

BICD 100 Genetics
Spring 2024
A00

Professor: Emily Troemel
Lectures: Tuesday and Thursday 8:00 am – 9:30 am Pacific (all times below in Pacific)
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 genetics as well as discussing more modern genetic approaches.

Prerequisites. BILD 1 is required; review the relevant parts of BILD 1 if necessary.

Lecture, exam, assignment schedule (subjects may change during quarter)

Readings = Chapters from Klug et al, *Essentials in Genetics*, Tenth Edition (I cannot vouch for other editions)

Class #, Date	Topic	Quiz after lecture?	Reading
1: Tues, 4/2	Background on DNA/RNA/protein, Chromosomes, Eukaryotic/prokaryotic, Intro to Mendel: monohybrid cross	Yes – Class #1 quiz	Chapter 1, 3 (p31-36)
2: Thurs, 4/4	Mitosis and Meiosis, dihybrid cross	Yes – Class #2 quiz	Chapter 2, 3 (p36-39)
<i>Friday, 4/5</i>	<i>Assignment #1 uploaded</i>		
3: Tues 4/9	Laws of probabilities, tri-hybrid crosses, Chi-square, pedigrees,	Yes – Class #3 quiz	Chapter 3 (p39-49)
4: Thurs, 4/11	Modifications of Mendelian ratios (e.g. varying kinds of alleles, epistasis)	Yes – Class #4 quiz	Chapter 4 (p53-64)
<i>Friday, 4/12</i>	<i>Assignment #2 uploaded; Assignment #1 due (graded for correctness)</i>		
5: Tues, 4/16	Complementation tests, Modifications of Mendelian ratios cont. (e.g. epistasis continued, X-linked traits, sex-limited and sex-influenced traits),	Yes – Class #5 quiz	Chapter 4 (p64-69)
6: Thurs, 4/18	Different types of pedigrees: X-linked/autosomal, dom./rec; Review for midterm #1	Yes – Class #6 quiz	Review previous reading
<i>Friday, 4/19</i>	<i>Assignment #3 uploaded; Assignment #2 due (graded for correctness)</i>		
7: Tues, 4/23	Midterm #1: Covers classes 1-6		
8: Thurs, 4/25	More modifications of Mendelian ratios; penetrance/expressivity, maternal effect, mitochondrial mutations; Sex determination	Yes – Class #8 quiz	Chapter 4 (p70-76) Chapter 5 (p83-88)
<i>Friday, 4/26</i>	<i>Assignment #4 uploaded; Assignment #3 due (graded for completion)</i>		
9: Tues, 4/30	Dosage compensation, imprinting (epigenetics) Chromosomes: variations in number and arrangement	Yes – Class #9 quiz	Chapter 5 (p89-95) Chapter 6
10: Thurs, 5/2	Gene mapping: recombination and linkage, 3-point crosses	Yes – Class #10 quiz	Chapter 7 (p121-135)
<i>Friday, 5/3</i>	<i>Assignment #5 uploaded; Assignment #4 due (graded for correctness)</i>		
11: Tues, 5/7	Bacterial genetics and gene transfer: conjugation, transformation; Antibiotic resistance	Yes – Class #11 quiz	Chapter 8 (p144-154)

