Developmental Biology
BIOL 4350(6350), Section A (4 credit hours)
Fall Semester 2015

Lecture (BC 2022): **Tue-Thu 11 pm – 12:15 pm**

Laboratory (BC 2071): **Tue 2 pm – 4:50 pm**

Instructor: Dr. Cristina Calestani
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Office hours:
Wed 4:00 pm-6:00 pm
Thu 4:00 pm- 5:00 pm
Or by appointment (please send me an email to my valdosta.edu account with "appointment" in the subject line).

Pre-Requisites: BIOL 1107, BIOL 1108, and BIOL 3200 with a grade of C or better or permission of instructor.

Course Description (as stated in the Undergraduate Catalogue 2014-2015):
A study of development from fertilization through embryological stages, with an emphasis placed on experimental embryology and molecular genetic mechanisms in selected model organisms.

Course Learning Outcomes

This course learning outcomes support the achievement of the Department of Biology Educational Outcomes 1 through 5, and the VSU General Education Outcomes 3, 5, and 7. By the end of this course the students will be able to:

1) Describe the developmental anatomy of selected invertebrate and vertebrate embryos
2) Comprehend the basic molecular and cellular mechanisms of fertilization and embryo development
3) Compare and contrast development of different organisms
4) Comprehend and predict the outcomes of possible interactions between developmental processes and environmental factors, naturally occurring or man-made.
5) Understand experimental approaches used to answer specific questions in developmental biology
6) Develop and test a hypothesis using experimental embryology techniques learned in the laboratory
7) Analyze and interpret experimental data in developmental biology
8) Communicate scientific results and evaluate their significance in the context of current knowledge in developmental biology
9) Discuss ethical implications and societal impacts of advances in developmental biology research

Textbook
Scott F. Gilbert. 2013. *Developmental Biology* 10th ed. Sinauer Associate, Inc., Massachusetts USA.

Laboratory Manual
Mary S. Tyler & Ronal N. Kozlowski. 2010. *DevBio Laboratory: vade mecum 3*. An Interactive Guide to Developmental Biology (online access). To download the manual register at: http://labs.devbio.com using the code printed inside the cover of the textbook.

Additional material for the lab will be posted on Blazeview.

ASSESSMENTS

Lecture

The lecture assessments will consist of four exams and one paper presentation. The fourth exam will be a comprehensive final.

Exams 1,2 and 3 will be taken during class time and must be turned in by the scheduled end of class. The final exam will be on Wednesday December 9, 2015 from 10:15 am to 12:15 pm in BC 2022.

Exams grades will be posted on Blazeview.

- All exams are based on lecture material and assigned readings.
- Exams questions are multiple choice, true/false, matching and short written answers.
- If you fail to attend one of the exams for any reason, you must provide documented evidence (e.g. from doctor, police, etc.) that circumstances beyond your control prevented you from taking the exam. Failure to provide reasonable evidence will result in a grade of 0 for the exam. Makeup exams will be administered at any time during the semester at the discretion of the instructor.
- If you arrive late for an exam you will be allowed to take the exam. However, you must turn in the exam paper at the regular scheduled end of the class. You will not be allowed extra time unless a documentable emergency has occurred.
- The final exam grade (exam 4) can replace the lowest grade of exams 1, 2 or 3. This applies only to exam 4; no other exam can replace the lowest grade. If exam 4 is used to replace a lower grade in tests 1, 2, or 3, the grade for exam 4 will count twice in the final grade calculation. Exam 4 cannot be used to replace a missed test.
- Exam 4 will always count in calculating the final grade.
- After each exam, students are strongly encouraged to review it. You can review an exam during office hours. Exam papers will not be returned to students.
- **Any student attempting to copy, take pictures or steal a hard-copy of a test, at any time during the semester, will receive an automatic F for the entire course and face disciplinary action for student misconduct.**

Attendance will be recorded at the beginning of class. Students arriving late, after the first 10 minutes of class, will be considered absent. If you do not attend class on a regular basis you will be at a significant disadvantage.

