

BICD100: Genetics  
Summer Session I 2017

**Instructor:** Genevieve Ryan

**Lectures:** Monday-Thursday 9:30-10:50 am

**Location:** Center Hall 214

**Textbook:** *Essentials of Genetics* by Klug et al. Ninth edition

**Prerequisites:** BILD1 or equivalent is required. If necessary, please review the relevant parts of BILD1.

**Instructor email:** [geryan@ucsd.edu](mailto:geryan@ucsd.edu)

To email me specific questions about the course, please put BICD100 in the subject line to ensure your email will be read promptly. I will generally be able to respond to emails within 12 hours. I will not respond to emails sent after 6 pm the day before an exam.

**Instructor Office Hours:** H&SS 1145C, Thursdays 2-4 pm

**Course Goals:** Genetics is critical to modern biological science. Genes provide the basis of inheritance for all life forms, from prokaryotes to humans, and genetic variation influences human biology and disease. We will examine how genes were discovered, how they are studied, and how they are used to explore and manipulate biological function. We will use quantitative approaches to solve problems in classical and population genetics, and will also touch on recent methodological advances in genetics.

**Learning Outcomes:** Upon completion of this course, students should be able to:

- Apply knowledge of genetics concepts to analyze data, explain data, solve problems, design experiments, and construct scientific arguments
- Read, understand, and critically evaluate primary literature
- Appreciate the molecular basis of biological diversity, variation within populations and biological systems, and evolution
- Discuss ethical considerations that accompany modern genomic techniques, including genomic privacy and genome editing
- Explain both classic and modern molecular and quantitative techniques in genetics

**Course website:** <https://ted.ucsd.edu>

**Discussion Sections and Instructional Assistants:**

You must be enrolled in and participate in a section. Participation in discussion sections, in the form of quizzes and critical evaluation of primary scientific literature, will account for 10% of your grade.

Section	Days and time	Room	IA	IA email
A01	Mon/Wed 11-11:50 am	Center Hall 218	Christopher Song	<a href="mailto:cisong@ucsd.edu">cisong@ucsd.edu</a>
A02	Tues/Thurs 12-12:50 pm	Center Hall 207	Tiffany Ho	<a href="mailto:twho@ucsd.edu">twho@ucsd.edu</a>
A03	Tues/Thurs 1-1:50 pm	Center Hall 207	Tiffany Ho	<a href="mailto:twho@ucsd.edu">twho@ucsd.edu</a>

**IA office hours:**

Christopher: Fridays 9-11 am, Leichtag Biomedical Research building lobby (School of Medicine)

Tiffany: Mondays 1-3 pm, Bonner 2401

**Discussion sections will meet for the first time on July 5<sup>th</sup>/6<sup>th</sup>.**

## Lecture Schedule

Please note that the lecture schedule is tentative and subject to change.

Readings are from *Essentials of Genetics* by Klug et al, ninth edition.

#, Date	Topics	Reading
1: Mon 07/03	Intro to Mendel, monohybrid cross	Ch 1, 3 (p31-36)
2: Wed 07/05	Mitosis and meiosis, dihybrid cross	Ch 2, 3 (p36-39)
3: Thurs 07/06	More crosses, chi-square and probability, pedigrees	Ch 3 (p42-48)
4: Mon 07/10	Epistasis, complementation, pleiotropy	Ch 4 (p53-66)
5: Tues 7/11	X-linked mutations, expressivity, penetrance, imprinting	Ch 4 (p66-76)
6: Wed 7/12	Sex determination, sex chromosomes, dosage compensation	Ch 5
7: Thurs 7/13	Chromosomes: variations in number and arrangement	Ch 6
8: Mon 7/17	Gene Mapping: Recombination and linkage	Ch 7
9: Tues 7/18	Guest lecturer Danny Antaki: structural variation	
<b>Wed 7/19</b>	<b>Midterm</b>	
10: Thurs 7/20	DNA and the transforming principle, classic experiments	Ch 9
11: Mon 7/24	DNA structure and analysis	Ch 9, 10, 11
12: Tues 7/25	Gene mutation, DNA repair, transpositions	Ch 14
13: Wed 7/26	Gene expression, epigenetics, RNA interference	Ch 15
14: Thurs 7/27	Forward and reverse genetic analysis, model organisms	Ch 17
15: Mon 7/31	Genomics	Ch 18
16: Tues 8/1	Quantitative traits, SNPs, GWAS	Ch 21
17: Wed 8/2	Population genetics and evolution	Ch 22
18: Thurs 8/3	Additional topics in genetics and review	

