Developmental Biology
BIOL 4350(6350), Sections A-B (4 credit hours)
Fall Semester 2021

Lecture (BC 2022): **Mon-Wed 3:30 PM – 4:45 PM**

Laboratory (BC 2071): **Section A Thu 9:30 AM – 12:20 PM**
Section B Fri 10:00 AM - 12:50 PM

Instructor: Dr. Cristina Calestani
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Office hours:
Mon 5:00-5:30 PM; Tuesday 2:00-5:00 PM; Wednesday 5:00-5:30 PM; Friday 2:00-3:00 PM
Or by appointment (please send me an email to my valdosta.edu account).

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):
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
Michael J.F. Barresi and Scott F. Gilbert. *Developmental Biology* 12th ed. Oxford University Press , Cary NC, USA

Laboratory Manual

The instructor will provide handouts for the laboratory exercises.

ASSESSMENTS

Lecture

The lecture assessments will consist of three exams and one presentation from the literature. The final exam will be optional and comprehensive.
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 Thursday December 9th, 2021 from 2:45pm to 4:45pm in BC 2022.

Exam 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 optional final exam (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. Exam 4 cannot be used to replace a missed test.
- 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.

Paper Presentation

The paper presentation is a group assignment (2 students per group). A paper from current literature in developmental biology will be assigned to each group of students by the instructor. The students will present the paper in class in a PowerPoint presentation format. The instructor will communicate the guidelines and rubrics to the students.
Your final grade for the presentation will be influenced by peer evaluation of your relative level of contribution; *i.e.* your group partner will grade your contribution on a scale of 0-100%. For example, if your group presentation receives a grade of 100% by the instructor and your partner estimates your effort to be 60% (instead of 100% for your assigned work) your presentation grade will be 60% of 50 points.

Laboratory

The laboratory assessments consist of two practical exams and one PowerPoint presentation of an inquiry-based experiment. 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% (instead of 100% for your assigned work) your lab presentation grade will be 60% of 25 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, take-home assignments and in-class written critique of the lecture paper presentations.

Grade Calculation*		
Assessment		**Max. Points**
Lecture	Exam 1	100
	Exam 2	100
	Exam 3	100
	(Final Exam)	(100)
	Paper Presentation	50
	Attendance	15
Laboratory	Practical 1	50
	Practical 2	50
	Oral presentation	35
Total Max. Points		**500**
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 + Paper Presentation +Attendance + Lab practicals + Lab presentations + Extra-Credits points)/500 points**

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

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 0% for the assignment and referral to The Office of Student Conduct for disciplinary action.**
For the VSU's Academic Integrity Code please see http://www.valdosta.edu/administration/student-affairs/student-conduct-office/
For the VSU's Academic Honesty policies and procedure please see http://www.valdosta.edu/academics/academic-affairs/vp-office/academic-honesty-policies-and-procedures.php

COVID-19 related policy

As the Blazer Creed articulates, members of the VSU community are expected to live by the high standards of civility, integrity, and citizenship and embrace their responsibility as a member of the Blazer community. In recognition of this responsibility, and in response to the best available science and current guidance from the Centers for Disease Control and Prevention and the Georgia Department of Public Health, while face coverings are no longer required, individuals are strongly encouraged to continue wearing a face covering indoors. Unvaccinated individuals are strongly encouraged to get vaccinated. Vaccines remain available at no cost for all members of the university community by appointment at Student Health Services. For COVID Vaccines, please call ahead for an appointment at 229-333-5886.

Learning Support

Access Office: Students with disabilities who are experiencing barriers in this course may contact the Access Office for assistance in determining and implementing reasonable accommodations. The Access Office is located in Farbar Hall. The phone numbers are 229-245-2498 (V), 229-375-5871 (VP) and 229-219-1348 (TTY). For more information, please visit VSU's Access Office or email: access@valdosta.edu.

