
BILD 20: Human Genetics in Modern Society

FALL 2021

Lectures: TU & TH 3:30 pm-4:50pm LIVE in TATA3201

Instructor: Brinda K. Rana, Ph.D. **Contact Instructor** Via Canvas Email ONLY!

Graduate Teaching Assistant: Alyssa Holman arholman@health.ucsd.edu

Graduate TA Office Hours: Time TBA; On ZOOM <https://ucsd.zoom.us/j/98119797527>

Undergraduate Instructional Assistants: Amy Kung and Rachel Lee

Website: UCSD Canvas <https://canvas.ucsd.edu> (use the Chrome Browser)

Course Description

This course will introduce students to the principles of genetic inheritance in human populations and current applications of human genetics and genomics in medicine, behavioral research, and society.

Learning Objectives

- ❖ Understand the nature of genetic variation and how it contributes to phenotypic variation and disorders.
- ❖ Learn about the various study designs applied to investigate the role of genes versus the environment in phenotypic variation.
- ❖ Learn how to conduct a hypothesis test.
- ❖ Use online resources to investigate genetic variants and their role in phenotypic variation and disorders.
- ❖ Develop skills to read and critically evaluate genetic reports in the media.

Grading

A total of 400 points are available for the course. Grades are based on the total number of points earned through the evaluation (see right column):

- ≥360 points (90%) A (A+, A or A-)
- ≥320 points (80%) B (B+, B or B-)
- ≥280 points (70%) C (C+, C or C-)
- ≥240 points (60%) D

Cutoffs may be adjusted downward so that at least 50% of students receive an A or a B, but cutoffs will not be adjusted upward for any reason.

Assessments

Midterms (250 points)

Midterm 1 (Nov 2) 100 pts (60 minutes)
Midterm 2 (Nov 30) 150 pts (90 minutes)
In Lecture Class.

Quizzes (30 pts)

Five 10-minute quizzes (10 pts each) will be given on Canvas. Each quiz will be based on the Problem Sets posted on Canvas. The lowest 2 quiz grades will be dropped. Problem Sets will not be graded.

Class Participation (20 pts)

You will receive points for participating in discussion section and short online activities and surveys on Canvas.

Final Group Presentations (100 points)

Finals Week: Monday 12/06 3pm-6 pm
Submit Presentations on Canvas by Sunday, 12/5 11pm.

Date	Lecture Schedule
Thursday September 23	Course Introduction <i>In Class Activity: Concept Maps</i> The DNA Molecule and the Central Dogma of Molecular Biology
Tuesday September 28	Mendelian Patterns of Inheritance: From Peas to Humans
Thursday September 30	The Scientific Method & Hypothesis Testing Chromosomal Theory of Inheritance & Meiosis Sex Determination & Dosage Compensation: The Lyon Hypothesis
Tuesday October 5	Mendelian Diseases & Modification of Mendelian Ratios
Thursday October 7	<i>A Human Genetics Research Story: Three Identical Strangers</i> Online QUIZ 1 (Lectures 1-3; Problem Set 1)
Tuesday October 12	Genetic Counseling Guest Lecture: Abby Draves & Emily Montoya UCSD Genetic Counseling Program <i>Be prepared to join in interactive activities with the presenters.</i>
Thursday October 14	Human Population Genetics Genetic Adaptation & Modern Human Evolution: Lactose Intolerance Lactose Intolerance Online QUIZ 2 (Lectures 1-5; Problem Sets 1 & 2)
Tuesday October 19	Genetic Adaptation in the Human Population Guest Lecture: Tatum Simonson, Ph.D., Associate Professor, UCSD SOM Division of Physiology “Genetics of High-Altitude Adaptation” Studying Genetics in the Community Guest Lecture: James Yu, UCSD Department of Medicine, Biomedical Sciences Graduate Program “High- Altitude Adaptation Studies in Nepal” <i>Be prepared to join in an interactive discussion with the presenters.</i>
Thursday October 21	Genetics of Complex Traits and Diseases: Human Pigmentation Online QUIZ 3 (Lectures 1-7; Problem Sets 1-3)
Tuesday October 26	Genetic Association Studies & Molecular Genetic Techniques
Thursday October 28	Epigenetics Online QUIZ 4 (Lectures 1-9; Problem Sets 1-4)
Tuesday November 2	MIDTERM 1 (60 min; IN CLASS) Eugenics (online activity)
Thursday November 4	COVID-19 Related Genetics Group Final Project Sign-Up Deadline
Tuesday November 9	Genetic Studies of Cognition and Alzheimer’s Disease Guest Lecture: William S. Kremen, Ph.D. Professor, UCSD Department of Psychiatry (Lectures 10/1-11/5; Problem Set 5)

