

BIOS E-55: Developmental Biology

Spring 2016

- Instructor: Susanne Jakob, Ph.D.
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- Office Hours: Thursdays 10-11am
- Teaching Assistant: Peter Wang
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Office hours: Tuesdays 5:40 – 6:15 & 7:15 – 7:30 in Sever 205
- Meeting Times: Lecture: Tuesdays 7:40 - 9:40pm in Sever 203
Discussion Section: Tuesdays 6:15 - 7:15pm in Sever 205
- Course Website: <https://canvas.harvard.edu/courses/8134>
You are expected to consult the course website each week.
Announcements, updates, handouts, etc. will be added frequently.
- Description: Developmental biology studies the mechanisms involved in growth and development of complex organisms. In many ways the basic understandings of developmental biology provide an invaluable foundation for other aspects of biology as well as medicine, especially as many health issues can be related back to early developmental defects during embryogenesis. This course aims to provide a broad, comprehensive look at embryology with special emphasis on vertebrate models, focusing on both classical experiments and modern molecular and genetic techniques. We explore how the body axes are established. We ask how organs are formed. How does the brain develop? What is sex determination? What role do embryonic and adult stem cells play during development?

Textbook: Scott F. Gilbert
Developmental Biology (10th Edition)
Sinauer Associates
ISBN# 978-0-87893-978-7

Discussion Section: A weekly 1h section will be held to discuss lecture topics in more detail, starting in the second week of class (February 2). Undergraduate students are required to attend and participate in at least 4 sections throughout the course of the semester (roughly once a month). Students need to sign up for a section group at the first day of class (January 26):

Section Group 1	Section Group 2	Section Group 3
2/2	2/9	2/16
2/23	3/1	3/22
3/29	4/5	4/12
4/19	4/26	5/3

Note that there will be no section in the weeks of either exam or during spring break. Students will need to read a pre-assigned scientific paper for each section, which will be used to review the lecture material and discuss relevant techniques and ways to analyze data in developmental biology.

Graduate Students: Graduate students will be introduced to scientific primary literature in the field of developmental biology in more depth. Graduate students are required to attend and participate in all weekly discussion section meetings starting in the second week of class (February 2). Each week graduate students will read a pre-assigned scientific paper and analyze and discuss the data by submitting their answers to paper-specific questions and participating in an online discussion forum. Over the course of the semester, graduate students will learn about the experimental approaches and techniques used in developmental biology and how to interpret the scientific data and figures. They will also learn how to evaluate the published results by giving critique and suggestions on how to address critique. Graduate students will complete three writing assignments (WAs) over the course of the semester in which they will interpret, analyze and critique the data in a given scientific paper.

Homework: Homework assignments are designed to help students engage with the lecture material in more depth. They will be posted on the course website after each lecture and are due to be submitted to the Teaching

Assistant BEFORE the start of lecture the following week. Assignments received after 7.50 pm on the due date will receive a late penalty of 25% followed by a deduction of 25% per day off the total score.

Exams:

During the course of the semester there will be one midterm and one final exam. Exams will be held during the usual lecture time in the usual lecture room. Exam 1 will cover material of the first 6 lectures and the final exam will be cumulative with focus on the latter half of the course. Students will need to provide documentation for medical or emergency conflicts to be excused from an exam.

Grading:

Graduate students

Midterm Exam 1	20%
Final Exam	20%
Homework	25%
Participation	15%
Writing Assignments	20%

Undergraduate students

Midterm Exam 1	25%
Final Exam	30%
Homework	30%
Participation	15%

<u>Date</u>	<u>Topic</u>
1/26	Introduction
2/2	Fertilization
2/9	Differential Gene Expression in Development Homework question #1 due
2/16	Early Development and Gastrulation Homework question #2 due
2/23	Axis Formation Homework question #3 due
3/1	Sex Determination Homework question #4 due & WA1
3/8	MIDTERM EXAM (covering L1-6)
3/15	NO CLASS – SPRING BREAK
3/22	Germline Development Homework question #5 due
3/29	Neural Development Homework question #6 due
4/5	Neural Crest Homework question #7 due & WA2
4/12	Organ Development Homework question #8 due
4/19	Development and Disease Homework question #9 due
4/26	Environmental Influences on Development Homework question #10 due
5/3	Evolutionary Developmental Biology
5/10	FINAL EXAM (cumulative, focus on L 7-13) & WA3

Noteworthy Dates:

Monday, 2/1	Deadline for course and credit status changes Deadline to drop the course with 100% tuition refund
Monday, 2/8	Deadline to drop the course with 50% tuition refund
Friday, 4/22	Deadline to withdraw with WD/WN grade on record

Plagiarism and Cheating:

All written work must be the student's own. Students may discuss work with others, but should be sure to write everything in their own words. Students also may not copy writings from textbooks, journals or the lab protocols without proper citations. Plagiarism is a very serious offense.

Exams must be taken individually; no collaboration is allowed.

Anyone caught plagiarizing or cheating will be disciplined, and may be sent before the Administration Board or expelled from the course.

You can read more about Academic Integrity on the following Extension School website:

<http://www.extension.harvard.edu/resources/career-academic-resource-center/plagiarism-proper-use-sources>