

MOLECULAR GENETICS H500 HONORS GENERAL GENETICS Autumn 2005

Lecture: MWF 2:30 - 3:48, Room BI 676
Lab: R 9:30 - 12:18 or 1:30 - 4:18, Room BI 332

Instructor:

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Course description and objectives:

During the quarter we will explore the many facets of modern genetics. An over-riding theme of the course is that while genetics is an intrinsically interesting subject on it's own, genetics' real value is as a powerful tool with which to study complex biological processes. We will focus our attention on five major areas of genetics:

1. Transmission genetics of eukaryotes
2. Molecular genetics - recombinant DNA
3. Genomics
4. Regulation of gene expression
5. Quantitative and population genetics

Basic understanding of these various areas of genetics will be developed through readings from the textbook and lectures. We will further extend and develop this basic understanding of genetics in two ways. First, we will explore the genetics principles that we are learning in the classroom through hands on laboratory experimentation. The collection of genetic data, analysis and interpretation of data, and written presentation of experiments and conclusions in lab reports will further enhance our understanding of textbook principles. Second, you will be reading a book during the second half of the quarter that examines the contribution of genetics to important aspects of human life. You will write a brief book review and participate in a class panel discussion of the book.

REQUIRED READING MATERIALS:

"**Concepts of Genetics**", 8th Edition, by W. Klug, M. Cummings and C. Spencer
Pearson Prentice Hall (ISBN #0-13-191833-8)

Student Handbook and Solutions Manual (ISBN #0-13-149008-7)

COURSE EVALUATION:

Examinations:

There will be a midterm and a final exam. The midterm will be worth 70 points. The final exam will be worth 90 points and will include a "comprehensive" component. There will be 8 quizzes over the course of the quarter. They will be worth 20 points each. You will be able to drop your two lowest quiz scores (i.e. only your 6 best quiz scores will count). No make up quizzes will be given. Exams and quizzes may cover material from the textbook, problems, lectures, and from any additional assigned readings.

Note: The final exam **MUST** be taken if one is to receive a grade in the course. University regulations will be adhered to in dealing with absenteeism at final examinations.

Lab Reports:

Lab reports will contribute a potential 95 points to your final grade. You will be turning in 6 lab reports that will range from 10 to 30 points each.

Book Review and Discussion:

You will select a book that discusses important issues in genetics from a list that I will provide. You will write a brief book review and participate in a class panel discussion about the merits of the book. This project will be worth 25 points.

Grades:

Grades will be based on a total of 400 points for the course (160 points from the midterm and final; 120 points from the quizzes; 120 points from lab reports and the book review). The following will serve as a guideline for determining letter grades:

- A range: 90 - 100%
- B range: 80 - 89%
- C range: 70 - 79%
- D range: 60 - 69%

Students are expected to abide by the Code of Student Conduct as outlined in the University Student Handbook.

Problem Sets:

Problem solving is an indispensable part of the process of mastering genetic principles and concepts. The textbook has an extensive set of genetics problems and you are strongly encouraged to attempt to work as many problems as possible. A Student Solutions Manual / Study Guide is available for the text. Additional problems will be provided in class.

DISABILITIES AND SPECIAL NEEDS

If you need an accommodation based on the impact of a disability, you should contact me to arrange an appointment as soon as possible. At the appointment we can discuss the course format, anticipate your needs and explore potential accommodations. I rely on the Office for Disability Services for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously contacted the Office for Disability Services, I encourage you to do so.

LECTURE SCHEDULE AND CHAPTER ASSIGNMENTS

(Please note: Schedule subject to change)

Date	Period	Topic	Chapter
Wed (9/21)	1	Introduction	1
Fri (9/23)	2	Mitosis, Meiosis and the Cell Cycle	2
Mon (9/26)	3	Mendelian Genetics	3
Wed (9/28)	4	Mendelian Genetics	3, 4
Fri (9/30)	5	Mendelian Genetics (QUIZ 1-3)	4
Mon (10/3)	6	Quantitative Genetics	24
Wed (10/5)	7	Chromosome Mapping	5
Fri (10/7)	8	Chromosome Mapping (QUIZ 4, 24)	5
Mon (10/10)	9	DNA Structure	10
Wed (10/12)	10	DNA Analysis and Replication	10, 11
Fri (10/14)	11	DNA Replication (QUIZ 5, 10)	11
Mon (10/17)	12	DNA Organization in Chromosomes	12
Wed (10/19)	13	The Genetic Code (QUIZ 11, 12)	13
Fri (10/21)	14	Transcription and Translation	13, 14
Mon (10/24)	15	MIDTERM (1-5, 10-12, 24)	
Wed (10/26)	16	Translation and Proteins	14
Fri (10/28)	17	Mutation and Repair	15
Mon (10/31)	18	Gene Regulation in Prokaryotes	16
Wed (11/2)	19	Gene Regulation in Prokaryotes (QUIZ 13, 14, 15)	16
Fri (11/4)	20	Eukaryotic Gene Expression	17
Mon (11/7)	21	Recombinant DNA	19
Wed (11/9)	22	Genomics (QUIZ 16, 17)	20
Fri (11/11)		Veterans Day - No Class	
Mon (11/14)	23	Genomics and Applications	20, 22
Wed (11/16)	24	Applications and Ethics of Biotechnology	22
Fri (11/18)	25	Variation in Chromosomes (QUIZ 19, 20, 22)	7, 8
Mon (11/21)	26	Cell Cycle Regulation and Cancer	18
Wed (11/23)			
Fri (11/24)		Thanksgiving Holiday	
Mon (11/29)	27	Population Genetics	25
Wed (12/1)	28	Evolutionary Genetics (QUIZ 7, 8, 18)	26
Fri (12/3)	29	Conservation Genetics	27
Thurs (12/8)	11:30-1:18	Final Exam (Chapters 7, 8, 13-19, 20, 22, 25-27)	