BILD 20: Human Genetics in Modern Society

2020 Summer Session I
Lectures: M & W 5:00-7:50 pm LIVE ONLINE: https://uchealth.zoom.us/j/93152448698
Instructor: Brinda K. Rana, Ph.D.
Email: Via Canvas
TA: Melody Nazarbegian, M.S.
Email: mnazarbe@ucsd.edu or via Canvas
Office Hours: Make an appointment-- https://melodynazarbegian.youcanbook.me/
Discussion Sections: M & W 4:00-4:50 pm or Tues & Thurs 3:00-3:50 pm LIVE ONLINE: https://ucsd.zoom.us/j/99308883342
Website: Log onto your Canvas account at https://canvas.ucsd.edu using 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 critically evaluate genetic reports in the media.

Grading

A total of 200 points are available for the course. Grades are based on the total number of points earned through the evaluation (see right column):
≥180 points (90%) A (A+, A or A-)
≥160 points (80%) B (B+, B or B-)
≥140 points (70%) C (C+, C or C-)
≥120 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

Midterm (100 points)
Monday, July 27 5:00-6:30 pm on Canvas.

Quizzes (40 pts)
Two 20-minute quizzes (20 pts each) will be given at the end of Wed lectures (July 13 and 22). Each quiz will be based on the problem sets posted on Canvas.

Class & Discussion Participation (10 pts)
Throughout the course, there will be short online activities and surveys worth a total of 10 points.

Final Group Presentations (50 points)
Date/Time: Friday, July 27, 2020, 7:00-9:50 pm

Date	Lecture Schedule
Monday 6/29	1. Course Introduction 2. The DNA Molecule and the Central Dogma 3. COVID-19 Genetics Part I 4. Mendelian Patterns of Inheritance
Wednesday 7/1	1. Mendelian Patterns of Inheritance Part II 2. The Scientific Method & Hypothesis Testing 3. Chromosomal Theory of Inheritance & Meiosis 4. Mendelian Diseases & Modification of Mendelian Ratios
Monday 7/6	1. ***Genetic Counseling Guest Lecture***: Yvonne Cardona & Claire Shepard, UCSD Genetic Counseling Program 2. Population Genetics: Genetic Variants & Markers 3. Genetic Adaptation & Modern Human Evolution: Lactose Intolerance
Wednesday 7/8	1. ***Genetic Adaptation in the Human Population*** ***Guest Lecture:*** Tatum Simonson, Ph.D., Associate Professor, UCSD SOM Division of Physiology "Genetics of High-Altitude Adaptation" 2. ***Studying Genetics in the Community Guest Lecture:*** James Yu, UCSD Department of Medicine, Biomedical Sciences Graduate Program "High-Altitude Adaptation Studies in Nepal" 3. COVID-19 Genetics Part II
Monday 7/13	1. Genetics of Complex Traits and Diseases 2. Study Design in Genetics Research 3. Genome Wide Association Studies ***QUIZ***
Wednesday 7/15	1. Sex Determination & Dosage Compensation: The Lyon Hypothesis 2. Epigenetics 3. Twin Genetics
Monday 7/20	1. ***Genetic Studies of Cognition and Alzheimer's Disease Guest Lecture:*** William S. Kremen, Ph.D. Professor, UCSD Department of Psychiatry 2. ***Polygenic Risk Analysis Guest Lecture:*** Jeremy Elman, Ph.D., Assistant Professor, UCSD Department of Psychiatry 3. COVID-19 Genetics Part III
Wednesday 7/22	Molecular Genetic Tools: 1. ***CRISPR Guest Lecture:*** Victor del Amo, Ph.D. Post-Doctoral Fellow, UCSD School of Medicine 2. ***RNAi Guest Lecture:*** Melody Nazarbegian, M.S., UCSD School of Medicine 3. Cancer Genetics 4. Review ***QUIZ***
Monday 7/27	1. Midterm 2. Group Project Q&A (7-7:50pm)
Wednesday 7/29	1. Personalized Medicine 2. Direct-to-Consumer Testing 2. DNA Fingerprinting 3. Eugenics

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 will be available in Course Reserves (https://reserves.ucsd.edu/ares/). You are not required to purchase this text book. The 8th edition is equally useful and you may be able to find the 8th edition at a discounted price online.

DISCUSSION SECTIONS

Weekly discussion sections 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. Students will submit their selected topic by the end of lecture on July 15. A 10-minute (live) oral presentations will be given online (ZOOM) by each group during the set Final Exam time: July 31 7-9:50pm. One copy of the slides is to be turned in by each group on CANVAS by 10:30am, July 31. Sign-ups for oral presentation time slots will be conducted by lottery. Students who anticipate issues with attending the live online oral presentation should discuss options with the instructor.

EXAM AND QUIZ INFO AND POLICIES

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 midterm is August 1. No requests will be considered after this date, 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 before July 31.

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. If you cannot do this and miss an exam for one of these reasons, contact the instructor as soon as possible. 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.

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+
- responding to clicker questions in class using another student's clicker*

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.