

BICD 100 Genetics
Winter 2020
B00

Professor: Emily Troemel
Lectures: Tuesday and Thursday 8 am – 9:20 am
Location: Peterson 110
Textbook: *Essentials of Genetics* by Klug, Cummings, Spencer, Palladino. Tenth Edition,

Goals: Genetics is central to modern biology. Genes provide the basis of inheritance for all life forms, from bacteria to humans. Genetic variation influences human biology and disease. We will explore how genes were discovered, how they are studied, and how they are used to analyze and manipulate biological function. We will use quantitative approaches to solving problems in classical and population genetics. We will also discuss more modern genetic approaches.

Prerequisites. BILD1 is required; review the relevant parts of BILD1 if necessary.

Lecture schedule (tentative and subject to change)

Readings = Chapters from Klug et al, *Essentials in Genetics*

#, Date	Topic	Reading
1: Tues, 1/7	Background on DNA/RNA/protein, Eukaryotic/prokaryotic, Intro to Mendel: monohybrid cross	Chapter 1, 3 (p31-36)
2: Thurs, 1/9	Mitosis and Meiosis, dihybrid cross <i>Assignment #1 uploaded to website</i>	Chapter 2, 3 (p36-43)
3: Tues, 1/14	Trihybrid crosses, pedigrees, probabilities	Chapter 3 (p43-49)
4: Thurs, 1/16	Chi-square, modifications of Mendelian ratios, e.g. epistasis; <i>Assignment #2 uploaded to website</i>	Chapter 4 (p53-66)
5: Tues, 1/21	Complementation tests, X-linked traits, maternal effect, mitochondrial mutations	Chapter 4 (p66-76)
6: Thurs, 1/23	Sex determination, sex chromosomes, sex-limited traits, dosage compensation; <i>Assignment #3 uploaded to website</i>	Chapter 5
7: Tues, 1/28	Chromosomes: variations in number and arrangement	Chapter 6
8: Thurs, 1/30	Gene mapping: recombination and linkage, 3-point crosses <i>Assignment #4 uploaded to website</i>	Chapter 7 (p121-135)
9: Tues, 2/4	More gene mapping, and review for midterm	Chapter 7 (p121-135)
THURS 2/6	MIDTERM	
10: Tues, 2/11	Bacterial genetics and gene transfer: conjugation, transformation	Chapter 8 (p144-154)
11: Thurs, 2/13	Antibiotic resistance, Bacteriophage genetics, gene transfer by transduction <i>Assignment #5 uploaded to website</i>	Chapter 8 (p154-159)
12: Tues, 2/18	DNA structure, base composition rules, DNA marker mapping	Chapter 9
13: Thurs, 2/20	The genetic code, DNA mutations, DNA damage and repair <i>Assignment #6 uploaded to website</i>	Chapter 10,12 (review) Chapter 14 (p261-277)
14: Tues, 2/25	Regulation of gene expression, lac operon, RNA interference	Chapter 15
15: Thurs, 2/27	Cancer genetics: cell cycle, oncogenes and tumor suppressors <i>Assignment #7 uploaded to website</i>	Chapter 19
16: Tues, 3/3	Recombinant DNA, Genomics, Genome Editing <i>Guest lecturer Evan Boyle, PhD</i>	Chapter 17,18 (skim)
17: Thurs, 3/5	Forward and reverse genetic analysis <i>Assignment #8 uploaded to website</i>	
18: Tues, 3/10	Quantitative traits, heritability estimates, twin studies, QTLs	Chapter 20
19: Thurs, 3/12	Genetics of Immunity (Troemel lab research) <i>Assignment #9 uploaded to website</i>	

FINAL EXAM: Thursday, March 19, 8am-11am, Peterson 110

Professor Office hours: Emily Troemel, 4202 Bonner Hall, Tuesdays 10-11 am.

