

College of Charleston (CofC)'s Developmental Biology (DB) course. BIOL 322-01, Spring 2016

LECTURE MEETING TIMES:

Mon, Wed, Fri: 9:30 - 10:20am, in Harbor View West (HWWE) room 305
Please bring your laptop/tablet to lecture and lab. for quizzes, etc.

LABORATORY MEETING TIME:

Wednesday 1:30 – 4:30 pm and Friday 1pm – 4pm, in HWWE room 208.
The first lab. will be on Wed. Jan. 13 and Jan. 15th 2016, respectively.

INSTRUCTOR: Richard Southgate, PhD. (University of Geneva, Switzerland, 1984).

OFFICE: HWWE 308.

PHONE: 953-0340 (not very efficient due to my busy schedule)

E-MAIL: southgater@cofc.edu (FAR BETTER AND QUICKER!).

OFFICE TIMES: Monday 10:30AM to 2pm

If you cannot come at these times on Monday, **e-mail me to set up an appointment** and we can find a good time to meet. We can also briefly talk before or after class, or lab. sessions. I am planning to have no student appointments on Tuesdays, allowing me time to do research, extra lecture & lab. prep., medical appointments/procedures etc. but are negotiable.

My busy school schedule for **Spring 2016** is:

3 DB classes, M, W and F @ 9:30–10:20 am) (3 hours) and 3 labs.

DB (W @ 1:30–4:30 pm & F @ 1-4pm) in HWWE 208 (6 hours) and

Molecular Biology (Th) @ 3:30–6:30 pm in SCMB 141 (3 hours).

These times **do not include** time for lab. preparation and lab. clean up.

TEXTBOOK: Developmental Biology, 10th Edition, by Scott F. Gilbert (Author)

ISBN-13: 978-0878939787, ISBN-10: 0878939784, CofC Bookstore:

<http://cofc.bncollege.com/webapp/wcs/stores/servlet/BNCBTBListView>,

DB LAB. There is **no book/manual** to buy for the lab. sessions and there will be a copy of the excellent "A Photographic Atlas of Developmental Biology" (by **Shirley J. Wright**) in the lab. **for reference purposes.** The protocols for each weekly lab. will be posted on OAKS and **you are responsible to print them.** **The DB Lab. syllabus will be posted in OAKS's DB Lab. section.**

What is the purpose of a syllabus?

It is supposed to inform you what is expected to be covered in this course and to help you grasp the pure beauty of developmental biology and all its multi-connection to many other different branches of biology to explain how one cell can become a complete adult being.

If you wish to attend a medical school, MUSC and many other schools require a developmental biology class in their first year with a major emphasis on human medical developmental errors.

DB at CofC is, therefore, an essential preparation course for entry into a medical school as well as the finishing touch for your graduation plans or also a great launching pad to greater encompassing understanding the essence of biology.

Always remember this course, like all the other CofC courses, should create a never satisfied thirst of scientific curiosity that will last for the rest of your life, creating you into a lifelong scholar, teacher, and researcher.

The standards & requirements set forth in this syllabus below may be modified at any time due to weather, flu, etc. Notice of such changes or revisions will be by given in class, posted on OAKS together with a bulk class / lab. E-mail.

DESCRIPTION IN THE UNDERGRADUATE CATALOG ABOUT BIOL 322 Developmental Biology (4)

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 discussions.

Lectures three hours per week, laboratory three hours per week.

Prerequisites: [BIOL 111/111L](#), [BIOL 112/112L](#), [BIOL 211/211D](#), and [BIOL 305](#).