## FINAL EXAM: Friday, August 4, 2017 8-11 am (Location TBA)

### How to do well in this course:

- Attend lectures and take your own notes. Don't rely on someone else's notes or the powerpoint slides posted after lecture. Active note taking is the key to effective learning!
- Attend and participate in discussion sections.
- Work through the problem sets on your own before discussion sections. You may struggle with the problems, but working on your own first will help you learn more effectively than if someone explained the answer to you. Even if you don't arrive at the correct answer, attempting the problem sets will allow you to come to section prepared with questions, and will help you understand where you went wrong so you'll be less likely to make the same mistake again.
- Come to office hours, and talk to the instructor and TAs: 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. If you need additional practice, work through the problems in the textbook, and don't just look up the answers in the solutions manual.

**Exams:** There will be one midterm (35% of grade) and a final (55% of grade). The final exam will be cumulative but with some emphasis on material presented following the midterm.

**Problem Sets:** There will be approximately 4 problem sets throughout the course, made available via TritonEd. Problem sets will not be graded, but will allow students to practice working through the kinds of problems that will be found on exams. Answers to problem sets will be worked through in

discussion sections. However, students are strongly encouraged to attempt problem sets on their own before attending section so that they are prepared to ask questions.

**Quizzes:** Weekly quizzes will be given in discussion sections (5% of grade in total). Quizzes will cover concepts discussed in lecture and will also include questions similar to, or taken directly from, problem sets. No makeup quizzes will be given, however if you miss a discussion section in which a quiz is given, you can receive credit by turning in your entire completed problem set to be graded to your IA by 3 pm on the day of the missed section. Each student may turn in a problem set in lieu of taking the quiz only once during the summer session, so please reserve for emergencies.

**Primary Literature:** Primary scientific literature will be read and discussed in section, with a significant group work component. Pre-reading assignments and participation in group discussions will account for 5% of your grade.

**Class participation:** Participation and contribution in class will mainly be through clicker questions. Clickers are not required but are strongly encouraged. To participate in clicker-based discussions in class, please have an iClicker 2 registered on TritonEd (earlier iClicker versions are okay too) set to frequency BD. Frequent classroom participation will allow students with “borderline” grades to be bumped up to the next half letter grade at the end of the course (e.g. 92.6% would earn an “A” grade instead of an “A-“). We may also occasionally do writing exercises in class, so please come prepared with paper and pens. Writing exercises will not be graded, but regularly completing and turning in in-class writing assignments will also allow student grades to be increased to the next half letter grade on an individual basis if they are borderline.

**Grading:** Grades will not be curved, and thus your ability to succeed in this course does not depend on other people doing poorly. However, depending on how the class performs as a whole, all grades may be “bumped up” a fixed amount (e.g. half a letter grade) at the instructor’s discretion at the end of the course. Instances in which this may occur are if, for example, students overall perform better on the final exam than on the midterm. Students are GUARANTEED to earn at least the following letter grades for the percentages listed below:

97%: A+  
93%: A  
90%: A-  
87%: B+  
83%: B  
80%: B-  
77%: C+  
73%: C  
70%: C-  
67%: D+  
63% D  
60% D-  
59% and below: F  
50% and below will receive a non-negotiable F

Grade breakdown:

Discussion section 10%

Midterm: 35%

Final exam: 55%

**Electronic Aids:** Unless you are skilled in mental arithmetic you will need a calculator for the exams.

Calculators must not be programmable but should be scientific. Any other kind of electronic device is prohibited. Students using cell phones, computers, or other messaging devices in exams will be assumed to be cheating, and will receive a zero grade for the exam.

**Laptop/tablet policy:** Students are discouraged from using laptops and tablets in class, because they can be distracting to other students. Please plan to take notes with a pen and paper. Laptops are encouraged in discussion sections to facilitate reading and discussion of scientific literature.

**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 90% of the grade. 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 instructor within 1 week of the end of Summer Session I.

**Regrade policy:** Due to the short summer session, regrade requests should be made in writing to the instructor by 6 pm on the date 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.

**Extra credit:** The instructor will check weekly seminar listings on the UCSD campus for seminars related to genetics. Depending on the availability of relevant seminars, students will be able to earn up to 2% extra credit for attending seminars and turning in a written (typed) summary. Such extra credit opportunities will be announced in class and on the course website. There are no additional opportunities for extra credit beyond what is assigned as part of the course by the instructor.

**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.

**Accessibility:** Any student with a disability is welcome to contact us early in the quarter to work out reasonable accommodations to support their success in this course. Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). Students are required to present their AFA letters to faculty and to the OSD Liaison in the Division of Biological Sciences in advance so that accommodations may be arranged.