Genetics Bio 3070
Spring/Summer 2021
Instructor: Dr. E. M. Golenberg-3123 Bio. Sci. Bldg.
Class Hours: T, Th 10:30-12:00 Canvas Conference
Discussion Section as Selected
Office Hours: T,Th 12:00-1:00 (T open review sessions)
Text: William S. Klug. Michael R. Cummings, Charlotte Spencer, Michael Palladino, Darrell Killian.
Concepts of Genetics, 12th Edition

Web Site: Use Canvas

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Course description and objectives

This course deals with the transmission and expression of genetic information. Upon successful completion of this course a student will be able to:

- Use the principles of chromosome transmission to predict patterns of inheritance
- Evaluate scientific data using the rules of probability
- Understand how the structure of DNA enables it to function as genetic material
- Explain the relationship between genotype and phenotype
- Understand the molecular basis of mutation, and its role in genetic variation
- Explain how the genetic code enables protein synthesis directed by genetic information
- Understand how genomes are replicated, repaired, organized and packaged
- Describe the modes of gene regulation in prokaryotes and eukaryotes
- Extract genetic information from public databases

Course Prerequisites

Students are required to have completed Bio 2200 (Microbiology) and Bio 2600 (Cell Biology) with a C- or better in both.

Tentative Lecture Schedule

Week	Date	Topic	Chapters
1	T, May 11 Th, May 13	Introduction, Cell Division and Chromosomes	1 and 2
		Chromosomes, Meiosis, Mendelian Genetics	2, 3

2	T, May 18 Th, May 20	Mendelian Genetics	3
		Dihybrid Crosses, Probabilities	3
		Hypothesis testing, Pedigree Analysis, Allelic Affects	3, 4
	Sunday, May 23	Last day to drop with tuition reembursement	
3	T, May 25	Pedigree Analysis, Allelic Affects	4
		Epistasis, Complementation, Genetic Networks and Interactions. Chromosomal Theory of Inheritance	4, 5
	Th, May 27	**Exam 1**	
4	T, June 1 Th, June 3	Chromosomal Theory of Inheritance	4, 5
		Sex Linkage, Crossing Over, Chromosomal Mapping,m Three Point Mapping	5
5	T, June 8 Th, June 10	Mapping functions, Mitotic Crossing Over,	5
		Tetrad Analysis, Synteny Analysis	5, Additional Material on Tetrad Analysis posted on Blackboard
		Genetic Analysis and Mapping in Bacteria and Phages	6.1-6.6
6	T, June 15	Bacterial Mapping	6.1-6.6
	Th. June 17	**Exam 2**	

7	T, June 22 Th. June 24	Polyploidy, Polysomy, Chromosomal aberrations	7, 8
		Deletions, Duplications, Inversions, Translocations	8
		DNA as material of heredity	10
8	T, June 29 Th, July 1	DNA Structure, Measurement and experimental manipulation of DNA	10
		DNA Replication, Telomere replication	11
		Replication, Recombination model, Gene Conversion	11
9	T, July 6	Genome packaging in viruses, prokaryotes, eukaryotes	12
		Setting the Problem. What is a gene in the DNA genome? Transcription	21.1-3, 13
	T, July 8	**Exam 3**	
10	T, July 13 Th, July 15	Genetic Code, Second Genetic Code	13
		Second Genetic Code, Translation	13, 14, 21.3
		Translation Mutation and Repair	14, 21.3 15
	Sunday, July 18	Last day to drop	
11	T, July 20 Th, July 22	Mutation and Repair	15

		Prokaryotic Gene Regulation	16
12	T, July 27	Eukaryotic Gene Regulation	17, 18, 19
	Th, July 29	**Exam 4**	
	Th, August 5	**Cumulative Final Exam**	

** Optional topics. We will determine how much time we have after we have completed Eukaryotic Gene Regulation.

Lecture topics: The above schedule is tentative in the sense that we may take more or less time on a given topic depending on how well students who attend the lecture appear to understand. This will primarily affect the final part of the schedule as not all topics may be covered. Alternatively, if we do have time, the class may determine which additional topics will be covered. (See above **.) **If we do not cover a given portion of the material before an exam, you will not be tested on that material even if it is written that way on the syllabus.**

N.B. The lectures will be given live at the scheduled times through Zoom on Canvas. Lectures will not be recorded. Unauthorized recording of the lectures is not permitted and is considered theft of intellectual property. Evidence of recording lectures or distributing recordings without permission will result in a report to the Dean of Students and potential legal action.

Tests: Genetics, perhaps more than any other course in biology, is based on conceptual problem solving. To be sure, you must know facts to solve the problems, but the emphasis must be on the process of understanding rather than on the facts alone. As such, the tests are designed to assess your problem solving ability. All exams, except for the cumulative final, will have questions that require problem solving or short written paragraphs. This will be different from what you have experienced in other classes. You must prepare yourself by working the problems at the end of each chapter. The test questions will be similar in style to such problems. Additionally, we have posted some old tests on the web page for your use. Please come prepared for the examinations. All tests will be given through Canvas. You should prepare yourself with scratch paper, pens, pencils, and calcalculators to solve the problems before typing the answers into the exam form online.

