Biol 360: Honors Genetics

Fall 2009
Tu/Th 1:00 – 2:15
Haworth 2025

Professor: Dr. Justin Blumenstiel
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Prerequisite: Two semesters of college-level chemistry and BIOL 150 or BIOL 152, membership in the University Honors Program

COURSE GOALS:
Genetics is the study of inheritance and genetic analysis is used to describe how biological systems function. The primary goals of the course are to learn the mechanisms of inheritance and learn how modern researchers use genetic analysis to understand biological systems. Core topics include: Mendelian inheritance, meiosis and recombination, mutation, molecular genetics, population genetics, quantitative genetics and genomics. A broader goal of Honors Genetics is to provide students a framework for understanding recent advances in medical genetics and the modern era of personal genomics.

COURSE OVERVIEW:
Lectures: Tuesday and Thursday, 1:00 to 2:15.
Exams: 3 midterms and 1 final exam.

TEXTBOOK:
Genetics: Analysis of Genes and Genomes, Daniel Hartl and Elizabeth Jones, 7th Edition.

Supplemental Reading: Advanced Genetic Analysis, R. Scott Hawley and Michelle Walker
This is a great book! If so if you are inclined, I recommend purchasing this book from Amazon. It will be a great tool for you if you continue studies in genetics!

SCHEDULE OF TOPICS AND READINGS:

Date			Lecture Topic	Reading
Aug	20	Th	*Introduction* Genes and Genetic Interactions	1.3 - 1.4, 2.5, 3.6
Aug	25	T	Probability and Mendel	3.1 - 3.5, 4.5 - 4.6
Aug	27	Th	Mendel/Pedigree Analysis/Sex Chromosomes	16
Sep	1	T	*Guest Lecture:* Scott Hawley, Stowers Institute Meiosis	4.1 – 4.3
Sep	3	Th	Linkage and Mapping	4.4 – 4.5, 5
Sep	8	T	Genetic Mapping	4.4 – 4.5, 5
Sep	10	Th	DNA as the Genetic Material I	1 and 2

Sep	15	T	**Midterm 1**	
Sep	17	Th	DNA as the Genetic Material II	6 and 14
Sep	22	T	Transcription, Translation and the Structure of the Gene	10
Sep	24	Th	Molecular Mechanisms of Meiosis	-
Sep	29	T	Genome Structure and Chromosome abberations	7 and 8
Oct	1	Th	Phage and Bacterial Genetics	9
Oct	6	T	Regulation of Gene Expression I	11
Oct	8	Th	Regulation of Gene Expression II	11
Oct	13	T	**Midterm 2**	
Oct	15	Th	**Fall Break**	
Oct	20	T	Epigenetics	11
Oct	22	Th	Recombinant DNA	12
Oct	27	T	Methods of Molecular Genetics	12
Oct	29	Th	Genomics	12
Nov	3	T	Genetic Analysis I: Designing a mutant screen	Advan. Gen. Analysis: Chapter 2
Nov	5	Th	Genetic Analysis II: Characterizing the mutants	Advan. Gen. Analysis: Chapter 3, 5.1
Nov	10	T	Genetic Analysis III: Cloning the gene	-
Nov	12	Th	Genetic Analysis IV: A15: A genetics tale	"A germline clone screen for meiotic mutants in *Drosophila melanogaster"*
Nov	17	T	Cell Cycle and Genetics of Cancer	15
Nov	19	Th	**Midterm 3**	
Nov	24	T	Population Genetics: Dynamics in finite and infinite populations	17
Nov	26	Th	**Thanksgiving**	
Dec	1	T	Population Genetics: Demography	17
Dec	3	Th	Evolutionary Genetics	-
Dec	8	T	Quantitative Genetics	18
Dec	10	Th	Genetics of Complex Disease and the Era of Personal Genomics	18
Dec	17	Th	**Final Exam**	

GRADES

Midterm 1	**200 points**
Midterm 2	**200 points**
Midterm 3	**200 points**
Final Exam	**200 points**
Total:	**800 points**

WEBSITE

The Blackboard site will contain class lectures/handouts. They will be uploaded 1 to 2 hours before lecture. Problem sets will also be provided on the website.

In addition, supplemental material (chapters from Advanced Genetic Analysis, Podcasts, Videos) will be provided on the Blackboard site.

EXAMS

Format for exams will be a mixture of fill in the blank, multiple choice and problem solving. Exams are closed book and closed notes. Equations may be provided on the test and I will let you know before hand which ones I will be providing. **No cell phones are to be used during exams**. Anyone caught using one will receive a zero for the exam. Calculators are permitted, but they must not have graphing or other advanced capabilities. Cheap, basic calculators are available at any grocery store.

Review sessions will be scheduled prior to exams, most of these will be in the evening (8 or 9 PM).

GRADING AND MISSED EXAM POLICY

Grades will be based on final number of total points and determined in aggregate at the end of the semester. Statistics such as mean and median score, and standard deviation, will be provided to the class after each exam has been graded.

Final grades are based on all four exams. If special circumstances require you to miss an exam, prior arrangement must be made as soon as possible, and at least a week before the exam. Arrangements will be made for the student to take a make-up examine prior to the class examination, typically one or two days before.

Emergency circumstances (family emergency, medical issues) are the only allowed excuse for missing an exam without prior notification. If emergency circumstances cause you to miss an exam, please notify me at once. Such emergency circumstances must be verifiable. Under these circumstances, a make-up exam will be a administered after the exam.

WORKED PROBLEMS AND PRACTICE PROBLEM SETS

Exams in this class will have a large component dedicated to problem solving and special time will be devoted in class to solving worked problems. While notes for this material will be provided on Blackboard, nothing beats being there while I work through problems. Thus, it will be crucial to attend classes. In addition, problems sets and solutions will be provided for students as a tool for studying for the exams. These problems sets are not mandatory and will not be graded. However, success in this course will depend on working through the practice problems.

DISABILTIES

The staff of Students with Disabilities (SSD), 135 Strong, 864-2620 (v/tty), coordinates accommodation and services for KU courses. If you have a disability and want to request accommodation in KU classes and have not contact them, please do so. Also, please see us privately in regard to this class.

ACADEMIC INTEGRITY

Academic integrity is fundamental to this class and it rests on two principles: First, that your work is represented truthfully as to its source and its accuracy, and second, that your answers and written results are obtained by fair and authorized means. “Academic misconduct” occurs when either of these principles is knowingly violated. Examples of academic misconduct include: copying an exam answer, knowingly providing an exam answer to someone else, or plagiarizing from a book or the internet. Such actions will result in a zero for the work in question, possibly a failing grade for the course, and notification of the University.