MCB 140 GENERAL GENETICS

An in depth introduction to genes, their sexual and asexual transmission in individuals and populations, and gene regulation in prokaryotes and eukaryotes. Gene manipulation by recombination, molecular cloning and genome editing is presented in contexts ranging from fundamental mechanisms of chromosome biology to applications in development, aging and disease. Human genetic variation and its quantitative evaluation are illuminated. Non-Mendelian and epigenetic modes of inheritance of transposable elements, prions and chromatin states are paired with discussions of groundbreaking technology rewriting the rules of how the genome is analyzed, with attention to the ethical considerations ranging from the history of eugenics to modern controversies.

We will post information and updates on bCourses.

Textbooks
We are transitioning from:

Introduction to Genetic Analysis, Griffith *et al*., 11th Edition. Macmillan, (now optional),
to
Russell, iGenetics, third edition, which can be downloaded for free using this link:
https://ia601600.us.archive.org/7/items/IGenetics3rdPeterJ.Russell/iGenetics%2C%203rd%20%28Peter%20J.%20Russell%29.pdf (Links to an external site.)

Both texts are fine, and we will do our best to give you reading assignments for both texts.

Important dates
- Week of Feb 11: Section Quiz 1
- Feb 27 Midterm 1, Mulford 159 and North Gate Hall 105 7-8:30pm
- Week of March 18: Section Quiz 2
- April 3 Midterm 2, Dwinelle 145 7-8:30pm
- Week of April 29: Section Quiz 3
- Exam week: Midterm 3 and Final combined. Date and Room TBD

Discussion sections
There will be no discussion sections the first week. Discussion sections will begin the week of January 22. Monday Feb 19 is a holiday, and students in the Monday section should try to attend either the Wednesday or Friday section. There will be NO mini quiz that week.
You have been assigned to a discussion section. If you want to change, you must get approval from the GSIs first.

GSIs:
Anthony Harris anthony_harris@berkeley.edu
Alec Uebersohn auebersohn@berkeley.edu

Instructors:
Elçin Ünal: elcin@berkeley.edu
Office Hours: Fridays 12-2 PM 622 Barker

Henk Roelink: roelink@berkeley.edu
Office Hours: Fridays 1-3PM 171 Koshland

Jasper Rine: jrine@berkeley.edu
Office Hours: Mondays 4-5 231 Barker, Tuesday 2-3 231 Barker

Grading
8 mini-quizzes in discussion section, 2 points each (16 points)
3 longer quizzes in section, 25 points each (75 points)
Section Participation (9 points)
Two midterms 150 points each (300 points)
Final: 300 pts (150 pts for midterm 3, and 150 points comprehensive)
700 points total.
We will assign grades on a curve.

Cheating
A good lifetime strategy is always to act in such a way that no one would ever imagine that you would even consider cheating. Anyone caught cheating on a quiz or exam in this course will receive a failing grade in the course and will also be reported to the University Center for Student Conduct. In order to guarantee that you are not suspected of cheating, please keep your eyes on your own materials and do not converse with others during the quizzes and exams.

Make-up exams
There will be no make-up exams. Failure to take an exam without an excuse will result in a zero grade for the missed exam. If you have a legitimate excuse, your absence will be accepted for only one missed exam, and only if you contact the lecturing professor or one of the GSIs one week before the exam and provide convincing documentation to support your request. Credit for the missed exam will be calculated based on your average performance on the exams that you do take.

Regrades
Written re-grade requests must be presented to your GSI within seven days after the exams are returned. You must present to your GSI the graded exam and a written proposal describing why you believe an error was made. The entire exam will then be subjected to a re-grade. Exams will be copied before they are returned. Any alteration of an exam submitted for a re-grade will be considered as cheating and will result in an F for the course. The case will be escalated to the Center for Student Conduct.

Students with special needs
Contact Roelink by email ASAP.