Co-requisite or prerequisite: [MATH 250](#) or equivalent course in statistics or permission of instructor.
<http://catalogs.cofc.edu/undergraduate/biol-322-developmental-biology-4.htm>

COURSE RATIONALE AND LEARNING OBJECTIVES

This course is designed to provide a basic understanding of the principles of development. The wonder of a fertilized egg directing its own development into an adult organism is nearly unfathomable in its complexity. You will find that the borders separating the disciplines of developmental biology, genetics, cell biology, biochemistry and molecular biology etc. become indistinct as there are a number of common themes including cell signaling, control of gene expression, cell migration and others in all these disciplines. We will find that the pathways of development are very similar in diverse animal groups, and we will be using a number of model organisms to deconstruct the patterns of early development in animals. Recent technological advances have begun to shed light on these fundamental molecular mechanisms that guide development. This lab part of the this course is designed to introduce students to these discoveries. In the lab, students will experience with modern techniques used to manipulate and examine developmental processes in several key model systems. But just as important as these practical reasons will be the development and appreciation of the elegant processes by which a single cell is transformed into a complex multicellular organism.

LEARNING OUTCOMES

- Familiarity with the main model systems used in Developmental Biology
- Familiarity with stages of development in different organisms
- Familiarity with techniques used to analyze gene and protein expression
- Training in scientific writing and scientific presentations
- Familiarity with reading the scientific primary literature
- Understand and be able to explain the use of modern developmental biology techniques
- Demonstrate an understanding of developing hypotheses and designing experiments.
- Communicate, analyze, and discuss experimental results.
- Understand, apply, and evaluate information presented in scientific journals.

Important dates for the Spring 2016 semester.

January 2016

Thursday, Jan 7 Spring full semester and Express I classes begin.
Wednesday Jan 13 Last day of Drop/Add for full semester classes.
Monday Jan 18 Martin Luther King, Jr. Holiday, observed.
No classes. College closed.
Saturday Jan 30 Designated Storm Make-Up Day (SD).

February 2016

Monday Feb 1 Last day to submit an Application to Graduate in May 2016
Faculty Attendance Verification OPENS in MyCharleston
(in Final Grades).
Monday Feb 8 Faculty Attendance Verification CLOSES at noon.
Tuesday Feb 16 Last day for students to submit incomplete undergraduate
Coursework to faculty for any Fall 2015 session (Fall 60
Day Deadline). Change of grade form to be submitted by
faculty.
Tuesday Feb 23 **Undergraduate missing and incomplete grades for Fall 2015
sessions convert to a grade of "F".**

March 2016

Sunday Mar 6 – 13 2016, **Spring Break.**
Monday Mar 14 Classes Resume
Full semester Mid Term and Express I final grades due at
noon. Mid Term grades available when posted.
Wednesday Mar 16 **Maymester and Summer Sessions registration begins for
College of Charleston students.**
Friday Mar 18 **Last day for students to withdraw with a grade of "W" from
full semester classes. NOTE: Holds placed by the
Treasurer's Office will prohibit students from being able
to withdraw in Banner Self-Service. Students should settle
the hold with the Treasurer to be able to withdraw online
or contact the Registrar's Office by this deadline to
withdraw.**
Monday Mar 21 **Fall 2016 early registration begins based on earned hours.
NOTE: Holds will prohibit students from being able to
register. Students should settle holds with the office
that placed the hold before their opportunity to register.
WA (Withdrawal for Excessive Absences) form may now be
submitted by faculty for full semester classes.**
Thursday Mar 31 Spring 2016 full semester and Express II course-instructor
Evaluations open.

April 2016

Tuesday April 12 WA (Withdrawal for Excessive Absences) form may now be
submitted by faculty.
Thursday April 21 Last day of full semester and Express II classes.
**NOTE: Only classes that normally meet on Mondays should
meet on this last Thursday.**
Reading Day
Friday April 22 Full semester and Express II final grading open.
Saturday April 23 First day of full semester and Express II final exams.
Friday April 29 Last day of full semester and Express II final exams.
Spring 2016 full semester and Express II course-instructor
Evaluations close at midnight.

May 2016

Tuesday May 3

**Full semester and Express II final grades due at noon.
Final grades for full semester and Express II classes
available to students on MyCharleston after 5 p.m.**

Saturday May 7

Spring 2016 Commencement

July 2016

Friday July 1

Last day for students to submit incomplete undergraduate coursework to faculty for any Spring 2016 class (Spring 60 Day Deadline).

Change of grade form to be submitted by faculty.

