

Developmental Biology

BIOL 3090-001/091 - Fall 2014

TR from 8:00-9:15 a.m. in WO1205

Instructor

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Office Hours: M 10-11:00 am; T 2-3:00 pm; W 11:00 - noon; R 12-1:00 pm (or by appointment)

Course Description

This course will introduce students to the molecular and cellular mechanisms that underlie the early development of organisms. The focus will be on the genes and proteins involved in controlling the behavior of cells in the processes of differentiation, morphogenesis and growth. Developmental mechanisms and processes will be examined in genetic model organisms such as the fruit fly (*D. melanogaster*) and the worm (*C. elegans*) as well as in vertebrates such as the frog (*X. laevis*), chicken, mouse and humans.

Required Materials

Textbook: Principles of Development (Forth or Third Edition, ISBN 978-0-19-955428-7 or 978-0-19-927537-3, respectively), Lewis Wolpert editor. Oxford University Press. The small amount of material not found in the 4th edition will be discussed in class, but that material will be available on the lecture slides.

Clicker: Turning Technologies response cards are available in the UT bookstore and elsewhere. The most basic model is sufficient.

Clicker Registration

You must register your clicker on Blackboard by 7 p.m., **Monday, September 1**. Use the Blackboard "Clicker Registration" link and be careful not to enter the letter "o" in place of zero (0) when entering your device ID. The letter "o" is not used in any device ID. *If you miss the deadline or change clickers during the semester you must send me your new clicker ID by email.* The Blackboard registration mechanism will not be used after the September 1 deadline. You will not receive clicker question points unless your current clicker ID is registered in advance of the lecture.

General Information

- BIOL 3030 (Cell Biology) is a prerequisite for this course.
- Lecture slides will be available for download from Blackboard before class (usually the evening before the lecture). Note that you can arrange your Blackboard settings so that you are informed by email when the lecture slides or any other course content is posted to Blackboard. For instructions see the file “Changing Notifications in Blackboard” under the “More Course Info” link on Blackboard.
- Please ask questions during the lecture, particularly if you feel something was not explained clearly. You can also ask questions after class by email, phone, or in person.
- Put away your cell phone while in class. Make sure it is off or in silent mode.
- If you are going to bring a laptop or tablet to class please use it for note taking only.
- If you wish to make audio recordings of the lectures please ask me first.
- Do not bring food into the room, although a drink is acceptable.

Student Evaluation

Your final grade will be calculated as follows:

54%	Three in-class exams (18% of your final grade for each)
30%	Comprehensive final exam
10%	Clicker points
<u>6%</u>	Discussion questions
100%	

Available **bonuses**: 1% for the top discussion board participants (see below for details).

Grading Scale:	90-100%	A	67-70%	C
	87-89%	A-	63-66%	C-
	83-86%	B+	59-62%	D+
	79-82%	B	55-58%	D
	75-78%	B-	50-54%	D-
	71-74%	C+	<50%	F

Exam Information

- There will be three exams during the semester and each will be worth **18%** of your final grade. The exams will cover mainly new material (since the last exam), although some concepts from earlier in the course will be revisited on the later exams. Exam questions will be based on the lecture material.
- The final exam will be comprehensive and it will count for **30%** of your final grade. Approximately half of the final exam will count for the last section of the course with the remaining half devoted to the first three sections.
- All exams will be a mix of multiple choice, definitions and short answer questions.

- On exam days:
 - Bring two pencils and an eraser.
 - Students will be asked to present a **picture ID** when turning in exams.
 - Additional time will not be given to students who come late for exams and latecomers will not be permitted to start if someone has already left the exam.
 - If for any reason the university is closed on the day of a scheduled exam, the exam will be given during the next scheduled class.
- Once the exam answers are available you will have *one week to respond* with any exam grading concerns.

Clicker Questions

- In each lecture approximately three questions about the lecture material will require your response using the Turning Technologies response card (clicker).
- **One point is given for a correct answer and half a point for an incorrect answer.**
- Set your clicker to channel 41 for this class.
- Clicker questions will begin in the third lecture (August 27).
- The clicker questions will count for **10%** of your final grade.
- The grading system for clicker questions is set so that you can still receive the full 10% even if you miss two classes with unexcused absences. For example, if 100 clicker questions are asked during the lectures you would only require 94 points for a perfect clicker score for the semester (100 - (2 lectures x 3 points) = 94).
- A small prize will be given to the student who maintains a perfect cumulative clicker score for the longest period into the semester.