You may not use a cell phone or smart watch in any capacity during an exam. You may not use external sources such as books, internet, or people.

The final exam will be multiple choice. The questions will still be on the level of problem solving or conceptual synthesis. The final will be cumulative in that all of the material studied during the semester may be covered

Exams will be given during scheduled class times on exam days. You are expected to start the exam at the beginning of class and finish it within the class time. Exams will not be rescheduled for individual students who request a change in time due to personal or professional conflicts or any unforeseen reason, the single exception being a university-recognized religious conflict or a university varsity team event in which the student is actively participating (is on the varsity team). These conflicts must be brought in writing by the end of the second week of classes.

You may not drop any midterm exam. However, the score of your lowest exam (including missed exams) will be replaced by **the average of all four original midterm exams scores**. You may not drop the final.

Regrading: Errors do occur in grading exams. If you feel that such an error has occurred on your exam, please bring it in (send it by email) for regrading. On an accompanying piece of paper (file), write which question you wish to be regraded and explain explicitly why you believe it is misgraded. However, we will only regrade exams up to two weeks from the time that we return them to the class.

Grading: You will have four intermediate examinations during the semester, each covering the material from the lectures preceding the exam. Each exam will have a possible 150 points. The final examination will deal with all of the material covered in the course. It will have a maximum score of 200 points. The grades on each exam will be standardized against the second highest grade in the class. All scores will be adjusted by adding the number of points necessary for the second highest class score to equal 150 (or 200 for the final). For example, if the second highest score is 133, then all scores will be adjusted by adding 17 points to the raw score. If two people tie for the top score on any exam, that score will be used to standardize the class grades. Thus students will have a total possible score of 800 points from the exams.

You must understand that working out the problems at the end of each chapter is one of the best ways of learning the material and preparing yourself for examinations. We encourage you to work or study together in groups, as explaining material to other people clarifies the concepts in your own mind. Finally, make the most of the discussion sections with your TAs.

Discussion/Quiz Sections: Attendance at the quiz/discussion sections is mandatory. You must have your camera on during discussion section times. You will be assigned homework problems that are recommended to help you learn the material and to prepare you for the exams. During the discussion period, you will have time to ask your TA questions about the material. There will be weekly quizzes given to you during the

discussion section period. They will be worth 15 points each. You may earn up to 150 points total from your discussion section.

Behavior that is not conducive to learning or is distracting to other students, such as (but not limited to) disruptive behavior, cell phone conversations, etc., may result in the deduction of points at the descretion of the TA. Cheating including cooperative quiz taking will result in a zero for the quiz. A second incident of cheating will result in a zero for your quiz section grade.

The total point distribution is as follows:

Component Possible Points
Lecture Exams 4 X 150 = 600
Final Exam 200
Discussion/Quiz Grades 150
Total Course Grade 950

The final letter grade will be determined by a straight scale as follows:

Total Points Final Grade
92%- 100% A
90%- <92% A-
88%- <90% B+
82%- <88% B
80%- <82% B-
78%- <80% C+
72%- <78% C
70%- <72% C-
68%- <70% D+
62%- <68% D
60%- <62% D-
<60% F.

Withdrawal Policy You may withdraw from the class and receive your tuition back through May 23. Following May 23, you may withdraw with signature through Academica and receive a grade of WF or WP (withdrawal failing, withdrawal passing) following the Registrar's guidelines. Your grade (WP or WF) will be determined by your test grade or grades at the time. The discussion section grade up until that time will not be used to calculate your standing grade. Note that if you did not take an exam that was given up until the time of withdrawal, your score for that exam is 0. The WP grade will be given for grades of 60% and higher. The WF grade will be given for grades of less than 60%.

Students with disabilities: If you have a physical or mental impairment that may interfere with your ability to successfully complete the requirements for this course, you are invited to contact Educational Accessibility Services (577-1851) to discuss appropriate accommodations on a confidential basis.

CHEATING POLICY: A student found to be cheating during an exam or quiz will be reported to the Dean of Students. Minimally, a non-replaceable grade of zero (not replaced by the average of four exams will be assigned. Evidence of egregious cheating will result in a grade of F and possible further actions through the Dean of Students Office.

ADD/DROP/INCOMPLETE POLICY: **Add** forms will not be signed after the second week of class. Please note that "**incomplete**" grades will not be issued to students in poor standing who are seeking an alternative to a late drop. See above for new withdrawal policy.

N.B. Some material or emphases will be given in lecture that are not in your book. You will be responsible for this material in addition to the material in your book. Also, please note that we will be happy to help students understand the material that they are having trouble with during office hours. However, we do not view office hours as a substitute for lectures.