BIOL 3350 GENETICS SPRING 2017

Professor:	Dr. Jennifer Cooper	Office: N256
Office hours:	M 11am-1pm	Email: jcooper3@csustan.edu
	Th 2pm-3pm	Write BIOL 3350 in the subject line of all emails

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COURSE PREREQUISITES

C- or above in all of the following courses: BIOL 1050, BIOL 1150, CHEM 1100, CHEM 1110, or transferred equivalents.

COURSE DESCRIPTION

Introductory Genetics is a required course for all biology majors. This is an upper-division science course and it is expected that you have a strong grasp of the material covered in the pre-requisite courses. In this course we explore the three branches of genetics: Mendelian genetics (also called classical or inheritance genetics), Molecular genetics (DNA replication, transcription and translation), and molecular biotechnology (molecular markers, gene cloning, DNA fingerprinting).

There is a substantial amount of information to be mastered in this course. To do well, one must devote the necessary time and effort. Experience indicates that to be successful, a minimum of 15 hours of effort is needed outside of class. **If you are not prepared to dedicate the time and effort needed for this course, you should reconsider your enrollment.**

REQUIRED TEXTS/MATERIALS

- *Concepts of Genetics.* Klug, et al. 11th edition. Pearson, ISBN 9780133887143
  You are allowed to purchase the loose leaf rather than a hardbound text.
- Mastering Genetics access (bundled with text at bookstore…otherwise purchase access online)
- Use of laptops to take notes is forbidden; take notes by hand.

CENSUS DATE

Students must attend the first three class sessions or they will be dropped from the course.

This course can only be taken for a letter grade. Students can drop the course prior to the census date of February 22. After this date, a student cannot withdraw from the course without an appeals process documenting extraordinary circumstances.

PERSONAL INTEGRITY AND CLASSROOM BEHAVIOR

It is assumed that you have read and understood the university's position on academic integrity and student discipline. **Cheating and plagiarism will be dealt with as severely as university and state regulations allow.** This includes receiving an F in the course, and being reported to University Judicial Affairs.

Do not text in my class. It is rude. Believe it or not, I can see you.

GRADING

Grades are determined by the points you earn during the course. Your grade will be determined by your combined performance in lecture and lab. I reserve the right to use +/- grades, rather than whole letter grades. A total of 1000 points are available. It is expected that students will keep track of their scores (including copies of all graded materials) for the duration of the term.

Exam 1	175 points
Exam 2	225 points
Cumulative Final Exam	300 points
In-class writing assignments (3, 40 points each)	120 points
Mastering Genetics online homework	180 points

IN CLASS EXAMS
The lecture exams will be given in a multiple choice format. The final exam is cumulative. I do not recycle exam questions.

Students who arrive after the first exam of the day has been turned in will not be allowed to take the exam. If you must leave the room for personal reasons, you will not be allowed to finish the in-class exam. Your partially finished exam will be graded as it stands. If you miss an exam for any reason, you must take an alternate exam **before** the in-class exam is scheduled to take place. If you miss an exam unexpectedly, and do not have documentation of a legitimate reason for doing so, you will not be allowed to take the alternate exam, and you will receive a 0 grade for the missed exam.

Exam answers will be recorded on Scantron 882-E forms. Erase thoroughly…**if the machine reads your erased answer as incorrect, the automatic score is the grade I record**.

ESSAY QUIZZES
I provide a selection of 2-3 question prompts. You will choose one, and respond by writing a short essay. Questions will be based on material from the previous 3 lectures. You will have 15 minutes to write your essay.

MASTERING GENETICS
There will be multiple online homework assignments due each week. Students who register after the first homework assignments are due may **not** make up those missed assignments.
Assignments are usually posted several days in advance, and you are responsible for checking the site for new assignments. Assignments usually take 3-4 hours to finish, but each answer is submitted individually so you can do assignments in chunks. Start assignments as early as possible, because a computer or website malfunction that prevents you from finishing an assignment by the deadline will result in a zero grade for the unfinished portion.
If you experience technical difficulties while submitting an answer to a particular homework question, click the "Contact Publisher" link above the question within the assignment.

To register for Mastering Genetics visit the website http://www.masteringgenetics.com/

Click the "STUDENTS" button under the register option. You will be asked for a student access code. This is a printed code supplied inside the Mastering Genetics Student Access Kit, which was included with the purchase of your new textbook. If you bought your textbook used, then there is an option for you to purchase an access code online during the registration process, typically cheaper than the campus bookstore (note: you do NOT need to buy access to Virtual Labs).

In Mastering Genetics, the name of this course is CSUSTAN BIOL 3350 SPRING 2017 Cooper. To register for this course, enter the code MGENCOOPER64554.

COURSE OBJECTIVES
Students who successfully complete this course will:

- Examine the scientific method as it relates to evaluating evidence and drawing logical conclusions.
- Examine fundamental genetic principles and the structural levels of genetic organization and evolution.
- Investigate the chemical basis of life with emphasis on structure and function of nucleic acids.
- Understand the cell cycle and how it relates to mitosis and meiosis, Mendelian transmission genetics and extensions of the basic Mendelian model.
- Investigate chromosome mapping in prokaryotes and eukaryotes.
- Describe the process of DNA replication, transcription and translation, and the various levels of mutation (chromosomal, nucleic acid, epigenetic).
- Understand gene expression in eukaryotes, especially during development and in oncogenesis.
- Explore the many fields of and methodologies of biotechnology, including gene cloning, DNA fingerprinting, stem cell research, genomics and bioinformatics, and genetic engineering.
- Explore the genetic foundations of behavior, population structure and evolution.

