Biology 313, Spring 2015

Principles of Genetics

Required textbook: Genetics: A Conceptual Approach, 5th edition by Benjamin A. Pierce.

Prerequisites: BIOL 211, BIOL 212

Clickers: Clickers are required. Register your clicker device using the "Clicker Registration" link on the course Blackboard site.

Web Resources: Lecture notes, sample problems and answers, exam and quiz answers, and additional resources, will be posted on Blackboard.

Attendance Policy: Attending lecture is beneficial to the learning process for many students. Information provided during lectures will be emphasized on exams, and in-class quizzes are included in the grading calculation. That being said, attendance is not recorded.

Course Outcomes: Through completion of this course students should obtain a working knowledge of the concepts and applications of genetics, as well as some appreciation for the history of this central discipline in the biological sciences. Genetics is increasingly at the center of where biology touches society. This course builds on information taught in BIOL 211 and BIOL 212. The course will also provide a foundation for upper division genetics, molecular and cellular biology, and biochemistry courses.

Reading Assignments, Homework Problems, and Quizzes: Genetics is an experimental, problem-solving science, and usually the best way to become a proficient problem solver is through practice. Students are encouraged to answer as many as possible of the in-chapter problems in the textbook and the end-of-chapter problems. During lecture problems of particular emphasis will be pointed out. Problem study is optional and should be used as a learning tool if that suits anyone's particular learning style. There are no assigned problem sets or graded homework assignments.
Another available learning tool is provided by sample multiple choice problems for each chapter, of the type that can be found on the exams, and also the exams themselves from the spring 2014 term. Again there are no specific, graded assignments from these problem sets.
Successfully learning the principles of genetics requires significant study time, and as such students should devote two hours of study for each class period (or more, of course). Reading in advance for one hour, and a subsequent hour of study after each lecture to integrate the reading and class discussion points, is recommended. The two hour time commitment should include study of the textbook problems, sample exam problems, and previous exams. In-class quizzes based on the assigned readings will be given periodically. **To be prepared for these quizzes students must read the textbook material before lecture!!!**

Exams, Quizzes and Grades: Grades will be calculated from a total of **350 points** earned from in-class quizzes and activities scored using clickers (**100 points**) and from exams (**250 points**). Six exams will be given, including the comprehensive final exam, each worth 50 points. All six exams will consist of 25 multiple choice or matching questions. *Of the six exam scores, the lowest will be dropped*, so that 250 points are possible from exams. Four exams will be given during the semester. The final examination period at the end of the term will include two exams, one covering the last section of the course and the other a comprehensive exam that covers the entire semester.
No make-up exams will be given. If an exam is missed for any reason, then that score will be the one that is not included in the final grade.
Exams will be taken on-line at the Engineering-LAS Online Learning Center (ELO) testing facilities located in 60 Carver Hall or 2552 Gilman Hall. During the term each hour exam will be available over an announced three-day period. The last two exams can be taken any time during finals week. For each exam during the semester one scheduled class will used as an optional review session.
In-class quizzes will be given on unannounced dates throughout the semester. A total of 50 quiz questions worth 2 points each for a correct answer will be included on these quizzes. Incorrect answers will be awarded 1 point, and 0 points are given if the question is not answered. In addition to the quizzes, *extra credit* clicker

responses will be collected during lectures with 1 click awarded for a correct answer, 0.5 clicks for an incorrect answer, and 0 clicks for no response. Total clicks collected from clicker questions will be normalized to *30 possible total extra credit points*.

Grading Scale: A = 350 - 315, B = 314 - 280, C = 279 - 245, D = 244 - 210, F = below 209 points. Final grades are **not** determined from a curve of the class grades. Students compete against themselves, not the other students in the class. No extra credit assignments will be offered other than the in-class clicker responses.

Lecture etiquette: Students attending lectures are expected to be quiet and courteous to their fellows. Using smart phones, talking, reading newspapers, etc., during lecture is both distracting and discourteous, and so is strongly frowned upon.

Disability policy: Students with a documented disability who anticipate needing accommodations in this course should discuss this issue with one of the instructors as soon as possible. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) form from the Disability Resources (DR) office (515-294- 7220). DR is located on the main floor of the Students Services Building, Room 1076.

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Lecture Topics and Exam Schedule

Lecture	Date	Topic	Chapter	Instructor
1	M Jan 12	Course overview and introduction	1	AM
2	W Jan 14	DNA structure	10	AM
3	F Jan 16	Chromosome structure	11	AM
4	W Jan 21	DNA replication	12	AM
5	F Jan 23	DNA replication	12	AM
6	M Jan 26	RNA transcription	13	AM
7	W Jan 28	RNA transcription	13	AM
8	F Jan 30	RNA processing	14	AM
	M Feb 2	Optional in-class review		
	M - W, Feb 2 - 4, Hour Exam #1, Chapters 1, 10 - 14			
9	W Feb 4	Genetic code	15	AM
10	F Feb 6	Translation	15	AM
11	M Feb 9	Meiosis and mitosis	2	EV
12	W Feb 11	Meiosis and mitosis	2	EV
13	F Feb 13	Mendelian principles of inheritance	3	EV
14	M Feb 16	Mendelian principles of inheritance	3	EV
15	W Feb 18	Sex determination and sex linkage	4	EV
16	F Feb 20	Sex determination and sex linkage	4	EV
	M Feb 23	Optional in-class review		
	M - W, Feb 23 - 25, Hour Exam #2, Chapters 2 - 4, 15			
17	W Feb 25	Extensions and modifications of Mendelian principles	5	EV
18	F Feb 27	Extensions and modifications of Mendelian principles	5	EV
19	M Mar 2	Pedigree analysis	6	EV
20	W Mar 4	Genetic testing	6	EV
21	F Mar 6	Linkage and genetic mapping in eukaryotes	7	AM
22	M Mar 9	Linkage and genetic mapping in eukaryotes	7	AM
23	W Mar 11	Linkage and genetic mapping in eukaryotes	7	AM
	W - F, Mar 11 - 13, Hour Exam #3, Chapters 5 - 7			
	F Mar 13	Optional in-class review		
24	M Mar 23	Chromosomal variations	8	AM
25	W Mar 25	Genetics of bacteria and viruses	9	AM
26	F Mar 27	Genetics of bacteria and viruses	9	AM
27	M Mar 30	Regulation of gene expression in prokaryotes	16	AM

28	W Apr 1	Regulation of gene expression in prokaryotes	16	AM
29	F Apr 3	Regulation of gene expression in eukaryotes	17	AM
30	M Apr 6	Regulation of gene expression in eukaryotes	17	AM
31	W Apr 8	DNA mutation and repair	18	EV
	F Apr 10	Optional in-class review		
	F - T, Apr 10 - 14, Hour Exam #4, Chapters 8, 9, 16 - 18			
32	M Apr 13	Molecular genetic technology	19	EV
33	W Apr 15	Molecular genetic technology	19	EV
34	F Apr 17	Whole-genome technologies	20	EV
35	M Apr 20	Whole-genome technologies	20	EV
36	W Apr 22	Quantitative genetics	24	EV
37	F Apr 24	Quantitative genetics	24	EV
38	M Apr 27	Population genetics	25	EV
39	W Apr 29	Population genetics	25	EV
40	F May 1	Evolutionary genetics	26	EV
M May 4 - F May 8		**Hour Exam #5, Chapters 19 - 20, 24 - 26**		
M May 4 - F May 8		**Final Exam, Cumulative**		