Friday July 8

Undergraduate missing and incomplete grades for Spring 2016 sessions convert to a grade of "F".

Full information can found on <http://registrar.cofc.edu/pdf/ac-2016spring.pdf>

<http://registrar.cofc.edu/pdf/exam-schedule-spring2016.pdf>

OAKS is the learning Management System used by the College of Charleston and is accessed via **mycofc.edu**. It is where you may find the syllabus and supplementary course material that supplements the text and lecture (pdf, PowerPoint Presentation (*.pptx), PowerPoint Picture Presentation (*.pptx), answer keys, study guides, etc.). I will use OAKS to post information and announcements before and after class or lab. activities. **Make it a habit to check the site frequently for study guides and any new information so you should check the "News" section at least once between every class meeting.** If you are not familiar with OAKS or having problems, please let me know, plus Library info. + OAKS TLT.

You are responsible for all material covered or assigned in class or assigned electronically on OAKS + class or lab. info. i.e. if this information is posted on OAKS or Voice Thread and was not presented in the class or lab., this information can still be material for quizzes, exams etc. You should check OAKS regularly for any updates.

TESTING of the DB lectures.

The entire Spring 2016 BIOL 322-01 and BIOL 322L-01/-02 Developmental Biology course is worth 875 points in total (700 points in the classroom and 175 points in the laboratory, split 80% in the classroom and 20% in the laboratory) and will be your highest possible point grade and the basis for your grade.

Quizzes: You will have 10 quizzes X 10 points each = 100 points and anything more than 10 will be dropped (1 or 2 more) by exchanging your lowest one or two previous quiz scores for a better grade(s). The quizzes will be taken typically once a week, either Wed. or Friday, either at the beginning or the end of the class, and we will use either paper quizzes, Socrative (<https://b.socrative.com/login/student/>), and OAK quizzes. Any quizzes greater than 10 quizzes will be dropped, and we will only see the total # of quizzes at the end...

The Quiz total will be 100/875 points = 11.5% of the total grade of the course.

As the final exam will be on the very last day, giving me only just 4 days for Grading! I have been arranged to have three exams in the classroom on: Monday, February 8th 2016 (Exam 1), Friday, March 18^h 2016 (Exam 2), and Monday, April 18th 2016 (Exam 3).

Each exam will be 100 points each, i.e. 300 points total or ~11.5% of the total per grade.

There will be three home assignments, each for 50 points for a total of 150 points, each worth 5.7% of the total grade. These assignments will be based on a peer reviewed article.

FINAL CLASS EXAM (Friday April 29th 2016, at ~8:15 am to 11:15 am in HWWE 305) will be worth 150 points (lecture) and will be worth ~17% of the total grade.

The lab. part of this course is 20% of the complete course grade = 175 points Developmental Biology Laboratory (DBL) on

Exam Times	Saturday April 23	Monday Apr 25	Tuesday Apr 26	Wednesday Apr 27	Thursday Apr 28	Friday Apr 29
8:00am-11:00am	Math All 101,111, 120 Exams	MWF 10:00am 10:30am	TR 9:25am 9:55am	MWF 11:00am 11:30am	TR 10:50am 11:20am	MWF 9:00am 9:30am
12:00pm-3:00pm	Online Exams	MWF 12:00pm 12:30pm	TR 8:00am 8:30am	MWF 8:00am 8:30am	TR 3:05pm 3:35pm 4:00pm	MWF/MW 4:00pm
4:00pm-7:00pm		MWF/MW 2:00pm 2:30pm	TR 1:40pm 2:10pm	MWF 3:00pm 3:30pm MW 3:25pm	TR 12:15pm 12:45pm	MWF 1:00pm 1:30pm
7:30pm-10:30pm		E/A	H/B	F/C	I/D	

Unfortunately for you and myself, the official CofC final is on the last day in HWWE 305 and I propose we start at 8:15am (we can talk later in class).

OAKS. The first DBL will be on January Wed. 13th (1:30 to 4:30 pm) and Fri. 15th 2016 (1 - 4pm), 2016.