STUDY RECIPE (FOR STUDYING ALONE)

This course has a reputation for being challenging, because some students are new to university-level biology. Students often complain that they study "all the time" but that their hard work doesn't pay off in good grades. This is often because their study strategy simply needs tweaking. I have developed the perfect recipe for studying, based on our current understanding of the neurophysiology of learning and long-term memory formation. Using the recipe I provide below, you will maximize the benefit gained from each single minute of study time. If you also study the number of hours I recommend (15 hours outside of class [20 in summer semester]) then you will enhance your chances of earning the grade you want.

For each day's lecture notes, you should do 4 "drive-bys" of the information. Your study environment should be isolated from external noise and distraction (no TV, no music, no kids, no throwing the ball for your dog).

1. **Take detailed notes in lecture.** Don't try to write every single word on the slide; instead, **listen to what I am saying** and write abbreviated summaries and main ideas based on what comes out of my mouth.

2. **DRIVE-BY 1 (LEARNING)**: This study session is for **learning and understanding** the material I introduced in lecture.
   - This study session should be accomplished the same day as the lecture (ie. don't have a sleeping period in between the lecture and the study session).
   - It should last a minimum of 1 hour, but will probably take 2-3 hours.
   - In the first 15 minutes, read through the notes and remind yourself of the general topic.
   - The remaining time should be spent in carefully reviewing each slide in turn, with your textbook open to the pages covering that material.
   - Read about every concept or process in the notes, and then read about it in the textbook. **Use your own words to describe concepts and processes.** When you do this, you are stimulating the language centers in the brain, which seem to be evolutionarily linked to learning in humans.
   - Think about the examples provided, and see if you can think of other examples.
   - Try to draw relevant images or flowcharts of processes.
   - Don't stop until you have completed processing every slide of that day's lecture notes.

3. **DRIVE-BY 2 (CONSOLIDATION)**: This study session is for **consolidating your understanding** of the lecture material, and forming a clear connection in your mind between concepts, processes, and structures.
   - This study session should be accomplished the day following the lecture.
   - It should last a minimum of 1 hour. You will not use your textbook for this session, except to clarify your understanding of a particular fact.
   - In the first 15 minutes, review the notes and remind yourself of what you learned the day before.
   - Return to the first topic, cover the notes with a sheet of paper, and write down what you can remember (definitions, concepts, drawings). **You must use your own words to describe concepts and processes**, writing as much as you can possibly squeeze out of your memory. Don't cheat by glancing at the notes! This process is called **"active challenging"** and it quite literally builds a neural and biochemical pathway in your brain. We use this process when we form long-term memories. The action of writing and drawing (<u>not</u> typing) seems to amplify the effect.
   - Uncover your notes and compare them with your memory work. Use a colored highlighter to highlight any mistakes or misunderstandings. Then move on to the next topic.
   - Don't stop until you have actively challenged yourself on every topic of that day's lecture notes.

4. **DRIVE-BY 3 (LONG-TERM MEMORY FORMATION)**: This study session is for **building the long-term memory** of the lecture material.
   - This study session should be accomplished the day following drive-by 2. Repeat every step described for drive-by 2. **For each concept, craft a new description using your language skills…you are not trying to memorize phrases!** Pay careful attention to the mistakes highlighted in that study session. Highlight new mistakes with a different color.

5. **DRIVE-BY 4 (LONG-TERM MEMORY RETRIEVAL)**: This study session is for **reinforcing the long-term memory** of the lecture material. **LONG-TERM MEMORY RETRIEVAL IS THE ACTION PERFORMED DURING EXAMS.**

Note: I may occasionally lag behind in lecture, and the Mastering Genetics homework may be due for a chapter that I haven't begun to discuss. Whether you do the homework before or after I lecture about it, the process will reinforce your understanding.

Week of	Lecture topic	In-class activity
Jan 23	Introduction	
Feb 6	Mitosis and Meiosis	
Feb 13	Ch. 3 Mendelian Genetics	
Feb 20	Ch 4 Extensions of Mendelian Genetics	**EXAM 1 Monday Feb 20** ***CENSUS DATE Feb 22***
Feb 27	Ch 5 Chromosome Mapping	
Mar 6	Ch 7 Sex Determination and Sex Chromosomes Ch 8 Chromosome Mutations	Essay Quiz 1 Monday Mar 13
Mar 13	Ch 9 Extra-nuclear Inheritance Ch 10 DNA Structure	
Mar 20	**SPRING BREAK**	
Mar 27	Ch 11 DNA Replication and Recombination	
Apr 3	Ch 12 DNA Organization into Chromosomes Ch 13 The Genetic Code and Transcription	Essay Quiz 2 Monday Apr 3
Apr 10	Ch 14 Translation and Proteins	
Apr 17	Ch 15 Mutation, DNA Repair and Transposition	**EXAM 2 Monday Apr 17**
Apr 24	Ch 16 – 17 Gene Regulation	
May 1	Ch 18 Developmental Genetics Ch 19 Cancer and Cell Cycle Regulation	
May 8	Ch 20 – 22 Recombinant DNA Tech and Biotech	Essay Quiz 3 Monday May 8
May 15	Ch 25 Population and Evolutionary Genetics	
May 19	**FINAL EXAM 8:30 a.m.-10:30 a.m.**	