Publishers, pp. 930. ISBN 978-0-7637-6632-0. This text has consistently been one of the most comprehensive and up-to-date texts available on molecular biology of prokaryotic and eukaryotic organisms. While no text can remain current with the rapid advances in genomics and functional genomics research, this text provides one of the best overviews of the basic topics of molecular genetics available. Included in purchase is an online Interactive Study Guide (http://biology.jbpub.com/lewin/genesx) designed to explore concepts in more depth and to help you master material in the text.

Primary literature:

Weekly papers and/or current review of the primary literature will be assigned. Be sure to consult the course website for more details.

Course Grading: You will be graded on the quality of your written exams/projects, oral presentations and the quantity of your participation in class discussions. Final grades may be adjusted on a sliding scale to ranges lower than those indicated below (if appropriate). However, students consistently receiving 70% or below on exams are in serious difficulty and should seek help from the instructor.

Points will be distributed as follows:

Assignment:	**Points (max = 1000)**
Participation in class discussions	100
Oral presentation about current topics	100
Written abstract about current topics	100
Exam 1	200
Exam 2	200
Final exam	300
Total	**1000**

The grading scale will be:	**Excellent**	**90-100%**	**A**
	Good (acceptable for graduate work)	**80-89%**	**B**
	Fair (unacceptable for graduate work)	**70-79%**	**C**
	Poor	**60-69%**	**D**
	Failing	**< 60%**	**F**

Academic Dishonesty Policy: Academic dishonesty is against university as well as the system community standards. Academic dishonesty is defined as: cheating, plagiarism or otherwise obtaining grades under false pretenses. Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one's own; or assisting in the act of plagiarism by allowing one's work to be used in this fashion. Cheating is defined as (l) obtaining or providing unauthorized information during an examination through verbal, visual or unauthorized use of books, notes, text and other materials; (2) obtaining or providing information concerning all or part of an examination prior to that examination; (3) taking an examination for another student, or arranging for another person to take an exam in one's place; (4) altering or changing test answers after submittal for grading, grades after grades have been awarded, or other academic records once these are official.

Disciplinary procedures for incidents of academic dishonesty may involve both academic action and administrative action for behavior against the campus regulations for student conduct. The procedures involve the determination by the faculty member pursuing concerns over alleged cheating or plagiarism as to whether administrative action is warranted, in addition to making a determination as to any academic consequence. Academic action may include: (1) cancelling the student's enrollment in the class without a grade; (2) filing a final grade of "F"; (3) awarding a failing mark on the test or paper in question; (4) requiring the student to retake the test or resubmit the paper.

A Note on Plagiarism: Plagiarism (copying all or part of someone else's work and passing it off as your own) is a serious form of academic misconduct and will not be tolerated in this class. The following definitions and possible courses of action are taken from the Academic Standards section of the university catalog:

Academic dishonesty is defined as: cheating, plagiarism or otherwise obtaining grades under false pretenses. Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one's own; or assisting in the act of plagiarism by allowing one's work to be used in this fashion.... Disciplinary procedures for incidents of academic dishonesty may involve both academic action and administrative action for behavior against the campus regulations of student conduct....Academic action may include: (1) canceling the student's enrollment in the class without a grade; (2) filing a final grade of "F"; (3) awarding a failing mark on the test or paper in question; (4) requiring the student to retake the test or resubmit the paper

"The work of another" does not just mean whole papers or articles copied from another source. It includes any information, ideas, sentences, or phrases that came from somewhere other than your own head (i.e. books, articles, internet sites, videos, documents, lecture notes or handouts from other courses, and any other sources used in your paper). These must be properly acknowledged by providing references either in the text or in a footnote, along with a bibliography giving the complete publication information for all sources used in your paper. Even if you paraphrase someone else's ideas and do not quote them directly, you still must acknowledge your source. Citations should also be given for little-known facts and statistics. **Ignorance is not an excuse for plagiarism. If you are not sure whether you need to provide a source for a piece of information or how to cite a source, ask me.**

Tentative Lecture Schedule

Date (Fall 2013)	Topic for Lectures	Speaker & Reading assignments*:
August 27	Orientation;	David Shintani
August 28	Methods in Molecular Biology I: DNA Techniques	David Shintani
September 3	Methods in Molecular Biology II: DNA Techniques (cont.)	David Shintani
September 5	Methods in Molecular Biology III: RNA Techniques	David Shintani
September 10	The Interrupted Gene	Genes X Chapter 4; David Shintani
September 12	The Content of the Genome	Genes X Chapter 5; David Shintani
September 17	Genome Sequences and Gene Numbers	Genes X Chapter 6; David Shintani
September 19	Clusters and Repeats	Genes X Chapter 7; David Shintani
September 24	Genome Evolution	Genes X Chapter 8; David Shintani
September 26	Chromosomes	Genes X Chapter 9; David Shintani
October 1	Chromatin	Genes X Chapter 10; Claus Tittiger
October 3	EXAM I	
October 8	The Replicon	Genes X Chapter 11; David Shintani
October 10	Extrachromosomal Replicons	Genes X Chapter 12; David Shintani
October 15	Bacterial Replication	Genes X Chapter 13; David Shintani
October 17	DNA Replication	Genes X Chapter 14; David Shintani
October 22	Homologous and Site-specific Recombination	Genes X Chapter 15; David Shintani
October 24	DNA Repair Systems	Genes X Chapter 16; David Shintani
October 29	Transposable Elements and Retroviruses	Genes X Chapter 17; David Shintani
October 31	Prokaryotic Transcription	Genes X Chapter 19; David Shintani
November 5	The Operon	Genes X Chapter 26; David Shintani
November 7	Exam 2	
November 12	Eukaryotic Transcription	Genes X Chapter 20; David Shintani
November 14	Eukaryotic Transcriptional Regulation	Genes X Chapter 28; David Shintani
November 19	RNA Splicing and Processing	Genes X Chapter 21; Kate O'Driscoll
November 21	mRNA Stability and Localization	Genes X Chapter 22; Kate O'Driscoll
November 26	Translation	Genes X Chapter 24; Seungil Ro
November 28	**Thanksgiving Holiday**	
December 3	Using the Genetic Code	Genes X Chapter 25; Seungil Ro
December 5	Epigenetic Effects are Inherited	Genes X Chapter 29; Seungil Ro
December 10	Regulatory RNA	Genes X Chapter 30; Seungil Ro
December 12	Final Exam	