IN SUMMARY: The lecture part of your total grade is based on:

100 pts. (Quizzes) + 300 pts. (Exams) + 150 pts. (Home Assignment) +150 pts. (Final) = 700 points for all the lectures = 80% of the final grade, leaving 20% = 175 for the DBL.

GRADE SCALE:			
93 and above:	A	80-83.9:	B -
90-91.9:	A -	77-79.9:	C ⁺
87-89.9:	B ⁺	74-76.9:	C
84-86.9:	B	70-73.9:	C -
		below 60:	F

This will be used to determine your grade.

A Tentative Syllabus based of the flow of the course, weather, flu etc.

for BIOL-322-001 Spring 2016 Developmental Biology lectures. We will talk in class the use of the textbook chapters ***, Notes will be on OAKS.

JANUARY 2016**CONCEPTS in generating cellular diversity,****Review: Cell Biology (On OAKS)****WEEK**

F 1/08 Introduction, a very general overlook.
Chapter 1 reading in the textbook (brown).

M 1/11 Introduction, a very general overlook, Part 2.
 - F 1/15 Cell Polarity and Asymmetric Cell Division
Intro Notes

Review: Cytoskeleton, cell movement and cell adhesion-ECM (on OAKS)

M 1/18 Martin Luther King, Jr. Holiday, observed. No classes.
 College closed.

W 1/20 Cell Polarity and Asymmetric Cell Division 2
FIRST LAB. HWWE 208, 1:30 - 4:30 pm.

F 1/22 Cell Communication
This is tough to read, so concentrate on the OAKS Class slides and the figures in Chapter 3 first that are mentioned in the lectures.
Cell-Cell communication notes

Review: control of gene expression: central dogma, what is a gene, DNA constancy (on Oaks)

M 1/25 - Cell Communication 2 + Cell Specification,
Cell specification notes

F 1/29 Cell Specification, **p. 107 - 115 and parts of chapter 5**
 Levels of control of gene expression,
Chapter 2, p. 31, p. 34-58.
Gene expression notes

Review control of gene expression: transcription, splicing and translation, (on OAKS)**FEBRUARY 2016**

M 2/1- General cellular processes during development 2
 F 2/5 **Development of sea urchins and nematodes**

Sea urchin early development,
Gametes, Fertilization, Cleavage + Gastrulation notes

M 2/8 - **Exam 1 (covering Introduction, Cell Polarity and**
 F 2/12 **Asymmetric Cell Division, Cell Communication, Cell Specification + Levels of control of gene expression General cellular processes during development).**

Sea urchin cell specification
 Tunicates development, **Chapter 7**

Early vertebrate development

M 2/15
 - F 2/19 Xenopus stages, Xenopus specification, **Chapter 8**

M 2/22 Fish development, **Chapter 8**
 F 2/26 Mammalian development, **Chapter 9**

MARCH 2016

M 2/29 - Chicken development, **Chapter 9**
 F 3/4

SPRING BREAK Sun 3/6 to Sun 3/13/2016

M 3/14 - *Drosophila* axis development ***Drosophila* Notes, Chapter 6**
3/18

F 3/18 **Exam 2 (covering Sea urchin cell specification, Tunicates development, *Xenopus* stages, *Xenopus* Specification, Fish development, Mammalian Development, Chicken development.**

Mar 18 Last day for students to withdraw with a grade of "W" from full Semester classes.

Organogenesis during development

M 3/21 - Ectoderm derivatives including nervous system
F 3/25 **Neurulation notes, Neural Crest Cell notes, Chapter 10 and 11**

M 3/28 - Mesoderm derivatives, **Chapter 12**
F 4/01

APRIL 2016

M 4/4 - Mesoderm derivatives 3 and 4, **Mesoderm notes, Chapter 13**
F 4/8 Endoderm derivatives, **Endoderm notes, Chapter 13**

M 4/11 - Field formation and homeotic gene, **Chapter 6**
F 4/15 Limb formation, **Limb note, Chapter 14**

Further organogenesis during development

M 4/18 Limb formation, **Limb note, Chapter 14**
W 4/20 **Exam 3 *Drosophila* axis development, Ectoderm derivatives including nervous system, Mesoderm and endoderm derivatives, Field formation and homeotic gene, Limb formation**
F 4/22 Possibly Gonads and sex determination. **Sex determination notes (if seen in class) and other left over topics.**
F 4/22 replaces the lost day on 4/18/2016

You will need to take about 15 minutes for your class online evaluations, which are now mandated and the day and the time has to be determined my democratic vote.

