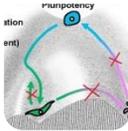


# Developmental Biology



BIOL 322 lecture



Spring 2017, Richard Southgate, PhD

## **INSTRUCTOR CONTACT:** Dr. Richard Southgate

Office: HWWE room 308

Phone: 953-0340 (not very efficient so please e-mail first)

e-mail: [southgater@cofc.edu](mailto:southgater@cofc.edu)

## **My office visit times are**

**Monday 10:30 am to ~12 noon as I have to prep the DB lab.**

**Wednesday 10:30 am to ~12:30.**

On some occasions, I will also have to go to faculty meetings in SSMB at 12 – 1 pm, so on those days, I will not be available, and I will let you know in class.

We can also talk after Monday lab, or by appointment and I may also be available on Wed. afternoons in my office, so ask.

The best way to contact me is by e-mail ([southgater@cofc.edu](mailto:southgater@cofc.edu)) and providing me with times when you are available. I check my e-mail frequently and will give you a specific meeting time in return.

## **MEETING TIMES**

**LECTURE: M, W, and F, 9:30 to 10:20 am in Harbor Walk West room 305.**

**LABORATORY: Monday: 1:30 – 4:30 pm in HWWE room 208.**

Lab is mandatory. There is a separate syllabus for the lab.

## **COURSE DESCRIPTION**

Lecture surveys the different stages of development from fertilization to organogenesis in both invertebrate and vertebrate model systems. Lecture covers both the descriptive nature of embryonic development, as well as the conserved molecular and cellular patterns. The laboratory covers some techniques of developmental biology, as well as histology slides of embryonic development, and research paper discussion. Lectures three hours per week; laboratory three hours per week.

Prerequisites: BIOL 111/111L, BIOL112/112L, BIOL 211/211D, and BIOL305.

## COURSE LEARNING OUTCOMES

1. Describe the steps of development and tissue formation in several major animal groups (echinoderm, nematodes, insects, and several vertebrates).
2. Explain the concepts of cell potency, plasticity and determination
3. Describe the importance of intrinsic and extrinsic cues for early developmental specification
4. Explain the concept of induction
5. Explain the processes involved in combinatorial regulation and control of gene expression as they apply to development.
6. Describe cell biology processes such as cell communication, cell migration, and cell shape as they pertain to developmental stages
7. Demonstrate an understanding of developing hypotheses and interpreting results on the basis of their hypothesis.

## COURSE OBJECTIVES

The lecture and laboratory are integrated and complementary. The lecture and laboratory are designed to:

- Excite your imagination and love of biology.
- Develop critical reading and discussion skills using primary literature papers.
- Develop team work, as well as information gathering, critical analysis and presentation skills through research and oral presentation.

## TEXT BOOK

**Best: Developmental Biology, Tenth Edition** , Hardcover – June 30, 2013,  
by **Scott F. Gilbert** ISBN-13: 978-0878939787, ISBN-10:0878939784.

However, any recent versions of Developmental Biology by Gilbert or Wolpert are fine. All necessary reading and notes will be posted on OAKS

**LABORATORY** There is no book or manual to buy for the lab. The protocols and other information for each week will be posted on OAKS.

I will be using OAKS to post information and announcements. Make sure to check the site **at least once every day**. If you are not familiar with OAKS, please let me know. Instruction is also available from the Library.

## IMPORTANT DATES and exam days:

<http://registrar.cofc.edu/pdf/ac-2017Spring.pdf>

<http://registrar.cofc.edu/pdf/exam-schedule-spring2017.pdf>

### Spring 2017 Exam Schedule

Exam Times	Friday April 28	Saturday April 29	Sunday April 30	Monday May 1	Tuesday May 2	Wednesday May 3	Thursday May 4	Friday May 5
8:00am-11:00am	MWF 9:00am 9:30am	TR 8:00am 8:30am	Reading Day 8:00-4:00pm	MWF 10:00am 10:30am	TR 10:50am 11:20am	MWF 7:30am	TR 9:25am 9:55am	MWF 8:00am 8:30am
12:00pm-3:00pm	MWF 11:00am 11:30am	Math all 101,111, 120 Exams		MWF/MW 2:00pm 2:30pm	TR 1:40pm 2:10pm	MWF 12:00pm 12:30pm	TR 12:15pm 12:45pm	MWF 1:00pm 1:30pm
4:00pm-7:00pm	MWF 3:00pm 3:30pm MW 3:25pm	H	Online Final Exams	E	TR 3:05pm 3:35pm 4:00pm	F	TR 7:05am	MWF/MW 4:00pm
7:30pm-10:30pm	D	G		A	B	C	I	J

