
BILD 20: Human Genetics in Modern Society

2018 Summer Session I

Lectures: Tu & Th 2:00-4:50 pm in Center Hall 222

Instructor: Brinda K. Rana, Ph.D.

Email: bkрана@ucsd.edu

Instructor Office Hours: Mondays 5:00-6:00 pm (beginning July 10)

Fridays 4:00-5:00 pm

Stein Clinical Research Bldg. (in the School of Medicine) Room 147

Website: <https://tritoned.ucsd.edu/>

Course Description

This course will introduce students to the principles of genetic inheritance in human populations and current applications of human population 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.
- ❖ Develop mathematical/statistical skills to analyze genetic data.
- ❖ Learn how to use online resources to learn about 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 500 points are available for the course. Grades are based on the total number of points earned through the evaluation (see right column):

≥450 points (90%) A (A+, A or A-)

≥400 points (80%) B (B+, B or B-)

≥300 points (60%) C (C+, C or C-)

≥250 points 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 (160 points)

Date/Time: July 19, 2018 2:00-3:45pm

Location: Center Hall 222

Covers material through July 17.

Final (225 points)

Date/Time: August 4, 2018 3:00-5:59 pm

Covers material from entire course.

Quizzes (45 pts)

20 minute quizzes will be given during the Wed sections (July 11, 18, 25, Aug 1). Each quiz will be based on the problem set posted the week before on TritonEd.

Clickers Questions (50 pts)

Questions will be asked in class that you will respond to using an i>Clicker. Each question is worth 1 point (half for answering at all, another half for answering correctly). Answers will start counting for credit on July 5. A cumulative total of your clicker points for the quarter will be posted at the end of each week on TritonEd. Once you reach the maximum possible 50 points, your clicker point total will not go any higher. See Clickers section pg. 3 for more info.

Class & Discussion Participation (20 pts)

10 points will be awarded by your instructor for participation in activities in the lecture and an additional 10 points will be awarded by your IA for consistent attendance and high quality participation in discussion sections.

Date	Lecture Schedule	In-class Activity	Mathematical & Statistical Concepts
7/3	1. Course Introduction 2. Mendelian Patterns of Inheritance	DNA Extraction, Concept Map, Concept Inventory	Product and Sum Laws of Probability
7/5	1. Mendel's Fourth Postulate: Independent Assortment 2. Chromosomal Theory of Inheritance & Meiosis	Pedigree Analysis with Genetic Counselor Grad Students	Pearson Chi-Square Test
7/10	1. DNA, Genes, Genetic Variants, Genetic Markers and Databases 2. Modifications to Mendelian Patterns of Inheritance 3. Genetic Association Analysis	Haplotype Inference	Maximum Parsimony Pearson Chi-Square Test
7/12	1. Evolution of Genes and Human Traits 2. Quantitative Genetics	Co-Evolution of Genes & Culture: The Lactase Story	Variance
7/17	1. "Family Studies on Alcohol Abuse Disorders" <u>Guest Lecture</u> by Marc Schuckit, M.D. UCSD Department of Psychiatry 2. "Characterizing Genetic Ancestry: Implications for Identifying Disease-Causing Genes" <u>Guest Lecture</u> by Nicholas Schork, Ph.D. J. Craig Venter Institute and UCSD School of Medicine	Midterm Review	
7/19	1. Midterm Exam 2:00-3:45 2. Epigenetics I		
7/24	Twin Methods <u>Guest Lecture</u> by Daniel Gustavson, Ph.D., UCSD Department of Psychiatry & the Center for Behavioral Genomics	Heritability	Variance, Co-variance
7/26	1. Epigenetics II: Twins 2. Genomic Methods: DNA Sequencing, Microarrays, and Genotyping	Media Misconceptions	
7/31	1. Psychiatric Genetics and Neurocognitive Aging <u>Guest Lecture</u> by William Kremen, Ph.D., UCSD Department of Psychiatry & the Center for Behavioral Genomics 2. The issue of multiple comparisons	Reading Scientific Literature	Polygenic Risk Scores, Multiple Comparisons
8/2	Direct-to-Consumer Genetics and Applications Personalized Medicine	Final Exam Review	Risk Scores
8/4	Final Exam		

PROBLEM SETS & READINGS

Problem sets to be discussed in Discussion Sections and readings for each week will be posted on TritonEd. Excerpts from Klug et al. Essentials of Genetics, 8th edition will be available in Course Reserves (<https://reserves.ucsd.edu/ares/>). You are not required to purchase this text book.

CLICKERS

You will need an i>clicker for this class – other clicker brands will not work, but any i>clicker model will work. You can buy a new or used one at the UCSD Bookstore or another source. Regardless of where you got it, you will need to register your i>clicker on TritonEd (<https://triton.ed.ucsd.edu/>) to get credit for your responses: after you login and select this class, in the blue menu block on the left click on “i>clicker Registration”. On the next page, enter the serial no. from the back of your clicker. You only need to register the clicker once - if you have done this before for another class at UCSD you are done. DO NOT register your clicker at iclicker.com – this will not get you into the TritonEd database for UCSD classes!! Do not switch clickers mid-quarter unless it is absolutely necessary. If you must switch, notify the instructor because your two clicker response records will need to be manually stitched together. Allowances will not be made for forgotten or malfunctioning clickers (e.g. dead batteries), absence from class regardless of the reason, or adding the class late. There will be enough “extra” clicker questions to give everyone a fair shot at earning the maximum of 50 clicker points in spite of issues such as missed lectures or mechanical failure. **Register before July 4.**

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 IA. Sections will meet for the first time in week 2 starting July 9. Beginning in week 2, a 15 point quiz will be given during your Wed discussion sections. There will be a total of 4 quizzes. Each quiz will consist of a problem from the homework set posted on TritonEd the week before and short questions (e.g. multiple choice). Bring a pen to take the quiz. Every student can drop their lowest quiz score, including zeros resulting from missing section for any reason. Credit will only be given for quizzes taken in the section you are enrolled in.

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 IA 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 TritonEd by clicking "My Grades" on the left menu below the Syllabus for the course. A weekly update of cumulative clicker points for the quarter will also be posted here at the end of every week. After the quarter ends, your discussion section points (quiz + participation points) and final grade will also be posted here.

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 July 31 and the final exam is August 15. 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 with your IA on the day you receive your quiz back.

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. See Discussion Sections for discussion of the impact of missed quiz scores due to absence from Section.

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*

* If a student is using more than one clicker, both clickers will be confiscated immediately for the remainder of the class period.

⁺Altering an exam and submitting it for a regrade is a bad idea. Each exam will be photographed prior to returning them to students, and exams handed in for a regrade will be checked against the original.

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.