BIO 304 -- Principles of Genetics (Summer 2006, 7/7-8/3)

Lecture: MTWRF 10:20-12:20 PM 116 T.H. Morgan Bldg.

Recitation: TR 12:40-4:00 PM 116 T.H. Morgan Bldg.

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Office Hours: MW 1-3:00 P.M.

Required Text: **Introduction to Genetic Analysis**, 8th edition, by Griffiths, Wessler, Lewontin, Gelbart, Suzuki & Miller, W.H. Freeman Co., NY, 2005 (includes CD and extensive WWW site aides)

Recommended: **Solutions Manual for Introduction to Genetic Analysis**, by W. Fixen & D. Lavett, W.H. Freeman Co., NY 2005

Molecular Biology of the Cell, by Alberts *et al.* or any modern cell biology text.

WWW: http://www.uky.edu/~jrawls/bio304/

Prerequisites: BIO 150-153; BIO 315

Objectives: This course should provide you with the basic knowledge and skills to understand and apply the principles of modern genetics. You should gain an understanding of the important fundamental concepts of genetics as they pertain to Mendelian principles, linkage analysis, the nature of genes, regulation of development, and dynamics of populations. Because of the broad scope of the material in the course, specific areas cannot be covered in detail. Rather, the goal will be to provide you with the necessary tools to approach the solution of genetic problems. By the end of the course, you should be able to make hypotheses about such genetic problems, design experiments to test those hypotheses, and interpret the experimental results. It is expected that this course will be appropriate preparation for advanced coursework in genetics, professional school, graduate school, or other careers in biology. BIO 304 fulfills a requirement in genetics for the Biology major and for certain other majors.

Expectations: *As a core course for Biology majors, BIO 304 is a challenging course and will require strong academic effort.* Many students find genetics to be a particularly difficult subject, in large part because it is a highly inferential subject. Especially in a four-week summer format, where we will be covering about one text chapter each day, students must be prepared to give very strong effort *outside of class* each day. To do well, one must master a basic array of genetics principles, then

diligently practice applying those principles in solving problems. In BIO 304 you will be responsible for materials presented in lecture, in text readings, and in recitation exercises. The text is the framework for this course and will serve as a detailed reference. *It is strongly recommended that you read the assigned chapters before lecture.* The lectures will emphasize the material that is particularly important (and likely to appear on exams). Lectures will also include material that is not specifically covered in the text, but will be on the exams. Finally, because much of genetics is based on problem solving, expect to see problems on the exams. The best models for exam questions are the problem sets in the text, the accompanying CD and the publishers WWW site. If you keep up with the problem sets, and seek help for problems you do not understand, you are likely to do well in the course.

Grading: Grades will be determined by scores on the three examinations (75%; each exam is weighed equally) and by scores from recitation (25%). The third exam will not be a comprehensive final, but a regular exam. Both the second and third exams will expect use of basic tools and information covered earlier in the course. The following traditional letter grade system will be used:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
E = <60

Absolute grades may be scaled up depending on the overall distribution of scores, but in no case will grades be lower than this scale.

Makeups for exams or other graded assignments will be allowed only in cases of excused absences (see University Bulletin for definitions). Makeup exams will be scheduled as needed. You will be excused from a graded recitation assignment only if you have a permissible excuse, and you must contact the instructor regarding making up work done in that meeting.

Recitation: Recitation is intended to reinforce the material covered in lecture and the text, and provide an opportunity for students to ask questions about the assigned problems. Each lecture, a set of problems from the text will be assigned and due at the next recitation meeting. While the solutions to these problems are in the **Solutions Manual**, it is to your benefit to try to work them out on your own. *Plagiarized answers are unacceptable.* Some recitation meetings will also include exercises designed to give you more "hands on" and interactive experience. Graded assignments may accompany those exercises. Your recitation grade will be based on the scores you receive on the problem sets.

Schedule

			Text pages
July	7	Patterns of Inheritance	27-72
	10	Chromosomal Basis of Inheritance	73-114
	11 (R)	Eukaryotic Chromosome Recombination Mapping	115-150
	12	Genetics of Bacteria and Their Viruses	151-184
	13 (R)	From Gene to Phenotype	185-226
	14	***EXAMINATION I***	***1-184***
	17	DNA: Structure and Replication	227-254
	18 (R)	RNA: Transcription and Processing	255-272
	19	Proteins and Their Synthesis	273-300
	20 (R)	Regulation of Gene Transcription	301-340
	21	Gene Isolation and Manipulation	341-388
	24	Genomics	389-422
	25 (R)	Transposable Elements	423-450
	26	***EXAMINATION II***	***185-422***
	27 (R)	Mutation, Repair and Recombination	451-480
	28	Large-scale Chromosomal Changes	481-520
	31	Dissection of Gene Function Normal and Cancer Cells	521-544 558-574
August	1 (R)	Genetic Basis of Development	575-511
	2	Population Genetics Evolutionary Genetics	611-642 679-706
	3	***EXAMINATION III***	***423-706***

On ***Examination*** days, one hour will be devoted to the exam and the remainder of the class meeting will be devoted to lecture.

(R) Denotes recitation days.