Schedule

Wednesday	1/23/18	lecture 1	Mendel part I- intro into genetics and Mendel, power of traits, law of segregation	Elçin Ünal	
Friday	1/25/18	lecture 2	Molecular definition of a gene	Elçin Ünal	
Monday	1/28/18	lecture 3	Mendel continued- law of segregation and independent assortment + basic principles of probability	Elçin Ünal	
Wednesday	1/30/18	lecture 4	Meiosis and abnormalities in chromosome structure/number	Elçin Ünal	Mini 1
Friday	2/1/18	lecture 5	Complementation	Elçin Ünal	
Monday	2/4/19	lecture 6	Epistasis-I	Elçin Ünal	
Wednesday	2/6/19	lecture 7	Epistasis-II	Elçin Ünal	Mini 2
Friday	2/8/19	lecture 8	Chromosome theory of inheritance	Elçin Ünal	
Monday	2/11/18	lecture 9	Recombination and linkage-part I	Elçin Ünal	
Wednesday	2/13/19	lecture 10	Recombination and linkage-part II	Elçin Ünal	Quiz 1
Friday	2/15/19	lecture 11	Recombination and linkage-part III	Elçin Ünal	
Monday	2/18/19	**Presidents' day**			
Wednesday	2/20/19	lecture 12	Principles and methods of genetic analysis-I (setting up a genetic screen)	Elçin Ünal	
Friday	2/22/19	lecture 13	Principles and methods of genetic analysis-II (cloning)	Elçin Ünal	Mini 3
Monday	2/25/19	lecture 14	Principles and methods of genetic analysis-III (suppressor genetics-I)	Elçin Ünal	
Wednesday	2/27/19	lecture 15	Conditional alleles	Jasper Rine	Midterm 1
Friday	3/1/19	lecture 16	Gene Isolation and Manipulation	Jasper Rine	
Monday	3/4/19	lecture 17	Mutation I	Jasper Rine	
Wednesday	3/6/19	lecture 18	Mutation II: DNA Repair and Checkpoints	Jasper Rine	Mini 4
Friday	3/8/19	lecture 19	Bacterial genetics	Jasper Rine	
Monday	3/11/18	lecture 20	Bacteriophage Genetics	Jasper Rine	
Wednesday	3/13/19	lecture 21	Transposable Elements	Jasper Rine	Mini 5
Friday	3/15/19	lecture 22	Prokaryotic Gene Regulation	Jasper Rine	
Monday	3/18/19	lecture 23	Eukaryotic Gene Expression	Jasper Rine	
Wednesday	3/20/19	lecture 24	Eukaryotic Regulation	Jasper Rine	Quiz 2
Friday	3/22/19	lecture 25	Chromatin	Jasper Rine	
Monday	3/25/19				
Wednesday	3/27/19	**Spring Break**			
Friday	3/29/19				
Monday	4/1/19	lecture 26	Epigenetics	Jasper Rine	
Wednesday	4/3/19	lecture 27	Genetic Drift nd HW Equilibrium	Jasper Rine	Midterm 2
Friday	4/5/19	lecture 28	Gene drives	Jasper Rine	
Monday	4/8/19	lecture 29	Fly Developmental Genetics I, the balancer chromosome; screening for embryonic lethal genes	Henk Roelink	
Wednesday	4/10/19	lecture 30	Fly Developmental Genetics II, parceling out development mosaic screens	Henk Roelink	Mini 6
Friday	4/12/19	lecture 31	Genetics of Cancer I, inhereted cancer risks, Li Fraumeni, Gorlin syndrome and Breast Cancer	Henk Roelink	
Monday	4/15/19	lecture 32	Genetics of Cancer II, transfections, viruses, oncogenes	Henk Roelink	
Wednesday	4/17/19	lecture 33	RNAi, shRNA, morpholinos	Henk Roelink	Mini 7
Friday	4/19/19	lecture 34	Gentics of coat color and composition	Henk Roelink	
Monday	4/22/19	lecture 35	Cloning genes by phenotype	Henk Roelink	
Wednesday	4/24/19	lecture 36	Quantitative genetics, GWAS	Henk Roelink	Mini 8
Friday	4/26/19	lecture 37	Forward Genetics in mouse I, Stem cells, knock outs and knock ins	Henk Roelink	
Monday	4/29/19	lecture 38	Forward Gentics in mouse II, Cre Lox, B	Henk Roelink	
Wednesday	5/1/19	lecture 39	Genome editing TALENS Crisprs- generation of ds break - repair modes -	Henk Roelink	Quiz 3
Friday	5/3/19	lecture 40	Eugenics	Henk Roelink	