			Chapter 11 (skim)
12: Thurs, 5/9	Bacteriophage genetics, gene transfer by transduction; Review for Midterm #2	Yes – Class #12 quiz	Chapter 8 (p154-159)
Friday, 5/10	<i>Assignment #6 uploaded</i> <i>Assignment #5 due (graded for correctness)</i>		
13: Tues, 5/14	Midterm #2: Covers classes 7-12		
14: Thurs, 5/16	DNA structure, base composition rules, the genetic code, DNA mutations, DNA damage and repair	Yes – Class #14 quiz	Chapter 9 Chapter 10,12 (skim) Chapter 14 (p261-277)
Friday, 5/17	<i>Assignment #7 uploaded</i> <i>Assignment #6 due (graded for completion)</i>		
15: Tues, 5/21	Regulation of gene expression, lac operon, RNA interference	Yes – Class #15 quiz	Chapter 15, 16 (skim)
16: Thurs, 5/23	Cancer genetics: cell cycle, oncogenes and tumor suppressors	Yes – Class #16 quiz	Chapter 19
Friday, 5/24	<i>Assignment #8 uploaded</i> <i>Assignment #7 due (graded for correctness)</i>		
17: Tues, 5/28	Guest lecturer postdoctoral fellow Maya Gosztyla, PhD student from Gene Yeo's lab: Genome sequencing, PCR, Sequence Assembly, Genome Editing with CRISPR/Cas9	Yes – Class #17 quiz	Chapter 17,18 (skim and focus on p.331-333; 335-338; 342-343; 348-349; 364-366;476-479)
18: Thurs, 5/30	Quantitative traits, heritability estimates, twin studies	Yes – Class #18 quiz	Chapter 20
Friday, 5/31	<i>Assignment #9 uploaded</i> <i>Assignment #8 due (graded for correctness)</i>		
19: Tues, 6/4	Guest lecture from Kaiser physician Mike Nelson, MD on clinical genetics	Yes – Class #19 quiz	
20: Thurs, 6/6	First hour: Guest lecture on developmental genetics and regulation of gene expression by Prof. Emma Farley, PhD	Yes – class #20 quiz	
Friday, 6/7	<i>Assignment #10 uploaded (not graded)</i> <i>Assignment #9 due (graded for correctness)</i>		

FINAL EXAM: Thursday, June 13, 8 am-11 am**LECTURES AND LECTURE SLIDES**

Lectures will be video podcast and a draft of lecture slides will be available before the lecture; these slides may be modified before and after the lecture as needed; please do not ask questions about the slides before lecture; save questions for during lecture and after lecture

Course web site will be on Canvas:

<https://coursefinder.ucsd.edu/> - you can login with your active directory login and password

Protocol for how to get answers to questions about course logistics or content:

1) Look through this syllabus, the course slides on Canvas, recorded podcasts and Discussion board on Canvas for answers first. *Many answers can be found within that material, so you can save instructors' time for answering more challenging questions. If answers aren't found above then:*

2) Post your question on the Discussion board on Canvas or ask in class

The Discussion board will be monitored regularly by the IA's and the Professor – by posting here, you will help answer other students' questions. Similarly, ask questions in class! You will have the opportunity to so. *If your question is confidential, or specific to your situation, or too complicated for Discussion board then:*

3) Email your IA (see below for which one) for help: put “BICD100 Genetics” in the subject line

If question is still not answered, contact Prof. Troemel through Canvas, who will check the Canvas inbox 1X per day Mon-Fri, with the goal to provide a response within 1 business day (24 hours)

Sections and Instructional Assistants (no Sections the first week):

The Discussion sections are remote, and will be led by the IAs. They will discuss 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 important to have first worked through the Assignments alone or in study groups and then to participate in the discussion during the Discussion sections. Assignments will be submitted at the end of the week to be graded either for credit or completion, as specified in the schedule above.

Section	Day	Time	Location	IA
A01	M	5-5:50pm	RCLAS	Katie Li, Ashlynn Canfield, Kristian Maniti, Matthew Nunes
A02	W	5-5:50pm	RCLAS	Katie Li, Ashlynn Canfield, Kristian Maniti, Matthew Nunes

Which IA do I contact for more individual help?

Students with last names A-J – contact Katie Li

Students with last names K-M – contact Ashlynn Canfield

Students with last names N-S – contact Kristian Maniti

Students with last names T-Z – contact Matthew Nunes

IA office hours (None the first week):

IA	Time	Location	Email
Katie Li	Mon, 6pm-6:50pm	Zoom	yil097@ucsd.edu
Katie Li	Wed, 8am-8:50am	Revelle's bcb coffee cart	yil097@ucsd.edu
Ashlynn Canfield	Fri, 10am-10:50am	Outdoor Seating Area, 2nd floor of Canyon Vista in Warren College	acanfield@ucsd.edu
Kristian Maniti	Tues, 11am-11:50am	https://ucsd.zoom.us/my/kristianmaniti	kmaniti@ucsd.edu
Matthew Nunes	Mon, 9am-9:50am	Mandeville coffee cart	jnunes@ucsd.edu

Professor Office hours: Emily Troemel, Thursdays 11-11:50 am Bonner 4202

Textbooks/Online Resources

The required textbook is *Essentials of Genetics* by Klug, Cummings, Spencer, Palladino, Tenth Edition. By enrolling in this course, you have been automatically enrolled in the UC San Diego Inclusive Access program. This means that your required course materials are being provided to you automatically, and at a discounted price. A charge for this material will be added to your student account and will appear as “Course Materials Central Charge”.

