Developmental Biology, Bio 4143, Spring 2009

Tue & Thu 12:30-1:45, HSS 2.02.06

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Course Objectives:

- This course is an overview of the field of developmental biology, emphasizing the origins of classical concepts in the field as well as the modern molecular approaches to the study of developmental processes. Subjects will include axis formation, induction, morphogenesis, embryonic pattern formation, cell differentiation, and organogenesis.
- The overall objective is to understand the principles and key concepts of developmental biology and embryology in a variety of vertebrate and invertebrate organisms, as well as plants.

Prerequisites: Genetics BIO 2313, (and the required prerequisites for Genetics). Also, Genetics lab (BIO 2322) and Cell Biology (BIO 3813) are suggested, but not required.

Required Textbook: Principles of Developmental Biology (2007), 3rd Edition, Wolpert et.al.

Additional Reading Material: Review articles, papers, and other materials may be assigned.

WebCT: WebCT will be used to distribute course material (additional reading and lecture notes), but please email me directly with questions (paul.mueller@utsa.edu).

Class Attendance: Students are expected to attend all lectures.

Exams: Exams will cover any material presented in the lectures and the assigned readings. There will be three (3) "mid-term" exams and one (1) Cumulative Final exam for a total of four (4) exams. All exams (mid-term or final) are worth 100 points each. As described below, your lowest exam score (mid-term or final) will be dropped in your final grade calculation.

Grading: The final grade will be determined from your three (3) best exam scores (midterm and final exams) for a total of 300 points maximum. Letter grades will be assigned based on the total points earned. Essentially, a letter grade of A is earned for 270-300 points (90% or above), the letter grade B is earned for 240-269 (80 to 89%), the letter grade C is earned for 210-239 (70 to 79%), the letter grade D is earned for 180-209 (60 to 69%), and the letter grade F is earned for less than 180 (below 60%). I might apply a curve to the scores, however you should not assume this action.

Policy on make up work: NO make-up exams will be given.

Policy on Cheating: Students who violate University Rules on Scholastic Dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. "Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an exam for another person, any act designed to give unfair advantage to a student of the attempt to commit such acts." Regents' Rules of Regulations, Part one, Chapter VI, section 3, Subsection 3.2 Subdivision 3.22. Policies on scholastic dishonesty will be strictly enforced.

Tentative Schedule of Lectures and Exams

Changes to this schedule will be announced as needed during the semester.

Lecture Packet #	Chapter Reading	Starting Date	Lecture Topics
1	1	1/13	Introduction and Basic Concepts
2	2	1/15	Development of the Drosophila (Part 1): Introduction, Methods, and Maternal Effect Genes
3	2	1/20	Development of the Drosophila (Part 2): Setting up the Axes
4	2	1/22	Development of the Drosophila (Part 3): Patterning the Embryo, Homeotic Selector Genes
5	3	1/27	Patterning the Vertebrate Body Plan (Part 1): General Introduction, Oogenesis, Introduction to Xenopus
6	3	1/29	Patterning the Vertebrate Body Plan (Part 2): Axes and Germ Layers in Xenopus
7	3	2/03	Patterning the Vertebrate Body Plan (Part 3): Introduction to Zebrafish, Chick, and Mouse
8	3	2/05	Patterning the Vertebrate Body Plan (Part 4): Axes and Germ Layers in Zebrafish, Chick, and Mouse
9	4, (3)	2/10	Patterning the Vertebrate Body Plan (Part 5): Left-Right Asymmetry, A/P Patterning, Mouse Transgenic & Knockout Methodologies
—	—	**2/12**	**Mid-Term Exam #1** (On Lecture Packets 1-8)
10	4	2/17	Patterning the Vertebrate Body Plan (Part 6): Dorsal Mesoderm Patterning, Somitogenesis, A/P Specification
11	5	2/19	Development of Sea Urchins & Nematodes
12	7	2/24	Morphogenesis (Part 1): Cell Adhesion, Cell Behavior
13	7, (5)	2/26	Morphogenesis (Part 2): Introduction to Morphogenetic Maneuvers, Sea Urchin Morphogenesis
14	7, (2, 3, 12) & 2 reviews	3/03	Morphogenesis (Part 3): Morphogenesis in Flies and Frogs
15	8, (5)	3/05	Cell Differentiation and Stem Cells (Part 1): Introduction, Specification and Maintenance of the Differentiated State
—	—	3/10 & 3/12	**No Class: Spring Break**
16	8, (4), & Website	3/17	Cell Differentiation and Stem Cells (Part 2): Differentiation and Cell Cycle Exit, Cloning and Plasticity of the Differentiated State
17	9	3/19	Limb Development (Part 1): Introduction, Limb Identity, Proximal/Distal Axis
—	—	**3/24**	**Mid-Term Exam #2** (On Lecture Packets 9-16)
18	9, (8)	3/26	Limb Development (Part 2): A/P Axis, D/V Axis, Apoptosis
19	10, (4, 7, 8)	3/31	Development of the Nervous System (Part 1): Early Patterning
20	10, (4, 7, 8)	4/02	Development of the Nervous System (Part 2): Neural Crest, Neuronal Migration
21	10, (4, 7, 8)	4/07	Development of the Nervous System (Part 3): Neuronal Identity, Neuronal Survival (Apoptosis again)
22	6, (7)	4/09	Plant Development (Part 1): Introduction to Arabidopsis, Embryonic Development
23	6	4/14	Plant Development (Part 2): Meristems, Flower Development
24	11	4/16	Germ Cells, Fertilization, and Sex Determination
25	13	4/21	Regeneration
—	—	4/23	(TBD) To be determined
—	—	**4/28**	**Mid-Term Exam #3** (Tentative date, on Lecture Packets 17-25)
—		**5/06**	**CUMULATIVE FINAL EXAM**