Laboratory

The laboratory assessments consist of two practical exams and two PowerPoint presentations of inquiry-based experiments. Students are required to maintain a laboratory notebook.

The practical exams questions may include microscope slides, whole specimens and a written component.

The inquiry-based experiments will be performed in groups of approximately four students. Time outside of the assigned laboratory hours is required for the inquiry-based experiments. Your final grade for the presentations will be influenced by peer evaluation of your relative level of contribution; *i.e.* your group partners will grade your contribution on a scale of 0-100%. For example, if your group lab presentation receives a grade of 100% by the instructor and your partners estimate your effort to be 60% (as compared to other members of the group) your lab presentation grade will be 60% of

10 points. An average taken from all members of the group will be used to calculate the percent effort for each person. Peer assessment will be anonymous.

There are no make-up labs. Attendance for the laboratory is mandatory. Attendance will be recorded at the beginning of each laboratory. Students arriving after the first 30 minutes of the laboratory will be considered absent. Any student missing 3 laboratories or more, with or without documented excuse, cannot receive a lab grade above a "D" (60%).

Extra-credit up to a maximum of 10 points will be offered. These points will be added to the student total points for the course before calculating the percentage grade. Extra-credit points can be earned with in-class activities during the lecture or the laboratory and with take-home assignments.

Grade Calculation*		
Assessment		**Max. Points**
Lecture	Exam 1	100
	Exam 2	100
	Exam 3	100
	Final Exam	100
	Attendance	40
Laboratory	Practical 1	50
	Practical 2	50
	Oral presentation 1	25
	Oral presentation 2	25
Total Max. Points		**590**
Extra-credit max. Points		**10**

Grade Distribution	
Letter	**Percentage**
A	90 -100%
B	80 - 89%
C	70 - 79%
D	60 - 69%
F	≤ 60%

***Final grade calculation: (Lecture exams +Attendance + Lab practicals + Lab presentations points)/590 points**

NOTE: Graduate students enrolled in BIOL 6350 will have additional assignments and adjusted grading scale in a supplementary syllabus.

Classroom Accommodations
Students requesting classroom accommodations or modifications due to a documented disability must contact the Access Office for Students with Disabilities located in Farber Hall. The phone numbers are 245-2498 (V/VP) and 219-1348 (TTY). For VSU's Access Office please see http://www.valdosta.edu/access/facresources.shtml

Behavior in the Classroom
It is assumed that all students will act in a mature manner in the classroom, showing consideration for their peers and the instructor. Any student who consistently distracts other students or the instructor will be removed from the course. **All electronic devices must be turned off or set to silent mode in the classroom.**

Cheating or Plagiarism
Incidents of cheating or plagiarism will result in **an automatic F for the course and referral to The Office of Student Conduct for disciplinary action.** For VSU's Academic Integrity Code please see http://www.valdosta.edu/academic/AcademicHonestyPoliciesandProcedures.shtml.
For VSU's Academic Honesty please see http://www.valdosta.edu/academic/AcademicHonestyatVSU.shtml.

Learning Support

 The Student Success Center: The Student Success Center (SSC) provides free peer tutoring in core courses, the top four of which are math, writing, Spanish, and biology/chemistry. It also offers time management and study skills workshops as well as provides free professional academic advising and on-campus job information in one location: Langdale Residence Hall. Help is available to all VSU students. Call 333-7570 to make an appointment, or visit the website: www.valdosta.edu/ssc.

 Odum Library provides a variety of services to assist classroom instruction, including library instruction, course reserves, and interlibrary loan. Please see http://www.valdosta.edu/library/services/faculty.shtml for further information.

