

MCB 104 Genetics, Genomics, and Cell Biology

Schedule of lectures and events*

*subject to change

	Lecturer	Topic	Readings; web resources; etc
Wed-Jan19	AD	Mitosis and the cell cycle	ECB Ch 5, 18
Fri-Jan21	AD	Meiosis	ECB Ch 19
Mon-Jan24	XD	Introduction; Mutations 1	Hartwell 1.1-1.3, 4.1, 4.3, 4.4
Wed-Jan26	XD	Mutations 2; Genotypes and phenotypes	Hartwell 7.1-7.3, 7.5, Ch 2
Fri-Jan28	XD	Transmission genetics; Fate of new mutations	Hartwell Ch 2, 3
Mon-Jan31	XD	Recombination 1	
Wed-Feb2	XD	Recombination 2	
Fri-Feb4	XD	Sex chromosomes	
Mon-Feb7	XD	Mitochondria and human migrations	
Wed-Feb9	XD	Population genetics 1	
Fri-Feb11	XD	Population genetics 2	
Mon-Feb14	XD	Genetics and molecular mechanism 1	
Wed-Feb16	XD	Exam 1 - Genetics	
Fri-Feb18	NK	From genome sequencing to biological insight - pt I	Next Generation Sequencing; Reference reading: Hartwell Ch. 9.3-9.4
Mon-Feb21		Academic & Administrative Holiday (Presidents' Day)	
Wed-Feb23	NK	Genome assembly	Refresher on coding DNA in the genome; Reference reading: Hartwell Ch. 10; The search for a mutated gene
Fri-Feb25	NK	Genome annotation	
Mon-Feb28	NK	Classical genetics: from phenotype to gene	Christiane Nüsslein-Volhard and Eric Wieschaus; Reference reading: Hartwell Ch. 19

Wed-Mar2	NK	Reverse genetics: from gene to phenotype	CRISPR-Cas9 intro; Genome Editing of Mosquitoes; Discovery Story (Doudna, Jinek, Charpentier) ; Reference reading: Hartwell Ch. 18
Fri-Mar4	NK	Perturb-Seq: uniting reverse genetics and classical genetics	
Mon-Mar7	FR	Chemical Genetics	
Wed-Mar9	NK	Canine Genetics	Canine Genetics
Fri-Mar11	NK	Bacterial genetics and suppressor screens	
Mon-Mar14	NK	Viral diversity, genomics and evolution	
Wed-Mar16	NK	Viral influences on human genetics and genomics	Viral transcriptional regulation
Fri-Mar18	NK	Exam 2 - Genomics	
Mon-Mar21		Spring Recess	
Wed-Mar23		Spring Recess	
Fri-Mar25		Academic & Administrative Holiday (Cesar Chavez Day)	
Mon-Mar28	AD	Overview of Cell Biology - what it is and how we study it	ECB Chapter 1; https://www.ibiology.org/talks/light-microscopy/
Wed-Mar30	AD	Cytoskeleton I - microtubules	ECB Chapter 17
Fri-Apr1	AD	Cytoskeleton 2 - actin and pathogenesis	ECB Chapter 17; https://www.ibiology.org/sessions/session-5-cell-motility/
Mon-Apr4	AD	Membranes, membrane proteins, fluorescence labeling, and GFP	ECB Chapter 11; https://www.ibiology.org/talks/fluorescent-proteins/
Wed-Apr6	AD	Protein trafficking I	ECB Chapter 15
Fri-Apr8	AD	Protein trafficking II	
Mon-Apr11	AD	Signaling	ECB Chapter 16
Wed-Apr13	AD	Phase separation	https://animationlab.utah.edu/phase-separation#phase-separation_intro
Fri-Apr15	AD	Exam 3 - Cell Biology	
Mon-Apr18	XD	Genetics of Cancer	

Wed-Apr20	AD	Cell Biology of cancer	ECB Chapter 20
Fri-Apr22	NK	Genomics of cancer	https://www.nature.com/articles/d41586-022-00976-w ; https://www.nature.com/articles/d41586-021-02269-0
Mon-Apr25	XD	Genetics of infectious disease	
Wed-Apr27	AD	Cell Biology of infectious disease	
Fri-Apr29	NK	Genomics of infectious disease	Natural selection during an outbreak
Mon-May2		Reading/Review/Recitation Week	
Wed-May4		Reading/Review/Recitation Week	
Fri-May6		Reading/Review/Recitation Week	
Mon-May9	AD/NK/XD	Exam 4 - Cancer and Infections Disease	

Grading

Module Exams (50 pts each X 4, drop lowest score)	150 pts
Mini-quizzes (5 pts each X 10, remove bottom two scores)	40 pts
Total:	190 pts

Final grades for the course are based on a holistic assessment of student performance; grade thresholds are not predetermined.

Quiz and Exam policies (subject to change)

Exams will be administered during class on Feb. 16, March 18, and April 15, and May 9.

We understand that students may face particular challenges due to the ongoing COVID pandemic, remote learning, and other circumstances. For this reason we are allowing everyone to drop their lowest exam score. The last exam will not be

cumulative, but it will be based on the final part of the course, which includes concepts from Genetics, Genomics, and Cell Biology.

Quizzes will be taken in section (whether remote or in-person). The lowest 2 scores on your Quizzes will not factor into your final grade. These are closed-book and students are expected to work independently, without reference materials.

Missed quizzes and exams

There will be no make-up quizzes or exams. However, all students will have their lowest two quiz grades and their lowest exam grade dropped before calculation of the final grade.