Textbooks/Online Resources, cont.**Your Opt-out deadline:** April 13, 2024**Opt-out Portal Link:** [UC San Diego Inclusive Access Opt-Out Portal](#)

If you decide not to participate, you can opt-out after the first day of classes through the above deadline. Once opted out you will be responsible for purchasing the materials listed below. A link to the opt-out portal has been sent to your UCSD email from noreply@follett.com

Material: Essentials of Genetics**By:** Klug**Total Charge:** \$39.00

In addition, this textbook is available as a print copy on reserve at Geisel library Reserves near the Service Hub for students to check out. Furthermore, The Essentials of Genetics Study Guide is available in Ares, where it can be accessed digitally.

LEARNING OUTCOMES QUIZZES

There will be two NON-GRADED quizzes utilized to assessing student learning outcomes in this course. The pre-course quiz will be available 3/27 midnight until 4/7 midnight and the post-course quiz 6/5 midnight – 6/12 midnight. The quizzes are set to be worth 35 points; however, they will not count towards the final grade.

EXAMS

You must arrive on time for all exams (for times, see schedule above and more detail on grading below). They will be given on paper and will cover topics from the Assignments (see below) and the clicker questions and lecture Quiz questions. They will be mostly multiple-choice/multiple-answer with 1 longer-answer question. For exams you will be allowed to bring a one-page 8.5 X 11" cheat sheet, double-sided with any information you need. You CANNOT work with classmates and are expected to solve the problems individually.

ASSIGNMENTS

Class assignments will be posted on the class website on Friday by 5pm during the quarter (see schedule). In general, they will be due the following Fri 5pm, and the answers will be discussed in Discussion sections held on Mondays and Wednesdays. Assignments will be available through Gradescope. The IAs will lead a discussion based on the Assignments to enable participating students to arrive at the correct answers. The IAs will not simply provide the answers. 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. **Late assignments will not be accepted; to accommodate illness, lowest grade assignment can be dropped.** In general, grading will be finished the following Friday at 5pm, and regrades are allowed until the following Tuesday at 5pm.

CLICKER USE FOR EXTRA CREDIT

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. 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.

A physical Clicker is required (app not allowed). To obtain as much credit as possible, please register your i-clicker ASAP at iClicker.com, and **no later than the Friday of the 1st week of class.**

Using a clicker constitutes up to 2% 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 for a given class if you answer 75% or more of the questions in that class. Altogether the points for all classes where we count clickers for credit will comprise the 2% extra credit. We will likely have 16 classes where it is possible to get Clicker credit (starting week 2, and excluding midterms), which would mean each class is 0.125% extra credit, but this number is subject to change.

Because it is only extra credit and due to class size, **it is not possible to get clickers credit for classes that you missed** (even for an illness), or for classes where you forgot your clicker, or where you had individual technical problems. 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. The last Clicker question in class will sometimes be a 'muddy point' question to determine which area needs more attention.

QUIZ QUESTIONS

Similar versions of Clicker questions will be available in Canvas Quizzes (with some modifications) to receive credit for correctness after lecture and for 24 hours afterward (e.g. 9:30am Tues through 9:30am Wed). Quiz questions cannot be answered after the 24 hour period; to accommodate illnesses, you can drop the lowest three quiz grades. 1st week quizzes don't count. Once started you will have 15 minutes to take the quiz.

MAKE-UP EXAMS

There will be no make-up exams. For students with an excused medical absence for a midterm exam, the other midterm will count for 50% of the grade; see Grading scheme below. Any medical excuses must be provided within 3 days of the midterm during a meeting with Prof. Troemel, and must be from a physician visit within 12 hours of the exam time. 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 two exams they automatically receive a failing grade.