<http://registrar.cofc.edu/pdf/exam-schedule-spring2017.pdf>

**Our Final will be on April 28<sup>th</sup> 2017, at 8 – 11 am (negotiable) in HWWE 305.**

### TEST DATES: 50 MINUTES IN CLASS

- Monday 02/06 2017: First test in class
- Friday 03/03 2017: Second test in class
- Monday 04/03 2017: Third test in class

**QUIZZES:** on OAKS (home) or Socrative <https://www.socrative.com/> in class probably every Friday except on test days. → 10 quizzes and any other to will be swapped with better quizzes.

### TESTING and GRADING:

Lecture and laboratory testing are integrated (you get only one grade, 80% in class and 20% in lab.) in this course.

- Weekly quizzes** on lecture materials 10 pts each with the goal to have 12 quizzes and drop your 2 worst grades = **100 pts..**
- There will be **3 tests during the semester.** These will be multiple-choice, fill-in, mini-essay, define questions (100 pts.) in class (see test dates above) and a research paper-review (50 pts.) on online to be due at mid-night of the test. The dates for the tests are on the syllabus. Test questions will use materials from both lecture and lab.  
**150 pts per test x 3 = 450 pts.**
- Class participation and attendance = 50 pts.**
- FINAL: The final is cumulative, 150 pts.**
- TOTAL: 100 + 450 + 150 + 50 pts = 750 pts for the class = 80% of the course.**
- Laboratory 20% (breakdown on laboratory syllabus) so  
**CLASS: 80% = 750 pts., 100% = 937.5 pts, LAB. = 20% = 187.5 pts.**

### GRADING SCALE:

92 and above:	A	74 - 76.9:	C
90 - 91.9:	A-	70 - 73.9:	C-
87 - 89.9:	B <sup>+</sup>	67 - 69.9:	D <sup>+</sup>
83 - 86.9:	B	64 - 66.9:	D
80 - 82.9:	B-	60 - 63.9:	D-
77 - 79.9:	C <sup>+</sup>	Below 60:	F

## TOPICS IN BIOL-322

This is a tentative syllabus and this list of topics below will be in order but the actual timing may vary, hence the below list does not give a precise date. All these topics will be covered in this class and all information will be available on OAKS 24/24. Over the ~12 semester weeks, we will see:

- Introduction and developmental biology concepts
- Gametes
- Fertilization
- Early cleavage in model systems: sea urchin, *C. elegans*, and *Xenopus laevis*
- Cell polarity and asymmetric cell division
- Cell adhesion, sorting and epithelial barriers
- Review cell adhesion-ECM
- Cues in early cell specification:
  - intrinsic maternal products, morphogenetic gradients
  - Discussion of sea urchin, *C. elegans*, and *Xenopus laevis* axis establishment
  - Overview of *Drosophila* early cleavage
- Review control of gene expression: transcriptional control,
- Early cleavage in other systems: *Danio rerio*, chicken, and mammals and discussion of their axis establishment
- Gastrulation in sea urchin, *Drosophila*, and *Xenopus laevis*
- Review cytoskeleton and cell movement
- Germ layer specification process: induction and organizer
- Review cell communication
- Gastrulation in *Danio rerio* (zebrafish), chicken, and mammals
- Germ layer specification process: induction and organizer
- Left-right specification
- DNA constancy concept
- Cell potency and specification
- Concept of combinatorial regulation
- Cell differentiation
- Neurulation: movements and molecular induction
- Field formation and homeotic gene
- Ectoderm derivatives including nervous system and neural crest cells
- Eye development
- Mesoderm derivatives
- Endoderm derivatives
- Limb formation
- Possible wrapping up discussions:
  - how do cells acquire and use information for specification
  - how do cells know where to move to when to stop
  - how do cell layers form tubes and lamina
  - others?

