

Developmental Biology: Syllabus

I. Instructor

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Office Hours:

1:45 - 2:45 PM T (219 Huestis)

1:45 - 2:45 PM R (219 Huestis)

...and by appointment

& Graduate teaching support:

Sophia Frantz (GE) - last names A-K

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Office Hours: 10:00 – 11:00 AM, T (33 KLA)

Zoe Irons (GE) - last names L-Z

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Office Hours: TBA (33 KLA)

...and by appointment for both SF and ZI

LECTURES	208 Deady	TR	21774 – 12:00 – 13:20
LABS	33 Klamath	W	21775 – 1200 to 1350
		W	21776 – 1400 to 1550
		W	21777 – 1600 to 1750

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III. Course Description

Developmental Biology is a branch of science that easily captures human interest and is one of the fastest growing disciplines in Biology. The shaping of a complex organism from a single cell is one of nature's miracles, made so much more amazing by the fact that it is so often successful. Traditional studies of embryonic development have recently been transformed by the many tools afforded by Molecular Biology and Genetics, allowing us to better understand the how, what, when, and where of development. In this course we will explore a number of aspects of developmental biology, trying to focus on mechanisms that are shared across diverse animals. The course consists of two lectures and one lab per week. Lecture material is drawn from the textbook ([Developmental Biology by Gilbert & Barresi, 11th ed.](#)). We will begin with an overview of development, and then discuss the underlying genetics of major steps during development. We will then focus on a few interesting topics in development. You will also get a hands-on look at some of the developmental processes in the lab portion of the class. While the overall course organization will not change, the content of individual lectures and labs may be modified as necessary.

IV. Expected Learning Outcomes

Students who successfully navigate this course should have gained knowledge about the major findings and principles of the field, an ability to use the vocabulary, as well as an understanding of various aspects/stages of development, its universality across species, and small changes during development can provide the variation that selection can act upon. Specifically,

- Students will recognize and describe major events during development
- Students will learn about cell communication and signaling, and employ this understanding to developmental phenomena
- Students will evaluate the role that gene expression plays in specifying the fate of individual cells
- Students will compare development in various model species to understand basic morphological and genetic interactions that mediate development
- Development is a complex process, which sometimes goes wrong – students will develop a perspective on the consequences of defects in gene expression and intra-cellular communication, and the possibilities of treating resultant disorders
- By integrating knowledge across species, students will develop an appreciation for the shared biology common to all humans, and indeed, all animals.

V. Course Details

1. Student workload and commitment

One undergraduate *credit* hour equals 30 *real* hours of student work, typically 10 hours in class and 20 hours outside of class. This is a 4 credit course which means

you will be spending a significant amount of time in preparing for class, review, self-study and learning through explorations and assignments (see UO Student Handbook, section Academic Success). Full attendance and active participation are critical to your chances of success in this class, and will be assessed via iClicker feedback.

2.Required Text

The readings are from the [11thed of Developmental Biology](#). It is the newest edition, and it therefore might be hard to find used. There will be copies available in the science library, as well as a copy of the 10th edition of Developmental Biology. Finally, the [6th edition of Developmental Biology is also available online at PubMed Books](#). Please note that there are always some differences in page numbers for assigned readings, topic arrangement and current knowledge between editions – and there is new material in the 11th Edition, especially related to the Molecular Biology of Development. Additional readings will be posted on Canvas as PDF files where needed.

3. Required Supplies

iClicker 2 (available in the Duck Store) will be used as the classroom participation and active learning tool.

VI. Grading

Quizzes and exams are the main tools that will assess student learning, and will have questions that test “lower order skills” (remembering, understanding and applying) as well as “higher order skills” (analyzing, evaluation, creating), as defined in [Bloom’s Taxonomy](#).

