

BIOL 4350(6350): Developmental Biology
Spring Semester 2012, Section A (CRN# 21393, 4 Credit hours)
Department of Biology, College of Arts & Science, Valdosta State University

Lecture (BC 1025): T & R 9:30 a.m. – 10:45 a.m.

Laboratory (BC 2070): W 9:00 a.m. – 11:50 a.m.

Instructor: Dr. Brian C. Ring
Office: BC 2092
Office hours: T / R 11:00 a.m. – 12:30 p.m.
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Pre-Requisites: BIOL 1107, BIOL 1108, and BIOL 3200 with a grade of C or better or permission of instructor.

Course Description: A study of development from fertilization through embryological stages with an emphasis placed on experimental embryology and molecular genetic mechanisms in selected model organisms. Topics include classic developmental life cycles from the formation of gametes to fertilization, early to late embryological stages, organ formation, and post-embryonic fates. Also included are more modern topics within the field to include developmental genetics, germ cell formation, sex determination and aging.

Course Objectives: Upon completion of this course the student should be able to:

- 1) Exhibit a broad perspective on basic history, concepts, and mechanisms of the developmental biology field;
- 2) Comprehend basic principles of organismal life cycles through major stages of development;
- 3) Compare and contrast differences in developmental patterning among different model organisms;
- 4) Interpret and analyze laboratory preparations within the field of developmental biology;
- 5) Develop and test a hypothesis using experimental embryology skills acquired in the laboratory.

These objectives support the Department of Biology Educational Outcomes # 1, 3, & 4 and the University General Educational Outcomes # 5 as listed in the VSU Undergraduate Catalogue for those enrolled in BIOL 4350 and the Department of Biology Selected Educational Outcomes for the Masters # 1 & 2 as listed in the VSU Graduate Catalogue for those enrolled in BIOL 6350.

Required Materials:

Text: Scott F. Gilbert. 2010. *Developmental Biology* 9th ed. Sinauer Associate, Inc., Massachusetts USA. (ISBN #: 9780878933846)

Laboratory Manual: 1) Mary S. Tyler & Ronal N. Kozlowski. 2010. *DevBio Laboratory: vade mecum 3*. An Interactive Guide to Developmental Biology. Comes with book, register: <http://labs.devbio.com>
2) Various materials posted through the course Blazeview site online. TBA.

Graded Course Components: Your final grade will be based on your performance on examinations and the laboratory. **NOTE:** Graduate students enrolled in this course (BIOL 6350) will receive additional literature assignments and adjusted grading scale in a supplementary syllabus.

Lecture: (75%) There will be a total of four exams; three lecture exams and one final exam covering sequential material as outlined below. Students are responsible for learning the lecture material and the readings from the text in order to prepare for exams. Exams will be composed primarily of multiple choice and short answer. Each of the exams will be worth 25% of your final grade. **There are NO MAKEUP EXAMS.** Missed exams are recorded as zero.

Laboratory: (25% pts) Students will be graded on their performance in laboratory based on various possible criteria: **(1) Laboratory Notebook, (2) Quizzes, (3) Practical Exams, (4) Experimental Proposal & Lab Report. There are NO MAKEUP LABS.** Any student missing more than 20% of laboratories (3 total) will automatically fail this course as per University attendance policy.

Grade Calculation & Distribution: Final grades will be based on the cumulative of the 3 highest exam scores plus the laboratory. **NOTE: the lowest exam grade will be dropped.** Therefore, if you miss an exam or score poorly, it will be dropped as your lowest grade. In addition, the final exam is optional. If you are content with your overall grade by the end of the semester, then the resulting zero on your final will be dropped as your lowest exam score.

Grade Calculation		Grade Distribution	
Category	Possible %	Letter	Percentage
Lecture Exam 1	25%*	A	89.5 – 100%
Lecture Exam 2	25%*	B	79.5 – 89.4%
Lecture Exam 3	25%*	C	69.5 – 79.4%
Final Exam	25%*	D	59.5 – 69.4%
Laboratory	25%	F	≤ 59.4%
Total	100 %		

* **Lowest Exam score dropped.**

Notes on grading: Students should note that a grade of "A" in this course represents an exemplary command of the material covered. To obtain this grade of excellence, it is recommended that students study daily and clarify with their instructor any problems regarding course information, as they arise. Additionally, the instructor may implement an overall curve based on class performance at the end of the course.

Mid-term and Attendance: Students will have at least one exam and a partial laboratory grade to determine their overall grade by the Mid-Term and decide whether to withdraw at the deadline date (**3/1/2012**). Attendance in this course is highly recommended. Attendance may be taken at any time during the lecture or laboratory and used as an indicator of class participation. If you are late, your attendance may not be acknowledged. The student is responsible for all material missed regardless of the reason for absences. **ABSOLUTELY NO LECTURES OR LABORATORIES CAN BE "MADE UP."** Laboratories in particular are important not to miss as stated above. In the event that a student will miss a lab, s/he should notify the instructor in writing by email. It is the instructor's prerogative to accept the excuse or not.

IMPORTANT EXAM SCHEDULE DATES:

- Exam 1: February 16, 2012**
- Exam 2: March 22, 2012**
- Exam 3: April 26, 2012**
- Final Exam: Thursday, May 3, 2012; 10:30 a.m. – 12:30 p.m.**

Procedure for exams:

- No books, electronic devices (including cell phones), or notebooks will be allowed during exams. Students using such items will be asked to leave and will receive a zero for the exam.
- No talking will be allowed during the exam, but students are permitted to ask the instructor questions.
- Each student will be given an exam to be completed and handed back to the instructor.
- Students will take the exam during the stated lecture time only.