## COURSE POLICIES

### ELECTRONIC DEVICES

You are encouraged to bring your laptop or tablet for every class, but they can only be used for class activities. Breach of that trust will lead to you losing that right.

## ATTENDANCE POLICY

You are **expected** to be present for every lecture. You will be allowed **three absences for the course (~once per month) without penalty to your attendance grade AFTER THE DROP/ADD DATE: Jan. 18<sup>th</sup> 2017**. There will be regular random attendance in the class but with only 14 students, I will know who is in or not, and that is why I ask for the class members attendance to legally recorded / know who is not in class. For each absence after the three allowed absences, you will lose 20% of the attendance points (i.e. you start with 50 points and you lose 10 points for each missed class after the three allowed absences). **EXCESSIVE ABSENCE**, i.e. **MISSING 4-5 CLASSES IN A ROW WILL RESULT IN A “WA” GRADE (WITHDRAWN EXCESSIVE ABSENCE) AT MIDTERM AND/OR FINAL GRADE if there is no communication with the lecturer. At midterm WA can still be changed to a regular final grade. A final “WA” grade is calculated as an “F” in your GPA. This is College policy.** This policy does not apply obviously if the absences are due to a **SERIOUS** medical or personal reasons with documented proof.

Missing classes penalizes you more than a drop in the class activity points because you **can rarely make up on your own the missed materials and never can make up the skill practice, discussion and shared ideas. Students are responsible for all content for any class missed. Under extenuating circumstances, I will make one-on-one decision based on individual conditions and again if you have provided documentation. I will work individually with student-athletes etc. who will need to be absent for meets/competitions/games.**

## COLLEGE POLICIES

- **DISABILITY SERVICES**

The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services / SNAP, located on the first floor of the Lightsey Center, Suite 104. If there is a student in this class who has a documented disability and has been approved to receive accommodations through SNAP Services, please feel free to come and discuss this with me during my office hours or if necessary by an appointment.

- Any student eligible for and needing academic adjustments or accommodations because of a disability is requested to speak with the professor in a timely manner so that your needs can be addressed i.e. earlier than later.
- The College will make reasonable accommodations for persons with documented disabilities. Students should apply for services at the Center for Disability Services located on the first floor of the Lightsey Center, Suite 104. Students approved for accommodations should notify their professors as quickly as possible.
- This College abides by section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act that stipulates no student shall be denied access to an education “solely by reason of a handicap.” Disabilities covered by law include, but are not limited to, learning disabilities and hearing, sight or mobility impairments. If you have a documented disability that may have some impact on your work in this class and for which you may require accommodations, please see an administrator at the Center of Disability Services, (843) 953-1431 or me so that such accommodation may be arranged.

<http://www.disabilityservices.cofc.edu>

- **COLLEGE OF CHARLESTON HONOR CODE AND ACADEMIC INTEGRITY**

- **Lying, cheating, attempted cheating, and plagiarism** are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

- Incidents where the instructor determines the student's actions are related more to a misunderstanding will be handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.
- Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.
- Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance.
- Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.
- Students can find the complete Honor Code and all related processes in the *Student Handbook* at
- <http://studentaffairs.cofc.edu/honor-system/>
- <http://studentaffairs.cofc.edu/honor-system/studenthandbook/>
- <http://parkj.people.cofc.edu/HonorCode.pdf>

- **CENTER FOR STUDENT LEARNING**

I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies and course content. They offer tutoring, Supplemental Instruction, study skills appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at <http://csl.cofc.edu/> or call (843)953-5635.

- **STUDY SKILLS WORKSHOPS**

Each semester a series of study skills workshops are offered free of charge to all College of Charleston students. The Workshop Series 101 is geared towards the general student population wanting more information on study skills. The Workshop Series 101 occurs three times a week lasting about 50 minutes for each session. Students will receive weekly reminders via email and Facebook for the upcoming session with time and place. You can also visit <http://csl.cofc.edu/study-skills/workshops/index.php>

**If you see a mistake in this syllabus, please let me know.**