

DEVELOPMENTAL BIOLOGY

BIOL 317, SPRING 2017

INSTRUCTOR: Dr. Karin Bodensteiner

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Office Hours: Monday and Friday 9:00-10:30 a.m., or by appointment

CLASS MEETINGS:

Lecture: TNR 460, Monday, Wednesday, and Friday, 12:00-12:50 p.m.

Laboratory: TNR 460, Wednesday 1:00-3:50 p.m.

Prerequisites: Biol 160; Chem 106 or 117.

Additional Course Information: Available off of Desire to Learn (D2L).

RECOMMENDED TEXT AND CD: Gilbert (2006), Developmental Biology, 8th Edition. Sinauer Associates, Sunderland, MA and vade mecum² CD course and laboratory supplement. Available for rent in bookstore. Please note: both the book AND the CD must be returned at the end of the semester or you will be charged.

COURSE DESCRIPTION:

This course will introduce you to fundamental concepts in Developmental Biology, with an emphasis on animal development. Gametogenesis, fertilization, and embryogenesis will be covered, along with discussion of current issues in developmental biology. Common model systems (e.g. sea urchins, chick, planaria) will be used in the laboratory to gain a basic understanding of key developmental processes. This course will include lecture, laboratory, and student presentations. In addition, students will be required to spend time in the laboratory outside of scheduled class time. Regular student participation and open discussion are encouraged.

COURSE OBJECTIVES: (By the end of the semester, students will be able to...)

1. Describe key developmental processes from gametogenesis through senescence and aging.
2. Compare and contrast patterns of development in a variety of model organisms.
3. Use basic laboratory tools and the scientific method to study developmental processes.
4. Discuss current environmental, social, ethical, and legal issues pertaining to development and explore the nature of beliefs surrounding these issues.

POINT BREAKDOWN:

Lecture Exams	3 @ 100 pts
Laboratory Exercises (various)	125 pts
Outline and Bibliography	20 pts
Student Presentation	80 pts
Professionalism	50 pts
TOTAL	575 pts

GRADE SCALE (out of 100% of Total):

A ≥ 93-100	C = 73-76
A- = 90-92	C- = 70-72
B+ = 87-89	D+ = 67-69
B = 83-86	D = 60-66
B- = 80-82	F < 60.0
C+ = 77-79	

ACADEMIC INTEGRITY:

Academic dishonesty in any form will result in disciplinary action in accordance with UW System Administrative Code.

EXAMS AND OTHER GRADED WORK:

There will be three exams: two during the course of the semester and one during finals week. Each lecture exam is worth 100 points. Exams will consist of multiple choice, problem sets, definitions, fill-ins, and short answer questions. In addition, application of information provided in lecture to an unknown problem may be required. All exams and assignments will count towards the final grade (i.e. no grades will be dropped).

Exams are not comprehensive. That said, course material will build over the semester and it will be important for you to remember and apply basic information learned early on to material covered later in the course. If there are students in the class who have a disability and need accommodation, please see me as soon as possible.

PROFESSIONALISM:

Attendance: Class and laboratory attendance are mandatory and you are expected to arrive on time and ready to learn. Unexcused absences and/or chronic tardiness WILL reveal themselves in your grade. Assignments are due when they are due. Exceptions to this rule will only be granted if arrangements are made with the instructor *WELL IN ADVANCE*. Exams must be taken at the assigned time and alterations to this schedule will only be made for personal injury or emergencies (e.g. death in the family, serious accident, or hospitalization). In such cases, evidence of some kind must be provided and you are expected to reschedule the exam and/or complete the assignment as soon as possible. It is your responsibility to get the notes for any missed classes.

Participation: I expect that students will come to class ready to be engaged and actively participate in the classroom experience. Open, honest discussion is encouraged and will factor in to your participation/professionalism grade. Attendance, overall conduct, and courtesy over the course of the semester will also factor in to your professionalism grade.

Classroom Behavior: I expect nothing short of complete mutual respect and courtesy. Cell phones and other personal electronic devices must be turned off while class and/or lab is in session.

GENERAL COURSE OUTLINE*:

RELEVANT CHAPTER(S)

Unit 1: The Beginning

Introduction/Overview	1, 2
Cellular Associations and Behaviors	3, 6
Regulation of Gene Expression During Development	4, 5
Gametogenesis	19

Unit 2: Early Development of Animals

Fertilization	7
Embryogenesis (in general)	8
Early Development in Model Species	8, 10, 11
Tissue Organization and Stem Cells	12
Neurogenesis	12

Unit 3: Later Developmental Processes and Their Implications

Development of Mesodermal Organs	14, 15
Development of Endodermal Organs	15
Sex Determination	17
Metamorphosis, Regeneration, and Aging	18
Medical Implications of Developmental Biology	21
Environmental Regulation of Development	22

*Please note: Course schedule and topics covered are subject to change.

COURSE SCHEDULE:

Jan. 25	Lab Introduction/Scientific Method Experiment
Feb. 1	Microscopy and Tools for Embryo Manipulation
Feb. 8	Gametogenesis
Feb. 15	Presentation Topic (in the LRC Room 316)
Feb. 22	Sea Urchin Husbandry and Basic Development
Feb. 24	<i>EXAM 1</i>
Mar. 1	Sea Urchin Experimental Design and Critique
Mar. 3	<i>Presentation Outline and Bibliography Due</i>
Mar. 8	Sea Urchin Experiment Implementation; <i>Draft Intro & Methods for Sea Urchin Due</i>
Mar. 15	Early Chick Development
Mar. 17	<i>Draft Sea Urchin Results Due</i>
Mar. 18-26	Spring Break
Mar. 29	Later Chick Development
Mar. 31	<i>Final Sea Urchin Write-Up Due</i>
Apr. 5	Planaria Regeneration Experimental Design and Critique
Apr. 7	<i>EXAM 2</i>
Apr. 12	Planaria Regeneration Experiment Implementation
Apr. 14	<i>Draft Planaria Intro & Methods Due</i>
Apr. 19	<i>Student Presentations</i>
Apr. 26	<i>Student Presentations</i>
May 3	<i>Student Presentations</i>
May 10	Laboratory Check Out; <i>Final Planaria Write-Up Due</i>
May 18	<i>EXAM 3, 8:00-10:00 a.m.</i>