FD '02

Course Syllabus for Biology 431-Genetics
Fall 2002
Chaminade University of Honolulu

Meeting time & place: MWF 11:00-11:50 AM Henry Hall 17

Textbook: *Essentials of Genetics, 4th edition* by Klug and Cummings
Additional, supplemental materials from review journals, newspapers, web sites may also be handed out during the course of the semester as required reading unless otherwise noted.

Instructor & Info: Dr. Joan Kuh
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Office Hours: WF 12-2, T 1-2 or by appointment

Course Description:

This course is a survey of genetics at the molecular, organismal and population levels. At each of these levels, the principles that govern transmission of genes,and their exceptions, will be studied. We will also look at how DNA gives rise to *genotype* which, in turn, gives rise to *phenotype* and to what extent this flow of genetic information is affected by spatial and temporal regulation as well as by environmental effects, mutations and *epigenetic* phenomena. Molecular tools that have assisted in the study of genetics will also be discussed.

Course Objectives: The student is expected to demonstrate the following:

1. An understanding of the Mendelian laws of gene transmission for one, two and more traits and the ability to apply these laws to pedigree analysis, determination of unknown genotypes, prediction of cross outcomes, quantitative traits, probability and meiosis.
2. An understanding of the numerous exceptions to Mendelian laws of gene transmission including codominance, epistasis, epigenetics, linkage and be able to describe/predict how these specifically modify Mendelian ratios.
3. Ability to calculate the amount of variation of a phenotype due to genetics and that due to environment.
4. To know how DNA fulfills the requirements of hereditary material, how it is organized into genes/chromosomes/genomes and how it is transmitted from cell to cell, generation to generation.
5. To describe what is meant by gene expression and how mutations affect this process.
6. Measure and/or calculate allele, genotype and phenotype frequencies in populations.
7. An understanding of molecular biological tools and techniques applied to genetic and genome analysis.
8. And inherent in the first eight objectives, mastery of genetic terminology.

Grades: My goal is to assign grades on a 90-80-70-60 percentile scale with 570 as the total number of points possible (see below). If a student falls within 15 points of a grade, class participation in discussions and attendance will be taken into account with respect to giving the student the higher grade. Therefore, attendance will be duly noted at each class meeting.

Homework assignments	(6 @ 20 points each):	120 points
Three midterm exams	(3 @ 100 points each):	300 points
Final exam	(1 @ 150 points):	150 points
Total		570 points

Tentative Schedule of Lectures, BI 431 Fall 2002			
Date	**Topic**	**Reading**	**Lab**
M---Aug 26	*Intro/Business*		I. Getting to know flies
W---Aug 28	*Survey of Genetics*	Ch. 1	
F----Aug 30	*Mendelian Genetics*	Ch. 3	
M---Sep 02	Holiday		II. Mendelian Genetics
W---Sep 04	*Mendelian Genetics continued*		
F----Sep 06	↓↓↓		
M---Sep 09	*Non-Mendelian Ratios*	Ch. 4	III. Probability & Chi Square
W---Sep 11	↓↓↓		
F----Sep 13	*Linkage and recombination rates*	Ch. 8	
M---Sep 16	*More on linkage*		IV. Sex Linkage
W---Sep 18	*Sex determination*	Ch. 5	
F----Sep 20	*Non-Mendelian genetics wrap-up*		
M---Sep 23	*Chromosome Mutations*	Ch. 7	V. Recombination Mapping
W---Sep 25	↓↓↓		
F----Sep 27	**Midterm I**	Ch. 1,3,5, 8	
M---Sep 30	*Quantitative/Polygenic Genetics*	Ch. 6	VI. Cytology
W---Oct 02	↓↓↓		
F----Oct 04	*Population Genetics*	Ch. 22	
M---Oct 07	↓↓↓		VII. Behavioral Genetics
W---Oct 09	*DNA Structure & Analysis*	Ch. 10	
F----Oct 11	↓↓↓		
M---Oct 14	Holiday		VIII. Lab Exam I
W---Oct 16	*DNA Replication*	Ch. 11	
F----Oct 18	↓↓↓		
M---Oct 21	*Applications of DNA replication*	Ch. 16	IX. Cloning DNA
W---Oct 23	*Gene Expression---Transcription*	Ch. 12	
F----Oct 25	↓↓↓		
M---Oct 28	**Midterm II**	Ch. 7, 6, 22, 10, 11	X. DNA Isolation
W---Oct 30	*Gene Expression—Translation*	Ch. 13	
F----Nov 01	↓↓↓		
M---Nov 04	*Recombinant DNA Technology*	Ch. 16	XI. DNA Analysis
W---Nov 06	↓↓↓		
F----Nov 08*	↓↓↓		
M---Nov 11	Holiday		XII. PCR & Population Genetics
W---Nov 13	*Gene Expression—Regulation*	Ch. 15	
F----Nov 15	↓↓↓		
M---Nov 18	↓↓↓		XIII. Differential Gene Expression
W---Nov 20	↓↓↓		
F----Nov 22	*Chromosome Structure*	Ch. 17	
M---Nov 25	**Midterm III**	Ch. 12, 13, 16, 15	NO LAB
W---Nov 27	*Chromosome Structure*		
F----Nov 29	Holiday		
M---Dec 02	*Mutations*	Ch. 14	XIV. Lab Exam II
W---Dec 04	↓↓↓		
F----Dec 06	*Wrap-Up*		
W Dec 11	FINAL EXAM 10:30-12:30		