

MCB 141 Developmental Biology

Faculty

Richard Harland (harland@berkeley.edu) Craig Miller (ctmiller@berkeley.edu), with guest lectures by Megan Martik, martik@berkeley.edu Iswar Hariharan ikh@berkeley.edu, David Bilder bilder@berkeley.edu, and Michael Levine

Prerequisites: 102 or C100A; Biology 1A, 1AL, and 1B; 110 or 130 recommended

Class: We will present lectures in person, and not hybrid, so you are encouraged to attend class and contribute to questions and clarifications. We will use Course Capture, but cannot guarantee that this will work perfectly.

Faculty office hours will be on Zoom, but Harland also allows in person attendance (571 Weill Hall). Harland is also baffled that more people don't take advantage of office hours. If you plan on asking for a recommendation, it is useful to attend office hours. He will answer questions at any level or on any topic, time permitting.

Discussion Sections: You are expected to attend the meetings of your assigned section as this is essential for both your comprehension and your grade. Sections will be based primarily on lecture material, with some supplementary material by the GSI.

Textbook (recommended, not required):

You do not need to purchase an expensive textbook. Referenced Textbook (recommended, not required): Scott F. Gilbert, Developmental Biology, Eleventh (2016, with Michael F. Barresi), or Tenth (2014), or Ninth (2010). You can purchase the twelfth if you must, but it will presumably cost more. The sixth edition of the textbook is available free online through the [NCBI bookshelf \(Links to an external site.\)](#), though it cannot be browsed, and instead must be searched through keywords to find the material. We will give page references for the eleventh edition throughout the course, but much of the content of 12, 10, 9, 8, 7, and 6 is similar. We will provide the lecture slides and notes for reference and study, in addition to course capture of the lecture. The main content of this course will be the lecture material, some of which is not in the textbook (including recent findings that haven't made their way into any textbook yet). So the textbook serves to support a subset of the lecture material.

Scott F. Gilbert, and Michael Barresi Developmental Biology, Eleventh Edition, 2013 Sinauer Associates, Inc., Sunderland, MA. <http://11e.devbio.com> (Links to an external site.) is the online companion for the eleventh edition.

How grades will be assigned.

Exams: We are following the recommendations of the campus in reducing the emphasis on midterms and finals, and instead adding more weight to take homes and quizzes in section. Since it is easy to look up the answers to "regurgitation questions", we have moved midterms and the final to a model that tests your understanding of the material through short answer format, and including the design of experiments. Exams will be held through Gradescope remotely

Code of Conduct: We assume that you have read, and will abide by the student code of conduct and academic integrity: <https://sa.berkeley.edu/conduct/integrity>

Plagiarism: It is your responsibility to familiarize yourself with the University's policies governing plagiarism. You may find [this website](#) helpful in defining and avoiding plagiarism. We note that Gradescope exams make it possible to cheat by **collusion**. But we have become very good at spotting this and collusion will be penalized as cheating. All graded work should be your own, though we encourage you to collaborate in study groups **before** you start your individual contributions to graded work.

There will be two midterms and a final exam. Midterms are on the dates indicated in course outline on the lecture topics page and the time and location of the final will be posted. The midterm exams will be designed to fit into one hour, but you will be given the complete class time to allow time to compose organized answers. The final will be three hours.

Please contact faculty if you have a serious conflict with the exam dates/times, and we can try to accommodate a later time slot. No earlier time slots are available. Regrade requests must be submitted in writing before the first lecture following the return of the exams. All the exams will be done on Gradescope.

Points: We are back to in person lecture classes, but we are still following the recommendation to reduce the point value of formal exams (half), and weighting more on the work related to sections (half). The course will be graded on the basis of 1000 possible points: each midterm is worth 125 points; the final will consist of a midterm covering the final third of the course (125 pts) and a cumulative section covering the entire course (125 pts); Placeholder for GSI syllabus 500 points

Ed Discussion: We will be using a new online platform [Edstem](#) this semester. You may post questions that you have about the course to this site (anonymous to your peers, if you wish) and they will be answered by either a fellow student or a GSI. You are encouraged to respond to each other's questions – this is a great way to help your classmates and also an excellent way to study! We may "endorse" student answers or provide clarification. Please read other Ed Discussion questions before posting, as GSIs will not respond to repeat questions. GSIs will monitor Ed regularly and respond to questions within 24 hours. For academic holidays, responses to questions will be within the next instructional day. For questions asked after 5 PM on Fridays, GSIs will respond by Monday at the latest.