F 4/22 **READING DAY-** Review Of the Course - to be discussed in Class. I propose a 2 to 2 1/2 hour review of the entire Course but on Friday 4/22 afternoon or perhaps on Sunday. We will need to Determine a good time for all the students.

F 4/29 General questions covering the entire course (lecture and lab.).

Let me know if there is a big mistake or major spelling problems in the syllabus, thanks, RS.

EXTRA CREDIT: I will most likely offer extra credit quiz or exam questions at various times throughout the semester for 4-6 points but more often after mid-term. This is primarily to allow you to catch up on some points if you had bad luck on a previous exam or assignment. These "events" will NOT be announced and if you are not in class, you know the consequences.

Course materials, including the syllabus, study guides, handouts, PDF copies of the lecture slides, etc. will be made available through OAKS and accessed through My Charleston. Everything updated on OAKS is material for quizzes, exams, home assignment and the final.

CLASS ATTENDANCE,

COLLEGE OF CHARLESTON CLASS ATTENDANCE

<http://catalogs.cofc.edu/undergraduate/class-attendance.htm>

Because class attendance is crucial for any course, students are expected to attend **all classes and laboratory meetings** of each course in which they enroll! Regular attendance is positively correlated with success in any course.

RULES FOR ABSENCES IN THE SPRING 2016 SEMESTER.

- Persistent tardiness will not be tolerated in this course.
- Class will begin and end in a timely manner.
- You are expected to be prepared when class begins.
- You are responsible for any work missed when you fail to attend class.
- When a student misses more than 4 classes they will be dropped from the

I will keep accurate attendance records based on random class attendance based on signature lists and classroom quizzes and exams. I will be more active in checking the number of students in the classroom if classroom attendance decreases. I will collect information about missing students with:

- quizzes given in the classroom (one or two per week)
- exams attendance and
- random attendance lists.

If you have missed 2 unexcused classes (i.e. without a documented excuse) you will receive an e-mail warning from me, and after three missing classes you will have a meeting with me at student after three missed classes. If I have collected documented evidence that you missed four classes without an excuse, I will submit a WA (Withdrawal for Excessive Absences) paper form after the official last day for students to withdraw with a grade of "W" from the full semester classes on

Thursday March 18th 2016. I DO NOT WISH TO EVER DO IT BUT PLEASE DO NOT BE THIS STUDENT!!!

All this decision depends on the definition of being excused or unexcused.

An illness, a death in the family, an accident or other unplanned events may prevent your student from attending classes.

Exceptions are the following:

- 1. Documented illness (notification on the same day; documented within one week)**
- 2. Documented personal tragedy**
- 3. Religious holiday recognized by university**
- 4. Documented official University business**

It is always a good idea for students to follow up with professors when they miss class.

In the event that a student misses a class for a **legitimate, documentable reason**, that student may bring this documentation to Office of the Associate Dean of Students at 67 George Street where the student may fill out a brief form with a schedule of missed class(es), dates missed and the names of the appropriate professors and advisor. After clearance from the dean, the office will notify the appropriate faculty by e-mail.

All CofC athletes are excused with official documentation.

(from <http://blogs.cofc.edu/parents/2011/02/04/missing-classes-excused-absences-policy/>).

HONOR CODE AND ACADEMIC INTEGRITY.

Students will be expected to abide by the academic honor code found in the most current edition of the Student Handbook. <http://parkj.people.cofc.edu/HonorCode.pdf> describe the process and the penalty, the worst outcome is you unable to get work for the next two years and then you have to petition to have this penalty to be removed, which is not automatic.