Discussion Board

- Every week you will be required to ask a question about the past lecture material using the discussion board. This is to encourage students to study the course material on a weekly basis and to identify topics that may require additional discussion in class. Example questions: I saw Jack Hana with a two-headed turtle on TV last week. Did that turtle have a mutation in the *cerberus* gene? I don't understand topic X; can you explain topic X again in class? If you don't have a question, a comment related to the lecture material is also acceptable.
 - Deadline to submit your question on the discussion board: **Every Sunday @ 11:59 pm**
 - Grading: One point for any "reasonable" question or comment related to the material.

$$\text{Discussion grade (\%)} = \frac{\text{Total points collected}}{(\text{Total points available} - 1) \times 100}$$
- Interesting questions, or topics that multiple students are having trouble with, will be addressed at the beginning of the first lecture of the next week.
- A 1% **bonus** will be added to the final grades of ten students with the best, most insightful questions through the semester.
- Students are also encouraged to reply to the questions on the discussion board if they know the answer or have a comment to make. Another 1% **bonus** will be given to the ten students with the highest number of relevant replies to the questions on the discussion board over the semester.

Absences

- Make-up exams and adjustments to clicker or discussion question grades will only be provided for *serious* medical or personal reasons that are backed up with the proper documentation such as a doctor's note. *Accommodations will be made only if the instructor is notified as soon as possible after the absence.*
- Make up exams will be scheduled within a week of the original exam date. If multiple students need a make-up exam they will write it at the same time in the Testing Center (FH1080). If it is not possible for a student to take the make-up exam within one week then the two remaining in-class exams will be used to determine the final grade for that student. Make-up exams will be long answer or essay format with few, if any, multiple-choice questions.

Academic Dishonesty

- The university policy on academic dishonesty can be accessed at:
“<http://www.utoledo.edu/dl/students/dishonesty.html>”
- Bringing a clicker to class for someone else is considered academic dishonesty for both students involved. Both students will be sanctioned according to university policy.
- Do not talk to other students or use electronic devices during examinations. Keep your eyes on your own work. Those that violate these rules will receive an F for the exam.

Keys to Success

1. **Attend every class.** Material presented during class will be emphasized for the exams and clicker points contribute to your final grade. In-class interactions with the instructor help strengthen your understanding of the material.
2. **Do not wait until a day or two before the exam to study.** This is one of the worst and most common mistakes students make. Go over your notes as often as you can between exams and make sure you understand the material *before* your last study session. Ask questions about topics you don't understand as soon as possible, either during lecture or during office hours.
3. **Be active with your studying.** Reading the textbook before class, taking notes during class, and making a separate set of study notes after class will aid in your ability to understand and retain the presented concepts.
4. **Test yourself.** Have a roommate or classmate ask you questions about the material in your notes. Doing this will let you know where you might have to spend more time on the details.
5. **Form a study group.** It helps with number four above and you will find out how well you know the material when you try to explain it to someone else.
6. Additional information can be found in the files “Keys to Success” and “Survival Skills” under the “More Course Info” link on Blackboard.

Course Schedule

Date	Lecture	Topic	Chapter	
			3 rd ed	4 th ed
Aug 26	1	Introduction and History	1	1
Aug 28	2	Concepts In Development	1	1
Sept 2*	3	Development of the <i>Drosophila</i> Body Plan I	2	2
Sept 4	4	Development of the <i>Drosophila</i> Body Plan II	2	2
Sept 9	5	Development of the <i>Drosophila</i> Body Plan III	2	2
Sept 11	6	Patterning the Vertebrate Body: Animal Models	3	3
Sept 16	7	Patterning the Vertebrate Body: Axis Formation	3	4
Sept 18		Exam I		
Sept 23	8	Patterning the Vertebrate Body: Germ Layer Formation	3	4
Sept 25	9	Patterning the Vertebrate Body: Somite Formation	4	5
Sept 30	10	Patterning the Vertebrate Body: Neural Induction	4	5
Oct 2	11	<i>C. elegans</i> Development	5	6
Oct 7	12	Plant Development I	6	7
Oct 9	13	Plant Development II	6	7
Oct 14		<i>Fall Break</i>		
Oct 16		Exam II		
Oct 21	14	Morphogenesis: Adhesion and Cleavage	7	8
Oct 23	15	Morphogenesis: Gastrulation and Neurulation	7	8
Oct 28	16	Morphogenesis: Migrations	7	8
Oct 30	17	Cell Differentiation: Control of Gene Expression	8	10
Nov 4	18	Cell Differentiation: Models of Differentiation I	8	10
Nov 6	19	Cell Differentiation: Models of Differentiation II	8	10
Nov 11		<i>Veterans Day</i>		
Nov 13	20	The Plasticity of Gene Expression	8	10
Nov 18		Exam III		
Nov 20	21	The Vertebrate Limb	9	11
Nov 25	22	Organogenesis	9	11
Nov 27		<i>Thanksgiving Day</i>		
Dec 2	23	Nervous System Development I	10	12
Dec 4	24	Nervous System Development II	10	12
Dec 9	25	Fertilization	11	9
Dec 11	26	Sex Determination and Growth	12	9/13
Dec 16		Final Exam (8-10am)		

The pace of the lectures varies from year to year so the exact day a particular topic is discussed may differ from this schedule. However, the topic order and the exam dates will not change.

Other Important Dates:	First discussion question due:	Aug. 31
	Deadline for clicker registration	Sept. 1
	*Clicker questions begin:	Sept. 2
	Last day to drop:	Sept. 8
	Last day to withdraw:	Oct. 31