GROUP	ASSESSMENT	GRADE	Letter grades	
EXAMS	Final	25%	A+	>96.7
	2 Midterms (20% higher & 15% lower scoring midterm)	35%	A	93.4 – 96.6
			A-	90.0 – 93.3
LABS	9 Labs (best 8)	20%	B+	86.7 – 89.9
QUIZZES	9 quizzes (best 8)	10%	B	83.4 – 86.6
PARTICIPATION	iClicker	10%	B-	80.0 – 83.3
TOTAL		100%	C+	76.7 – 79.9
			C	73.4 – 76.6
			C-	70.0 – 73.3
			D	60.0-69.9
			F	< 59.9

a) Quizzes:

There will be 9 quizzes, all administered through Canvas. Quizzes will be online Wed after class, and are due Friday of the same week (by 2359h). Quizzes will cover

all labs and materials covered since the preceding quiz. Quizzes will be automatically graded, short-answer questions. The lowest scoring quiz will be dropped, and the remaining will count towards 10% of your total grade. Only one attempt is allowed per quiz: before starting, make sure that you have checked your browser for compatibility with the UO Canvas site. Technical difficulties, dropped internet connections etc. are not acceptable excuses for a missed quiz. If you miss a quiz, that will count your lowest graded quiz, which you can drop. There will be no make-up quizzes.

b) Exams

There will be two midterms and a final, collectively accounting for 60% of your course grade. Exams will be cumulative, because concepts will overlap substantially over the term, but the focus of each exam will be on material covered since the preceding exam. Exams can contain materials from lectures, relevant chapters from the textbook, other assigned readings and labs, and will most likely be a combination of different types of questions. The exam schedule is listed on the last page. The final is worth 25% of the overall grade, but midterms will be scored on a sliding scale (higher scoring midterm will count for 20%, while the lower scoring one will count for 15%). Exams will be held in the same room as the lectures

c) iClicker Participation

You can earn up to 10% credit for attendance, which will be scored using iClickers. Each click counts towards credit, and opportunities for clicker participation are spread through each lecture and across classes. I will often ask you to respond to MCQs. You will be scored on participation rather than correctness, but you are expected to respond correctly to aid in your own learning. Ninety percent of the total participation opportunities will be counted for credit. The remaining 10% accounts for any missed sessions, iClicker failure etc. Missing iClicker opportunities beyond that - for example by failing to bring your iClicker to class or by not registering your iClicker, will result in a lower participation score.

d) Lab Assignments

Lab participation and assignments are worth 20% of your final grade. An important part of learning about Development is to experience some of the processes first-hand. This will give you some perspectives about techniques and methods used to study development and to some extent, how research in the field is carried out. By using as wide an array of model animals as possible, we will try and give you a perspective that is difficult to gain only from reading.

Lab sections are held on Wednesdays, starting second week of term and are mandatory. General information about each lab is provided in the class schedule (last page), and more information will be provided during class and will be made available online. Grading for the lab section of the course will be split between attendance /participation (5%) and completion of lab assignments (15%). You are expected to follow all safety guidelines and staff instructions. Assignments for each lab will be available on Canvas during the preceding week,

and should be downloaded, printed, and brought to the lab section. Completed lab assignments are due at start of your lab section on the following Wednesday. It is extremely difficult to make up for a missed lab by attending another section. If you know that you are going to miss your lab section, contact your GE at least 24 h ahead to figure out whether you can earn partial credit for that lab.

VII. Course Policies

1. Classroom Etiquette

Please arrive on time. Lectures and labs begin promptly on the hour. Questions are welcome, but the Instructor may postpone lengthy discussions to a later time. Laptops and other electronic devices are not to be used unless explicitly permitted. Please do not leave early as this is disruptive to everyone. If you have an unusual circumstance and must leave early, please inform the instructor, and sit near the exit so your leaving is not disruptive. Finally, please be respectful of your fellow students.

2. Email Etiquette

Emails addressed to the GE (Last names A-K write to Sophia, others to Zoe) or Avinash should include "Bi328" in the subject line. We will try to answer emails in a timely manner, except during late evenings or weekends.