It is simply not worth the effort and I have no respect for cheater students nor plagiarism in lab.

reports etc. <http://library.cofc.edu/plagiarism-and-assignments-that-discourage-it/>
<http://studentaffairs.cofc.edu/honor-system/faqs.php>

Citing articles and avoiding plagiarism

<http://podolskyr.people.cofc.edu/biol337/guidelines.htm>

I learned of cell phone cheating in my fall 2013's cell biology course final exam in December 2013, but the authorities at CofC could not find sufficient evidence to charge these students (apparently students in the back row were e-mailing and texting for answers). Since this incident, I have tried to be tougher on watching in the exams and finals, but only in Fall 2015, I was notified by a good student that there was one occasion in which some students cheated (but I had to proof of these bad apple student actions). I do not respect cheaters at all. We will talk more about this issue later in class and lab....

SPECIAL REQUESTS 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 see in the first week of the new semester to make sure you have all your rights. <http://disabilityservices.cofc.edu/>

CONFIDENTIALITY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974 (FERPA) is a federal law designed to provide students with greater access to and control over information contained in their educational records, while at the same time prohibiting, in most circumstances, the release of **any information** contained in those educational records without express **written consent** of the student.

http://marcomm.cofc.edu/brandmanual/bychapter/officialstatements/os_confidentiality.php

THIS IS WHY I CANNOT INFORM YOU FOR A REQUEST FOR YOUR GRADES ETC. BY E-MAIL OR THE TELEPHONE AT THE END OF THE SEMESTER... THE ONLY LEGAL OPTION IS PERSON – PERSON COMMUNICATIONS I.E SEEING EACH OTHER IN PERSON.

THE FLU: At this point in time, we do not know how severe the second part of the flu season will be. However, we should all be prepared for the worst-case scenario. **If you have the flu, please do NOT come to class until you are well. Please DO contact me by email or phone.** I will be as flexible as possible to help you. Even though late, you can still get a flu shot (it's free).

Course Policies

Attendance: We adhere to the College of Charleston Absence Policy, as described in the student handbook. Miss lecture? Get notes and handouts from another student (note, exam questions come from lecture as well as the text). Make-up exams will be scheduled only for students with valid excuses. These must be cleared with me before the missed exam. Contact me by phone or e-mail.

Class Courtesies: Be on time, turn off (or put in silent mode) cell phones and other devices that beep (do not talk on the phone or text message! use Facebook or conduct web searches not associated with assignments during discussion or lecture). **Do not eat, drink or smoke in the Laboratory, study and ask many questions, if you must leave early or arrive late please sit in the back (and let me know before class starts), be courteous to your colleagues. Please bring your enthusiasm – it is contagious.**

Tips for Success:

- Attend all classes,
- Be an active learner,
- Put in at least 6 – 10 hrs. /wks. outside of classroom,
- Scan the details or the themes in the textbook/OAKS info. ahead of lecture,

- Read textbook figures and important parts of the text & do homework problems after each lecture,
- When confused, ask for help – from the instructor, Lab. TA and friends,
- Use resources to study – chapter study goals, class notes, sample problems, homework, end-of-chapter reviews, and key terms in textbook
- Stay Healthy
- **DO NOT FALL BEHIND before this becomes a reality, get help ASAP!**

Classroom Norms:

- | | | |
|------------------|---|--------------------------|
| • Safe behavior, | • Respect for others I.e. no cheating, | • Integrity, |
| • On time, | • Participation, | • Hard work – work hard, |
| • Don't cheat, | • Love Biology, | • Have fun! |

If you struggle in this course, please talk with me in a meeting or in the lab. sections and get help earlier rather than later. A student coming in the last three week of the course begging for extra credit etc. is WAY TO LATE. If you feel you are having within the first 2 – 3 weeks, come and see me because overtime, these little problems will be become much bigger. ... but on the other hand, if you are struggling in Organic or Biochemistry and do not put enough time in learning about DB, don't blame me. The old BIOL-111 rule, one class in the classroom and two times at home i.e. per week 3 hours in class and 6 hours at home means ~9 hours per week on DB minimally ... and as you are now in a 300 level course even more for a grade A.