The Academic Support Center: The Academic Support Center provides free peer tutoring for most core courses and some upper-division courses. It also offers time management and study skills workshops as well as other learning support services.
Call 333-7570 to make an appointment, or visit the website: https://www.valdosta.edu/asc/

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

Title IX Statement: Valdosta State University (VSU) is committed to creating a diverse and inclusive work and learning environment free from discrimination and harassment. VSU is dedicated to creating an environment where all campus community members feel valued, respected, and included. Valdosta State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including pregnancy status, sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, national origin, disability, genetic information, or veteran status, in the University's programs and activities as required by applicable laws and regulations such as Title IX. The individual designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning nondiscrimination policies is the Office of Student Affairs.

Lecture	Date	Topic	Text Reading
1	Aug 16	Course Introduction	
2	Aug 18	Introduction to Development	Chapter 1
3	Aug 23	Differential Gene Expression I	Chapter 3
4	Aug 25	Differential Gene Expression II	Chapter 3
5	Aug 30	Specifying Identity	Chapter 2
6	Sept 1	Cell-Cell Communication I	Chapter 4
--	Sept. 6	**LABOR DAY-No Class**	
7	Sept 8	Cell-Cell Communication I	Chapter 4
8	Sept. 13	Stem Cells	Chapter 5
9	Sept 15	Sex Determination and Gametogenesis	Chapter 6
10	Sept 20	Fertilization	Chapter 7
--	**Sept 22**	**EXAM # 1**	**Lecture # 2-9**
11	Sept 27	The Genetics of Axis Specification in Drosophila	Chapter 9
12	Sept 29	Sea Urchins	Chapter 10
13	Oct 4	Vertebrate Early Development**:** Amphibians and Fish	Chapter 11
14	Oct 6	Vertebrate Early Development: Birds and Mammals	Chapter 12
--	Oct 11	**FALL BREAK- NO CLASS**	
15	Oct 13	Vertebrate Nervous System (Ectoderm derivatives)	Chapter 13-14
16	Oct 18	Neural Crest Cells (Ectoderm derivatives) and Paraxial Mesoderm	Chapter 15-17
--	**Oct 20**	**EXAM #2**	**Lecture # 10-15**
17	Oct 25	Intermediate, Lateral Plate Mesoderm and the Endoderm	Chapter 18-20
18	Oct 27	Development of Tetrapod Limb	Chapter 19
19	Nov 1	Regeneration	Chapter 22
20	Nov 3	Development in Health and Diseases	Chapter 23
21	Nov 8	Development and Evolution	Chapter 25
22	Nov 10	**EXAM # 3**	**Lecture # 16-20**
23	Nov 15	Literature presentation and discussion	
24	Nov 17	Literature presentation and discussion	
25	Nov 22	Literature presentation and discussion	
--	Nov 24	**THANKSGIVING HOLIDAY**	
26	Nov 29	Literature presentation and discussion	
27	Dec 1	Literature presentation and discussion	
28	Dec 6	Review	
--	**Dec 9 Thursday**	**FINAL EXAM 2:45 PM-4:45 PM (Optional)**	**Cumulative- lecture # 2-21**

TENTATIVE LABORATORY EXERCISES:

Lab	Day:	Topic:
--	Aug 19-20	NO LAB
1	Aug 26-27	Amphibian Development
2	Sept 2-3	Chicken Development
3	Sept 9-10	Gametogenesis
4	Sept. 16-17	Effects of UV radiation on sea urchin fertilization and development
5	Sept. 23-24	Regeneration of Planaria
6	Sept 30 Oct 1	**Oral presentation** (Effects of UV on sea urchin)
7	Oct 7-8	**Practical Exam 1 (Lab 1-6)**
8	Oct 14-15	Effects of endocrine disruptors on gene expression: transcriptome sequencing
9	Oct 21-22	Effects of endocrine disruptors on gene expression: transcriptome sequencing
10	Oct. 28-29	Effects of endocrine disruptors on gene expression: transcriptome sequencing
11	Nov 4-5	Effects of endocrine disruptors on gene expression: transcriptome sequencing
12	Nov. 11-12	Effects of endocrine disruptors on gene expression: transcriptome sequencing
13	Nov. 18-19	Effects of endocrine disruptors on gene expression: transcriptome sequencing
--	Nov 25-26	**THANKSGIVING-NO LAB**
14	Dec 2-3	**Practical Exam 2 (Lab 8-13)**