Student identification: Students should have in their possession at all times their VSU student identification card. In order to verify the identification of students officially enrolled in the course, it is the instructor's prerogative to request official student photo identification cards at any time during lecture or during exams.

Academic Dishonesty (e.g. cheating or plagiarism): A student cheating or plagiarizing will be penalized by receiving a zero for the assignment and will be reported to the dean of students. Refer to the Student Code of Ethics in the VSU Student Handbook.

Privacy Act (FERPA): The Family Educational Rights and Privacy Act (FERPA) prohibit the public posting of grades by Social security number or in any manner personally identifiable to the individual student. No grades can be given by email or over the telephone, as positive identification cannot be made by this manner.

Students with Disabilities: Students requesting classroom accommodations or modifications because of a documented disability must let me know and must also contact the Access Office for Students with Disabilities located in room 1115 Nevins Hall. The phone numbers are 245-2498 (voice) and 219-1348 (tty).

TENTATIVE LECTURE OUTLINE:

Lecture:	Date:	Topics:	Text Readings (pgs):
1	Jan. 10 (T)	Course Introduction & Objectives	--
2	Jan. 12 (R)	History, Concepts, & 7 Big Questions	Part I: pg. 1-4
3	Jan. 17 (T)	Developmental Anatomy	Chpt. 1
4	Jan. 19 (R)	Developmental Molecular Genetics	Chpt. 2
-	Jan. 24 (T)	Continued	--
5	Jan. 26 (R)	Cell Communication & Differentiation	Chpt. 3
6	Jan. 31 (T)	Specification: Committing to Early Development	Part II: pg. 110-121
7	Feb. 02 (R)	Fertilization	Chpt. 4
8	Feb. 07 (T)	Continued	--
9	Feb. 09 (R)	Invert Early Development: Overall Process, Sea Urchins, & Tunicates	Chpt. 5 (partial)
10	Feb. 14 (T)	Continued	--
--	Feb. 16 (R)	EXAM # 1	Lecture material 1-10
11	Feb. 21 (T)	Fruit Fly Genetics: D/V & A/P Axis Specification	Chpt. 6 (203-226)
12	Feb. 23 (R)	Continued	--
13	Feb. 28 (T)	Vert Early Development: Amphibians	Chpt. 7 (241-272)
14	Mar. 01 (R)	Vert Early Development: Birds	Chpt. 8 (287-297)
--	Mar. 01 (R)	Midterm- last day to drop without penalty.	--
--	Mar. 06 (T)	Stem Cells: Introducing Organogenesis & Late Development	Part III: pg. 323-331
15	Mar. 08 (R)	Ectoderm: Nerves & Skin	Chpt. 9
16	Mar. 13 (T)	Spring Break- NO CLASS T	--
17	Mar. 15 (R)	Spring Break- NO CLASS R	--
18	Mar. 20 (T)	Continued	--
--	Mar. 22 (R)	EXAM # 2	Lecture material 11-18
19	Mar. 27 (T)	4th Germ Layer: Neural Crest Cells	Chpt. 10 (partial)
20	Mar. 29 (R)	Paraxial & Intermediate Mesoderm	Chpt. 11
21	Apr. 03 (T)	Continued	--
22	Apr. 05 (R)	Lateral Plate Mesoderm	Chpt. 12
23	Apr. 10 (T)	Continued	--
24	Apr. 12 (R)	Sex Determination & the Germ Line	Chpt. 14 & 16 (partial)
25	Apr. 17 (T)	Continued	--
	Apr. 19 (R)	Continued	--
26	Apr. 24 (T)	Catch-up, review	--
--	Apr. 26 (R)	EXAM # 3	Lecture material 19-25
--	May 3 (R)	FINAL: 12:30 pm – 2:30 pm BC 2022	Cumulative

TENTATIVE LABORATORY EXERCISES:

Lab	Day:	Topic:	Text / Other
1	January 11	Laboratory Introduction, Other Resources, Microscopes & Objectives	Chapter 1 & 3
--	January 18	NO LAB: MLK Week	--
2	January 25	Amphibian Life Cycle & Early Development	Chapter 14
3	February 1	Gametogenesis	Chapter 5
4	February 8	Fertilization- Sea Urchin	Chapter 6
5	February 15	Early Chicken Development & Embryo Origami	Chapter 9 & Handout
6	February 22	Mid Chicken Development (33 hour)	Chapter 10
7	February 29	Late Chicken Development- whole mounts	Chapter 11 & Handout
8	March 7	Practical Exam	--
--	March 14	NO LAB: SPRING BREAK	--
9	March 21	Zebrafish vs. Mangrove Killifish Development Discussion & Experimental Ideas	Chapter 15 (pg. 1-9, 12-19) & Mourabit et al. 2011
10	March 28	Proposal Discussion & Set-up	Group Proposal Due
11	April 4	Independent Experiment	--
12	April 11	Independent Experiment	--
--	April 18	Independent Experiment	--
13	April 25	Catch-up, clean-up, review	Lab Paper Due

Note: Above schedule subject to change or rearrangement based on availability of live specimens or pace of course. Additional Ancillary materials may also be provided on Blazeview listed as text. It is strongly recommended you print out diagrams or pictures available for comparison during laboratory time and specify with instructor what structures you are responsible for identifying on the practical exam.