GRADING

Midterm exams (2) – given in class #7 and class #13

25% each midterm for total of **50%** of overall grade (both midterms count toward grade)

Final exam (1) –comprehensive, with over half the questions based on classes #14-20

30% of overall grade

Assignments (weekly, 9 total, but can drop the lowest one to accommodate illness)

short-answer every week; 7 graded for correctness, 2 graded for completion

10% of overall grade

Quizzes (18 total will be available, but 1st week quizzes don't count, therefore 16 quizzes for credit; to accommodate illnesses, can drop the lowest 3 scores, so 13 quizzes total count toward grade)

10% of overall grade

Grading cutoffs:

90% of total points is A- ; 92% is A; 99% is A+

80% of total points is B- ; 82% is B; 88% is B+

70% of total points is C- ; 72% is C; 78% is C+

60% of total points is D

Below 60% is an F

REGRADE POLICY

Regrade requests will be made through Gradescope, within 3 days of the exam or assignment being returned and specifying the basis for the request in writing with 1-2 sentence explanation. 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. Remember that requests for a regrade may result in a loss of points, if extra points were given in error in the original grading.

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! This concept is still true with video lectures. For tips, see this video: <https://youtu.be/1IIUVU-d1DM>
- 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.
- Work through the problems in the textbook. Don't just look up the answer in the solutions manual.

PRINCIPLES OF COMMUNITY IN THIS COURSE

- Engage with humility
- Strive for dialogue
- Consider air time, uplift marginalized voices
- Lean into discomfort
- Ask questions for deeper understanding
- Confidentiality
- Maintain safety of our shared space
- Practice holding complex thought

ACADEMIC INTEGRITY: Students' Responsibilities and Contract with the Professor

As your Professor, I pledge to exercise care in planning and supervising the work, and to do my best to teach you and to provide support for you to succeed in this class. In exchange I expect you to:

- provide your full attention during lecture without talking unless during Clickers, or during asking a question for the whole class, so I can provide information without distraction, and so you can enable your fellow students to listen without distraction
- achieve your grade with your own honest effort, and not through plagiarizing
- complete your own assignments and not alter graded class assignments or examinations and then resubmit them for regrading.
- accept the class policies as laid-out in this syllabus and not ask for personal exceptions, other than for medical and other unforeseen circumstances

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.

Information about UCSD policies on academic integrity can found at:

<https://academicintegrity.ucsd.edu/>

Frequently asked questions (FAQ):**Can I submit an Assignment late or take Quiz late?**

I understand that illness happen, and emergencies occur. To accommodate these occasional unexpected circumstances, it is possible to drop one assignment, and drop 3 quizzes, but it is

not possible to submit assignments or quizzes late.

I would like my final exam (or midterm exam) to be worth a greater percentage than what it says in the syllabus – is that an option?

The grading policy is structured to help you develop good time management skills, which includes pacing yourself throughout the quarter and anticipating any potential difficulties in the future that might impair performance at a particular time. So no – it is not possible to make the final exam or midterm exam worth a greater percentage than what is stated in the syllabus. If the weight of the final exam grade were increased, it would reward the choice to cram at the end of the quarter, which studies show does not lead to long-term learning, and can impair short-term health.

My grade is so close to the cut-off – can you please move my grade from the current letter grade to one grade higher? e.g. can you adjust the cut-off, round the numbers differently, or find a way to give me more credit?

I understand that it can be frustrating to see your score near the cut-off for a particular grade. As such, I have received many requests over the years to move the cut-off for individual students. However, if I moved the cut-off for one person's grade, I would have to move it for everyone, in order to be fair. And once I moved the cut-off, then there would be a new group of people who are near the cut-off and would ask for it to be moved, and that could go on and on. Therefore, the cut-offs are set as they are.

Can you curve the class?

Just to make sure the definition of curving is clear: The process of curving involves setting the average to be C and it limits the # of A's and B's. For more information on curving, please see this link:

<https://community.canvaslms.com/t5/Instructor-Guide/How-do-I-curve-grades-in-the-Gradebook/ta-p/745>

Because I do not want to limit the # of A's and B's, I will not curve the class.

Can you normalize the class scores?

Yes: At the end of the quarter, I will average the overall point total for the top 2% 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-.

Will I have the opportunity to learn about many different concepts in Genetics, and the opportunity to interact with instructors and other students and guest lecturer experts on these cool topics?

Yes – please take advantage of these opportunities!