Thursday November 11	Veterans Day
Tuesday November 16	<i>Gene Editing & CRISPR</i>
Thursday November 18	Online QUIZ 5 Pharmacogenetics Cancer Genetics
Tuesday November 23	Personalized Medicine Direct-to-Consumer Testing
Thursday November 25	Thanksgiving Holiday! No class
Tuesday November 30	MIDTERM 2 (90 minutes; IN CLASS)
Thursday December 2	Forensic DNA Applications Group Project Discussions (In Class Mandatory Session)
Monday December 6	Final Exam

LECTURES

When possible, lectures will be recorded and available on CANVAS. However, we recommend that you join the live lecture when possible. The benefits of in-person learning in this class will include interacting with scientists who are world renowned in their fields, practicing communicating scientific concepts with your peers and mentors, and it will be fun!

PROBLEM SETS & READINGS

Problem sets to be discussed in Discussion Sections and readings for each week will be posted on TritonEd. Klug et al. Essentials of Genetics, 9th edition is a good reference. You are not required to purchase this textbook. The 8th edition is equally useful and you may be able to find the 8th edition at a discounted price online.

DISCUSSION SECTIONS

Attendance at weekly discussion sections are required. The discussions are designed to help you develop the skills in problem solving and data analysis that will be important on the exams and provide you with the opportunity to build relationships with fellow students and your TA.

FINAL PRESENTATIONS

Students will work in groups of 5-6 to create a 7-8 minute recorded video presentation of a genetics topic of your choice. The videos will be presented during the scheduled Final Exam for the class. All group members must attend the final exam. Students who anticipate issues with attending the final exam should discuss options with the instructor before December 1.

MIDTERM EXAM AND QUIZ INFO AND POLICIES

If you have an illness, injury or personal crisis that you believe will prevent you from performing adequately on an exam, contact the instructor about this problem before the exam to discuss your options. Students facing unstable internet issues should contact the instructor before the exam for

accommodations. A missed exam receives 0 points and there will be no make-up exam for any reason.

Midterm Exams will be taken in lecture class. An 8.5 x 11 inch page of notes (both sides) and a calculator will be permitted at the exam. Phones or other electronic devices may NOT be used. **Quizzes** will be available to take on CANVAS at 5:00pm (PST) on the Thursday date on the syllabus and remain open for 22 hours (until 3pm the next day). The quizzes are designed to be completed within 10 minutes, but the clock will be set at 20 minutes or longer to accommodate for online issues. The lowest 2 quiz grades will be excluded from the computation of the total quiz grade. This should accommodate any missed quiz, for reasons such as: technical difficulties; absence due to sickness, personal or family issues, scientific presentations or conferences, or any other expected or unexpected circumstances. Once you have taken an exam (or part of it), you will not be able to drop the score or negotiate a reduction in its impact on your grade for any reason, so it is imperative that you decide you are well enough to take an exam before it starts. Quizzes are open book but not open to discussion with other humans.

Students with accommodations for exams from the Office of Students with Disabilities must provide their accommodation letter to Dr. Rana at the beginning of the quarter or as soon thereafter as the letter becomes available. Please contact Dr. Rana about a week before each exam to arrange for your accommodation. Please speak with your TA regarding how your accommodation will be applied to quizzes.

After the grading of each exam is completed, you can view your score at the course website in Canvas by clicking "Grades" on the left menu.

If you find an error in the grading of your exam, you can request a regrade by submitting your exam to Dr. Rana in class with a note attached explaining the grading error. The deadline for a re-grade on the midterms is 10 days after taking the midterm. No requests will be considered after this time, except for correction of point addition errors. If you believe there was an error in the grading of one of your quizzes, you must raise this concern within 5 days of the quiz.

ACADEMIC DISHONESTY

Academic dishonest (aka cheating) will not be tolerated in this class. According to UCSD policy, academic dishonesty includes:

- taking an exam for another student
- allowing another student to take an exam for you
- copying another student's work on an exam or quiz
- allowing another student to copy your work
- altering graded assignments and submitting them for a regrade
- utilizing tutors (eg. online, in-person, phone, text) during exams and quizzes

Any student caught or suspected of violating the principles of academic integrity at UCSD by doing one of the things on the list above will be reported to the UCSD Academic Integrity Coordinator and the Dean of the student's college. Confirmed cases of cheating will result in a reduction in the student's grade – violations determined by the instructor as particularly serious (e.g. cheating on an exam or repeated instances of cheating) will result in the student receiving an F as their final grade as well as other disciplinary actions determined appropriate by the Academic Integrity Coordinator.