3. Inclement Weather

If road conditions are dangerous, it is possible that class may be canceled even if the University remains open. Cancellation notices specific to BI328 will be posted on the class Canvas site, while university-wide announcements will be on the UO home page.

4. Inclusive Learning

The University of Oregon is working to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please let me know as early as possible, in person or via email. For accommodations to aid in your participation, please contact [Accessible Education Services](#) as early as possible, in 164 Oregon Hall, by phone at (541) 346-1155 or uoaec@uoregon.edu. I welcome the chance to help you learn, and will work with you to help make it a good learning opportunity and experience. Second language learners who have used a translator in prior courses should meet me as soon as possible.

5. General Policy on Missed Assignments

Assignments must be turned in on time and there are no early exams or make-up exams. If you are ill, or have an emergency where you cannot attend class, miss an assignment, or miss an exam please contact the instructor. Please contact the instructor in advance, so we can make arrangements so that you can receive credit where possible.

6. Plagiarism and Cheating

Academic Misconduct will not be tolerated. You are expected to do your own work on assignments. Using another student's iClicker during class constitutes cheating. You are encouraged to discuss ideas and study together, but do not copy someone else's

work or allow anyone to copy yours. All students are expected to conform to the [Student Conduct Code](#). Please note that Instructors are **required** to report academic misconduct with the Director of Student Conduct and Community Standards.

IX. Class Schedule

Date	Venue	Topic	Chapters
T, Jan 8	Lecture 1	Principles of Development	1
W, Jan 9	--	--	
R, Jan 10	Lecture 2	Cell Identity and Fate Specification	2, 5
T, Jan 15	Lecture 3	Cell to Cell Communication	4
W, Jan 16	Lab 1	Fertilization in sea urchins	
R, Jan 17	Lecture 4	Fertilization	7
T, Jan 22	Lecture 5	Gastrulation	10-12
W, Jan 23	Lab 2	Germ-line cells in <i>Drosophila</i>	
R, Jan 24	Lecture 6	The Organizer & D-V axis Specification	11
T, Jan 29	EXAM	MIDTERM-1	
W, Jan 30	Lab 3	Oogenesis in <i>Drosophila</i>	
R, Jan 31	Lecture 7	A-P Axis in Amphibians, <i>Drosophila</i>	11
T, Feb 5	Lecture 8	Segmentation in <i>Drosophila</i>	9
W, Feb 6	Lab 4	Visualizing gene expression in <i>Drosophila</i>	
R, Feb 7	Lecture 9	Late development in <i>Drosophila</i>	9
T, Feb 12	Lecture 10	Avian-mammalian Gastrulation	12
W, Feb 13	Lab 5	Early zebra-fish development	
R, Feb 14	Lecture 11	Neural Tube	13
T, Feb 19	Lecture 12	Neural tube patterning	13-14
W, Feb 20	Lab 6	Regeneration in Planaria – Design and conduct an experiment	
R, Feb 21	EXAM	MIDTERM-2	
T, Feb 26	Lecture 13	Axonal Growth & Migration	15
W, Feb 27	Lab 7	Regeneration in Planaria, continued	
R, Feb 28	Lecture 14	Somitogenesis & Mesodermal Development	17
T, Mar 5	Lecture 15	Limb Development	19
W, Mar 6	Lab 8	Regeneration in Planaria, continued	
R, Mar 7	Lecture 16	Regeneration	22
T, Mar 12	Lecture 17	Sex Determination	6
W, Mar 13	Lab 9	Project presentations	
R, Mar 14	Lecture 18	Common Themes in Development	TBD
W, Mar 20	FINAL	FINAL EXAM (10:15-12:15)	

NOTE: This is a tentative lecture schedule. Lecture contents are not fixed, and are will be updated periodically, depending on pace of learning and student feedback. Pre-class reading: more detailed page numbers are available on the Canvas page for each lecture. You can also track events in the course calendar and in the MODULES section in the Canvas course site.