Course discussions, Q&A

Students are STRONGLY ENCOURAGED to ask questions in lecture, discussion sections, and office hours. We will also use [Piazza \(Links to an external site.\)](#) for Q&A about the course content and logistics; this will be monitored by the faculty and graduate student instructors to ensure accurate answers. You can post questions anonymously (the instructors will see who posts them, but other students will not).

To communicate privately with your GSI or faculty instructor, please contact them through the bCourses site or by email, as specified in the Instructor list, above.

Textbooks

The textbook readings listed next to the lectures on the syllabus are intended as support for the lecture material. Our emphasis is on the lecture material, and the readings are optional, but will likely be helpful for students who learn better by reading than by listening or feel confused by aspects of the lectures. Free versions of relevant textbooks will be available through the MCB 104 bCourses site.

[Genetics: From Genes to Genomes](#)

By Leland Hartwell and Michael Goldberg and Janice Fischer and Leroy Hood

[Essential Cell Biology \(5th Edition\)](#)

Bruce Alberts, Karen Hopkin, Alexander Johnson, David Morgan, Martin Raff, Keith Roberts, and Peter Walter

POLICIES and GUIDANCE

Academic Integrity

The Instructors will do our best to provide a valuable learning experience; we expect that students will contribute to the course through participation, and by acting in good faith. We encourage you to collaborate to help each other understand the material, but expect you to do all assignments (Quizzes and Exams) on your own. 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 will receive a failing grade and will also be reported to the University Center for Student Conduct. We understand that remote instruction creates unique opportunities and temptations for plagiarism and inappropriate collaboration, but bear in mind that it also offers tools to detect cheating. To ensure that you are not suspected of cheating, please carefully follow the guidelines set out at the time of the quizzes and exam. Please refer to the [UC Berkeley honor code \(Links to an external site.\)](#) and [Student Conduct Guide and PoliciesLinks to an external site.](#)

Disabilities and Accommodations

Students who need accommodations for disabilities should request them through the [Disabled Students' ProgramLinks to an external site.](#), 260 César Chávez Center, 642-0518 (voice), dsp@berkeley.edu. DSP is the campus office responsible for assessing, verifying, and planning for disability-related academic accommodations. We understand that the office is currently struggling to meet demands, and accommodation requests may not have been implemented before the beginning of the semester. All students requiring accommodations should also contact the course assistant, [Jonathan Karr](#), during the first week of the course to communicate their needs. Additionally, if you have emergency medical information you wish to share with the instructional team, please inform Jonathan as early as possible during the semester. DSP requests and medical information will be kept confidential from students and instructors.

Safe, Supportive, and Inclusive Environment

All MCB 104 instructors and students are expected to foster a safe and inclusive learning environment. The [Office for the Prevention of Harassment and Discrimination \(OPHD\)Links to an external site.](#) is responsible for ensuring the University provides an environment for faculty, staff and students that is free from discrimination and harassment on the basis of categories including race, color, national origin, age, sex, gender, gender identity, and sexual orientation. Questions or concerns? Call (510) 643-7985, email ask_ophd@berkeley.edu, or go to <http://survivorsupport.berkeley.edu/Links to an external site.>

Whenever a faculty member, staff member, post-doc, or GSI is responsible for the supervision of a student, a personal relationship between them of a romantic or sexual nature, even if consensual, is against university policy. Any such relationship

jeopardizes the integrity of the educational process and will not be tolerated in this course.

Although faculty and staff can act as excellent resources for students, you should be aware that [we are often required to report any violationsLinks to an external site.](#) of this campus policy if we become aware of them. If you wish to have a confidential discussion on matters related to this policy, you may contact the Confidential Care Advocates on campus for support related to counseling or sensitive issues. Appointments can be made by calling (510) 642-1988.

Mental Health

If you are experiencing stress, anxiety, or other forms of distress during the semester, we hope to be a resource for you. Please reach out to your GSI or one of the Professors.

If you need support there are many resources available to you. All registered Berkeley students are eligible to use [Counseling and Psychological Services \(CAPS\)Links to an external site.](#). You do not have to purchase the Student Health Insurance Plan to use these services. The first five counseling sessions are free for registered Berkeley students. Counselors can provide support in academic success, life management, career and life planning, and personal growth and development.

UC Berkeley, Counseling Psychological Services:

- Please call (510) 642-9494 or stop by the office on the 3rd floor of the Tang Center to make an appointment with a counselor.
- Drop-in counseling for emergencies: Monday - Friday, 10:00AM - 4:30PM
- After hours counseling: In the case of emergencies at night or on weekends, call (855) 817-5667 for free assistance and referrals. Request to speak with a counselor.
- For emergency support: Call UCPD 911 or (510) 642-3333
24 Hour Crisis Hotlines:
- Alameda County Crisis Line: (offers confidentiality, TDD services for deaf and hearing impaired callers and translation in 140 languages) Call 1-800-309-2131
- National Crisis Help Line: Call 1-800-273-TALK
- National HopeLine Network: Call 1-800-SUICIDE

We also ask that you look out for your fellow peers. If you see any of the signs below that may indicate your classmate may need assistance, please use the resources above or reach out to the GSI or Professors.

- Withdrawing from other people
- Changes in weight or eating patterns
- Changes in sleeping patterns
- Fatigue or lack of energy
- Increased anxiety or irritability

- Feeling worthless or hopeless

Reference Letters

If you desire a reference letter, please contact your GSI at least two weeks before the letter is due. The GSI will draft a letter, which will then be revised and co-signed by one of the instructors.