Contact: Your instructional assistants (IAs) and fellow students are your best resource for information and you should first attempt to answer your questions through them. Use the discussion board on Canvas or email your IAs. This is important! The IAs are excellent at answering questions, and in fact, are usually better than most professors at providing a response that will help you learn. Because of the class size, it is difficult for Dr. Troemel to respond to emails individually. Ask questions in class! You will have plenty of opportunity. In the very rare event of emergency, contact Dr. Troemel by email at etroemel@ucsd.edu. On all emails put BICD100 in the subject line to indicate that the email pertains to this course. In any email to Dr. Troemel, include your UCSD username, and PID.

Course web site:

<https://coursefinder.ucsd.edu/> - you can login with your active directory login and password
Lecture notes will be posted to the website right after lecture as a pdf file for downloading.

Sections and Instructional Assistants:

Discussion sections will be held by IAs once a week, except the first week. The IAs will lead a discussion based on the Assignments (posted the previous week) to help participating students arrive at the correct answers. The IAs will not provide the answers themselves. To get the most out of Discussion sections, it is therefore critical to have first worked through the Assignments alone or in study groups and then to participate in the discussion during the Discussion sections.

Section	Day	Time	Building	Room	IA	IA email
B01	W	4 PM	MANDE	B-104	Tsai, Nathaniel	n1tsai@ucsd.edu
B02	W	5 PM	MANDE	B-104	Pintea, Mark	mpintea@ucsd.edu
B03	W	6 PM	MANDE	B-104	Pintea, Mark	mpintea@ucsd.edu
B04	Th	7 PM	HSS	1128A	Woo, Sangwon	saw013@ucsd.edu
B05	Th	8 PM	HSS	1128A	Wang, Shuhe	shw279@ucsd.edu
B06	F	12 PM	TM102	1	Bui, Theresa	thbui@ucsd.edu
B07	F	1 PM	TM102	1	Bui, Theresa	thbui@ucsd.edu
B08	F	2 PM	TM102	1	Meunier, Marion	mameunie@ucsd.edu
B09	F	3 PM	TM102	1	Meunier, Marion	mameunie@ucsd.edu
B10	F	4 PM	TM102	1	Okamuro, Luke	lokamuro@ucsd.edu

IA office hours:

IA	Day	Time	Location
Meunier, Marion	Thurs	9:30am	Art of Espresso
Tsai, Nathaniel	Fri	10am	Revelle 64 north
Pintea, Mark	Wed	7pm	Revelle Commuter lounge
Bui, Theresa	Wed	noon	Art of Espresso
Woo, Sangwon	Fri	noon	Starbucks, Price Center
Okamuro, Luke	Mon	noon	Mandeville coffee cart
Wang, Shuhe	Tues	noon	Geisel library: room 722

Textbooks

The required textbook is *Essentials of Genetics* by Klug, Cummings, Spencer, Palladino, Tenth Edition. A textbook, as well as the Study Guide and Solutions Manual, has been put on reserve at the Biomedical Library Building.

How to do well in this course:

- Attend lectures and take your own notes. Don't just 'follow along' with a printout, or rely on someone else's notes. Active note taking is the key to effective learning!
- Attend and participate in discussion sections.
- Work through the assignments.
- Come to office hours. Talk to the instructor and IAs: we are here to help you.
- Genetics is a problem solving science. It is essential to spend time solving problems in classical Mendelian and human genetics. The exams will largely consist of such problems.
- Work through the problems in the textbook. Don't just look up the answer in the solutions manual.

EXAMS

There will be one midterm (40% of grade) and a final (60% of grade). The final exam will consist mostly of material since the mid-term, but will also include some material from the first portion of the course. ****Bring scientific calculator to exams****

CLICKER USE

You will need an i-clicker. New and used i-clickers are available at the Price Center bookstore. Make sure to get an i-clicker and not a different system (such as H-ITT or PRS). Both i-clickers 1 and 2 are fine. For more information, visit: <http://mediaservices.ucsd.edu/clickers>

Clickers will be used for rapid feedback to foster interactive learning in a large classroom setting. Clicker questions will be used during class time to make students think and discuss with each other how the material fits within the bigger picture of genetics.

