



Developmental Biology 3344

Syllabus

Fall
2024

Instructor: Dr. Jon Scales
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Hours: 930 -12 TR, 330-5 T, 10-12 F
Office: PH 109

COURSE GOALS

This course is designed to be an introduction to many of the areas of ongoing research in the field of Developmental Biology. Developmental Biology is a highly interdisciplinary field. You should come away from this course with a greater understanding of the molecular processes controlling embryonic development as well as an appreciation for the experimental approaches used in this field.

PREREQUISITES

Genetics >=C, O-Chem >=C. Biochem is strongly recommended as a co- or prerequisite.

COURSE MATERIALS

Textbook for this course is *Developmental Biology* 12th Ed. by Scott Gilbert & Michael Barresi. This textbook is linked to a web site which supplements the information presented in the book. We will also make use of the journals *Developmental Biology*, *Development*, and *Developmental Cell*. Exercises for the labs will be provided as handouts. The course is linked to D2L and lecture notes and additional related information may be found there.

ASSIGNMENTS

READING:

It is expected that you will read relevant topics in the textbook and any assigned papers before coming to class. At a minimum, you should scan through the textbook chapter(s) before coming to class and then read the chapter(s) more thoroughly afterwards. The logic of this approach is that you will have seen new terms we bring up in class in the overall context of the topic and then you can go back for more detail after we discuss it in class. Furthermore, it will be impossible for you to participate in discussions of the text and assigned papers during lecture and your grade will suffer as a result. Obviously if we have a pop quiz, having scanned the material before class means you'll be prepared!

EXAMINATIONS

QUIZZES

Quizzes will be announced in advance. We will have practical quizzes in lab. Quizzes may also be assigned through D2L.

EXAMS

There will be 3 exams all of equal weighting. **Students enrolled at the masters-level will complete additional questions on the examinations and present a paper on a current developmental topic (during last lab period).**

MAKE-UP EXAM POLICY

There are only 3 exams. You may only miss 1 exam. If you do miss 1 exam, the lower score of the other 2 exams will be doubled to replace the missed exam score. If you take all 3 exams, your lowest score will be replaced by the lower of the two higher exam scores.

ACADEMIC DISHONESTY

Any appearance of academic dishonesty will result in a score of zero on the assignment, quiz or exam. A second instance of academic dishonesty will result in being dropped from the course with an F.

LAB

The format of the lab will vary from week to week. Due to construction, the lab exercises may vary dramatically from the syllabus. In many lab periods we will begin an exercise, then have some lecture, then return to complete the exercise. Several exercises will be performed over multiple weeks. The lab component will constitute 25% of the course score. Attendance to lab

is mandatory. Students that miss 2 labs without prior consent of the instructor will be dropped from the course.

GRADUATE CREDIT REQUIREMENTS:

Graduate students enrolled in Developmental Biology 3344 for graduate credit will perform additional assignments. This will include writing a 5-7 page paper on a developmental biology topic of your choosing using primary sources. The presentation will subsequently be made available online by the student. Guidelines on specifics for writing the paper and giving the presentation will come during the semester. Graduate students will also be required to answer additional test questions on exams.

TENTATIVE LECTURE SCHEDULE

Week	Date	Topic	Reading
1	Aug 26-30	The Questions and Principles of Developmental Biology	Chap 1
	Sep 2	Labor Day	
2-3	Sep 4-13	Mechanisms of Cell Specification	Chap 2
4-5	Sep 16-27	Developmental Genetics and Differential Gene Expression	Chap 3
6	Oct 2	EXAM 1 IN-CLASS during lab	
6	Sep 30-Oct 4	Cell-Cell Communication and Embryonic Inductions	Chap 4
7	Oct 7-9	Sex Determination, Gametogenesis & Fertilization	Chaps 6, 7
8-9	Oct 11-25	Drosophila Axial Patterning - Genetic Hierarchies	Chap 9
10	Oct 30	EXAM 2 IN-CLASS during lab	
10-11	Oct 28 -Nov 8	Amphibian Axial Patterning - Inductive Events	Chap 11
12	Nov 13-20	Bird/Mammal Axial Patterning	Chap 12
13-14	Nov 22-27	Neural Tube Patterning & Neural Crest Cells	Chaps 13, 15
14	Nov 29	Thanksgiving Break	
15	Dec 2-6	Limb Formation	Chaps 19
16	Dec 9	FINAL EXAM 8-10	

TENTATIVE LAB SCHEDULE

Week	Topic
1	Life Cycles
2	Introduction; Classic Embryology - Frogs
3	Embryology - Chick
4	Experimental Embryology - Basic Methods
5	Experimental Methodologies Raising Worms
6	Experimental Methodologies -Developmental Timecourse
7	Experimental Methodologies - Planning RNAi Exps
8	Experimental Methodologies - Perturbation Exps
9	RNA Isolation from embryo stages and perturbations
10	Microscopy of preserved specimens
11	Molecular analysis of RNAi perturbations
12	RT PCR
13	Presentations
14	Thanksgiving
15	FINAL