BICD100: Genetics
Summer Session I 2018

Instructor: Dr. Genevieve Ryan
Lectures: MTuWTh, 12:30-1:50 pm
Location: Peterson 104
Textbook (optional): *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
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: Tuesdays, 10:30 am-12 pm, H&SS 1145B

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:
Students must be enrolled in and participate in a section. Problem sets will be due in discussion sections every week, and two quizzes worth 10% of the course grade each will be administered in discussion sections. **Discussion schedule is listed on the last page of this syllabus**.

Section	Days and time	Room	IA	IA email
A01	TuTh 2-2:50 pm	Solis 109	Kingston Zhou	kizhou@ucsd.edu
A02	TuTh 3-3:50 pm	Solis 109	Kingston Zhou	kizhou@ucsd.edu

Instructional Assistant (IA) office hours: Wednesdays, 10 am-12 pm, Leichtag lobby

Discussion sections will meet for the first time on July 3rd.

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.

Lecture #, Date	Topics	Reading
1: Mon 07/02	Intro to Mendel, monohybrid cross	Ch 1, 3 (p31-36)
2: Tues 07/03	Mitosis and meiosis, dihybrid cross	Ch 2, 3 (p36-39)
3: Thurs 07/05	More crosses, chi-square and probability, pedigrees	Ch 3 (p42-48)
4: Mon 07/09	Epistasis, complementation, pleiotropy	Ch 4 (p53-66)
5: Tues 7/10	X-linked mutations, expressivity, penetrance, imprinting	Ch 4 (p66-76)
6: Wed 7/11	Sex determination, sex chromosomes, dosage compensation	Ch 5
7: Thurs 7/12	Chromosomes: variations in number and arrangement	Ch 6
8: Mon 7/16	Gene Mapping: Recombination and linkage	Ch 7
9: Tues 7/17	Guest lecturer Danny Antaki: structural variation	
Wed 7/18	**Midterm**	
10: Thurs 7/19	DNA and the transforming principle, classic experiments	Ch 9
11: Mon 7/23	DNA structure and analysis	Ch 9, 10, 11
12: Tues 7/24	Gene mutation, DNA repair, transpositions	Ch 14
13: Wed 7/25	Gene expression and epigenetics	Ch 15
14: Thurs 7/26	Forward and reverse genetic analysis, model organisms	Ch 17
15: Mon 7/30	Genomics	Ch 18
16: Tues 7/31	Quantitative traits, SNPs, GWAS	Ch 21
17: Wed 8/1	Population genetics and evolution	Ch 22
18: Thurs 8/2	Additional topics in genetics and review	

FINAL EXAM: Friday, August 3, 2017 11:30-2:30 pm (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.

Problem Sets: There will be 5 problem sets throughout the course, made available via TritonEd. The types of problems found on the problem sets will be reflective of the problems that will be found on exams. Problem sets will be due in discussion sections, and will be graded. No late problem sets will be accepted for any reason. Answers to problem sets will be worked through in discussion sections, and answer keys will be posted to the course website.

Quizzes: Two multiple-choice quizzes will be given in discussion section (on July 17th and July 31st), each worth 10% of the course grade. Quizzes are intended to help prepare students for the midterm and final exam.

Exams: There will be one midterm (30% of grade) and a final exam (45% of grade). The final exam will be cumulative but with greater emphasis on material presented following the midterm.

Make-up exams: There will be no make-up quizzes or exams. For students with an excused medical absence from a quiz, one quiz will count for 20% of the course grade. For students with an excused medical absence from the midterm, the final will count for 75% of the course 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 2 days of the end of Summer Session I.

Exam regrade policy: The midterm exam will be handed back in discussion section on Thursday, July 19th and time will be allotted for students to review their graded exams. Regrade requests must be made to your IA by the end of that discussion section. Final exams will be available for review in Dr. Ryan's office on Monday, August 6th from 10 am-12 pm. Any regrade requests must be submitted during this time. For all regrade requests, your entire exam will be regraded by Dr. Ryan, which may result in your score either increasing or decreasing. If your answer was not clear in the first place, additional clarification will not get you extra points. Exams completed in pencil will not be accepted for regrades. As a rule we will be happy to correct any clerical errors in grade computation. Quizzes will not be eligible for regrade requests.

Extra credit: There will be no opportunities for extra credit beyond what may be assigned as part of the course by the instructor.

Class participation and discussion section attendance: Frequent participation in class and in discussion sections will allow students with "borderline" grades to be bumped up to the next half letter grade at the end of the course (e.g. 92.7% would earn an "A" grade instead of an "A-"). In-class participation will include group discussions and/or short writing assignments. Discussion section participation will be evaluated based on attendance and group work.

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:
Problem sets: 5%
Quizzes: 20%
Midterm exam: 30%
Final exam: 45%

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 during 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.

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.
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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.

Discussion Section Schedule

Date	Assignments Due/Quizzes	Discussion
Tues 07/03	**Problem Set 1 due**	Review, go over Problem Set 1
Thurs 07/05	None	Review
Tues 7/10	**Problem Set 2 due**	Review, go over Problem Set 2
Thurs 7/12	None	Review, go over Problem Set 3
Tues 7/17	**Problem Set 3 due** **Quiz 1**	None
Thurs 7/19	None	**Midterms handed back**
Tues 7/24	**Problem Set 4 due**	Review, go over Problem Set 4
Thurs 7/26	None	Review, go over Problem Set 5
Tues 7/31	**Problem Set 5 due** **Quiz 2**	None
Thurs 8/2	None	Review and additional practice problems