TENTATIVE LECTURE OUTLINE:

Lecture	Date	Topic	Text Reading
1	Aug 18	**Course Introduction**	
2	Aug. 20	**Comprehending Development I**	Part I: pg. 1-3 Chapter 1 pp.5-12; 14-23
3	Aug. 25	**Comprehending Development II**	Part I: pg. 1-3 Chapter 1 pp.5-12; 14-23
4	Aug. 27	**Fertilization**	Chapter 4 pp.117-134; Fig. 4.25 pp.140-147
5	Sept 1	**Differential Gene Expression in Development I**	Chapter 2
6	Sept 3	**Differential Gene Expression in Development II**	Chapter 2
7	Sept. 8	**Cell-Cell Communication I**	Chapter 3
8	Sept. 10	**Cell-Cell Communication II**	Chapter 3
9	Sept. 15	**Specification and Early Development**	Part II pp.109-115 Chapter 5 pp. 153-161 (Snails excluded); pp.170-177
10	Sept. 17	**The Genetics of Axis Specification in *Drosophila***	Chapter 6 pp. 179-187; 194-197; 202-203; 209-210
--	Sept. 22	**EXAM # 1**	**Lecture material 2-9**
11	Sept. 24	**Sea Urchin Development**	Chapter 7 pp. 217-224; 225-232
12	Sept. 29	**Vertebrate Early Development:** Amphibians and Fish	Chapter 8 pp. 244-260; 271-277
13	Oct 1	**Vertebrate Early Development:** Birds	Chapter 9 pp. 285-296
14	Oct 6	**Vertebrate Early Development:** Mammals	Chapter 9 pp. 298-317
--	Oct. 8	NO CLASS	
15	Oct 15	**The Stem Cell Concept**	Part III: pp. 319-331
16	Oct. 20	**Postembryonic development- Regeneration**	Chapter 16 pp. 568-574; 578-579
17	Oct. 22	**Late Development-Organogenesis I** Central Nervous System	Chapter 10 pp. 333-349; 351-359
--	Oct. 27	**EXAM #2**	**Lecture material 10-16**
18	Oct. 29	**Late Development-Organogenesis II** Derivatives of the Neural Crest Cells, Paraxial and Intermediate Mesoderm	Chapter 11 pp.375-386; 391-392 (Cranial placodes excluded) Chapter 12 pp. 415-426; 429-434
19	Nov 3	**Late Development-Organogenesis III** Derivatives of the Lateral Plate Mesoderm and the Endoderm	Chapter 13 pp. 449-460; 472-481; 484-486
20	Nov 5	**Development of the Tetrapod Limb**	Chapter 14 pp.490-498; 506-516
21	Nov. 10	**Sex Determination**	Chapter 15 pp.519-532; 541-545
22	Nov. 12	**The Germ Line**	Chapter 17 pp. 591-592; 598-597; 604-605; 614-623
23	Nov. 17	**Medical Aspects I**	Chapter 18
--	Nov. 19	**TEST # 3**	**Lecture material 17-22**
24	Nov 24	**Medical Aspects II**	Chapter 18
--	Nov. 25-27	**THANKSGIVING HOLIDAY**	
25	Dec 1	**Developmental Mechanisms of Evolution I**	Chapter 20 pp.689-707
26	Dec 3	**Review**	
--	**Dec 9 Wednesday**	**FINAL EXAM 10:15 am-12:15 pm**	**Cumulative**

TENTATIVE LABORATORY EXERCISES:

Lab	Day:	Topic:	Lab Manual	Due Dates
--	Aug 18	NO LAB	--	
1	Aug. 25	Amphibian Development	Chapter 14	
2	Sept 1	Sea Urchin Fertilization	Chapter 6	
3	Sept. 8	Labor Day-NO LAB		
4	Sept. 15	Effects of UV radiation (inquiry-based experiment)	Chapter 7	
5	Sept. 22	Chicken Development I	Chapter 9	
6	Sept 29	Chicken Development II	Chapter 10	
--	Oct. 6	**Practical Exam 1**		
7	Oct 13	Fall Break-NO LAB		
8	Oct 20	**Oral presentation 1** (Effects of UV)		
9	Oct. 27	Regeneration in Planaria (inquiry-based experiment)	Chapter 13	
10	Nov. 03	Teratogens effects on Planaria regeneration (inquiry-based experiment)	Handout	
11	Nov. 10	Gametogenesis	Chapter 5	
--	Nov. 17	**Practical Exam 2**		
	Nov 24	NO LAB		
12	Dec 01	**Oral presentation 2** (Regeneration-Teratogens)		