Please note that this tool is meant to facilitate collaborative learning with your peers and is not meant to replace existing study resources. It is still your responsibility to verify answers through other resources (eg. textbook, lecture notes, discussion sections, office hours, etc.)

Letters of recommendation: Of course, if you plan on asking for a letter of recommendation, it should be obvious to you that you should take an active part in both lectures and section, so we know who you are, and so that we can write an informed letter. Attendance at office hours might also help the instructors recall your strengths. Most letters contain contributions from the GSI and an instructor.

Disabilities: If you need disability-related accommodations in this class, if you have emergency medical information you wish to share with us, or if you need special arrangements in case the building must be evacuated, please inform the professor and your GSI immediately. We do have access to the letters, and will implement time adjustments through Gradescope

Students who need academic accommodations (for example, a notetaker), should request them from the [Disabled Students' Program](#), 260 César Chávez Center, 642-0518 (voice or TTY). DSP is the campus office responsible for verifying disability-related need for academic accommodations, assessing that need, and for planning accommodations in cooperation with students and instructors as needed and consistent with course requirements. [Click here](#) for more information.

Safe, Supportive, and Inclusive Environment

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.

Although faculty and staff can act as excellent resources for students, you should be aware that they are required to report any violations of this campus policy. 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.

The classroom, lab, and work place should be safe and inclusive environments for everyone. The Office for the Prevention of Harassment and Discrimination (OPHD) 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/>.

Mental Health & Wellness

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, depression, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. UC offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, consider utilizing the confidential mental health services available on campus. we encourage you to reach out to the Counseling Center for support (<https://uhs.berkeley.edu/counseling>, (510) 642-2000). An on campus counselor or after-hours clinician is available 24/7.

Lecture Schedule

Lecture 1	Tuesday Jan 17	RMH	Introduction to Developmental Biology: history and questions; Differentiation and Morphogenesis; Nuclear equivalence and reprogramming.
Lecture 2	Thursday Jan 19	RMH	Introduction to Xenopus Development- oogenesis, fertilization and the early cell cycle
Lecture 3	Tuesday Jan 24	RMH	Symmetry breaking Dorsal Ventral determination
Lecture 4	Thursday Jan 26	RMH	Endo mesoderm induction and synergy of signaling pathways
Lecture 5	Tuesday Jan 31	RMH	Gastrulation
Lecture 6	Thursday Feb 2	RMH	Neural induction and neurulation
Lecture 7	Tuesday Feb 7	RMH	Early amniote development (Chick and mouse), Nodal signaling
Lecture 8	Thursday Feb 9	RMH	Left right asymmetry; Notch signaling and pluripotency
Lecture 9	Tuesday Feb 14	RMH	Patterning the spinal cord
Midterm 1	Thursday Feb 16		Midterm I: 11:10-12:30 (covering Lectures 1-8)
Lecture 10	Tuesday Feb 21	IKH	Regulation of growth during development
Lecture 11	Thursday Feb 23	IKH	The biology of regeneration
Lecture 12	Tuesday Feb 28	CTM	Somite development and clock oscillation
Lecture 13	Thursday Mar 2	CTM	Limb development 1: AER and ZPA

Lecture 14	Tuesday Mar 7	CTM	Limb development 2: forelimb vs. hindlimb
Lecture 15	Thursday Mar 9	CTM	Periodic pattern formation: Turing patterns and genetics vs. generics
Lecture 16	Tuesday Mar 14	CTM	Branching morphogenesis
Lecture 17	Thursday Mar 16	MM	Neural crest development
Lecture 18	Tuesday Mar 21	CTM	Hox genes
Midterm II	Thursday March 23		Midterm II: 11:10-12:30 (covering Lectures 9-17)
	Spring Break March 27-31		
Lecture 19	Tuesday April 4	RMH	Organoid development
Lecture 20	Thursday April 6	CTM	Evolution of development
Lecture 21	Tuesday April 11	ML	Anterior posterior polarity
Lecture 22	Thursday April 13	ML	Stripes and segmentation
Lecture 23	Tuesday April 18	DB	Cell polarity
Lecture 24	Thursday April 20	DB	Developmental morphogenesis
Lecture 25	Tuesday, April 25	CTM	Single-cell RNA-seq
Lecture 26	Thursday April 27	CTM	Fate mapping by next generation sequencing

Classes end	April 28		RRR week
Final Exam			