To obtain as much credit for clicker use as possible, please register your i-clicker ASAP, and no later than Friday, Jan 10, on the class web-site. Here is information on registering clickers: <https://blink.ucsd.edu/faculty/instruction/tech-guide/clickers/before-class/plan-course.html>
Using a clicker constitutes up to 3% extra credit toward your grade. These points are based entirely on clicker use, not on whether you get the answers right. Clicker point counting will begin in week 2 of the quarter, and you will get a point if you answer 75% or more of the

questions. Cheating with clickers by having someone other than yourself using your clicker during class is considered a breach in academic honesty and will result in the loss of all clicker points for the quarter for both yourself and the person bringing your clicker, as well as any additional disciplinary actions as indicated by the policy to maintain academic honesty. Correct clicker use will be monitored by the instructor and IAs during class.

ASSIGNMENTS

Class assignments will be posted on the class website on most Fridays during the quarter (see schedule). Assignments are used as a tool to promote understanding of the discussed topics through problem solving. It is optional to work through the assignments and they are not handed in. However, it is very strongly recommended to work through the assignments either alone or in study groups. The IAs will lead a discussion based on the Assignments to make participating students arrive at the correct answers. The IAs will not provide the answers themselves. To get the most out of Discussion sections, it is therefore critical to have first worked through the Assignments alone or in study groups and then to participate in the discussion during the Discussion sections.

ELECTRONIC AIDS

Unless you are whiz at mental arithmetic *you will need a calculator in the exams*. Any other kind of electronic device is prohibited. Students using cell phones or other messaging devices in exams will be assumed to be cheating, and will receive a zero grade for the exam.

MAKE-UP EXAMS

There will be no make-up midterms. For students with an excused medical absence from the midterm, the final will count for 100% of the grade (this excuse must be provided in person within 7 days of the midterm, and must be from a physician visit within a day of the midterm). The final exam must be taken on the exam date. **No early or late exams will be given for any reason**. For students with an excused medical absence from the final, a make-up final will be administered as an oral exam by the professor within the first 3 weeks of the next quarter. If a student misses both the midterm and the final exam they automatically receive a failing grade.

GRADING

I will average the point total for the top 5 students in the class and assign that average a value of 100%. Any student with a point total of at least 90% of that average will receive a grade of A- or better. A score of 80% is guaranteed a B- and a score of 70% is guaranteed a C-.

REGRADE POLICY

Regrade requests should be made in writing to your section IA, within 1 week of the exam being returned and specifying the basis for the request. As a rule we will correct clerical errors in grade computation. If your answer was not clear in the first place, additional clarification will not get you a regrade. Exams completed in pencil will not be accepted for regrades. Remember that requests for a regrade may result in a loss of points, if extra points were given in error in the original grading.

ACADEMIC INTEGRITY

UCSD policies on academic integrity can be read at:
<http://www-senate.ucsd.edu/manual/appendices/app2.htm>

Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the

individual to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be upheld.

Students' Responsibilities

Students are expected to complete the course in compliance with the instructor's standards. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort; for example:

No student shall knowingly procure, provide, or accept any unauthorized material that contains questions or answers to any examination or assignment to be given at a subsequent time.

No student shall complete, in part or in total, any examination or assignment for another person.

No student shall knowingly allow any examination or assignment to be completed, in part or in total, for himself or herself by another person.

No student shall plagiarize or copy the work of another person and submit it as his or her own work.

No student shall employ aids excluded by the instructor in undertaking course work or in completing any exam or assignment.

No student shall alter graded class assignments or examinations and then resubmit them for regrading.

No student shall submit substantially the same material in more than one course without prior authorization.

Suspected cases of academic dishonesty will be reported to the Academic Integrity Coordinator and the Dean of Student Affairs.

If a charge of academic dishonesty is upheld, the penalty will be a failing grade for the course.