

# Evolutionary Developmental Biology

ZOO 3603C

4 credit hours

Fall 2021

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## Instructor(s):

**Course Director:** Gareth Fraser, Ph.D.

**Teaching Assistants:** Wesley Dillard

### Contact through the Mail Tool in Canvas

Office Hours: Tuesday 10:00am-11:00am or by appointment

Phone: 352-273-4758

Course Website: <https://ufl.instructure.com/courses/375629> (Canvas)

Course Communications: If you need to get in touch with Dr. Fraser, or the TAs assigned to this course (see above) please use the Mail Tool in Canvas. Your email will be answered within 24 hours.

**Questions about class materials or content:** Please use the discussion boards in Canvas for all questions about class mechanics or content. If you have a question about the class or subject material, others probably share the same question and posting it to the discussion boards allows everyone to see the question and answer (This is just as if you had raised your hand in class and asked the question). If you use email to ask a general class related question, you will be asked to post your question on the appropriate board, and it will be answered there.

**Individual questions, problems, or appointments:** Please use the email function in Canvas to communicate with Dr. Fraser or the Teaching Assistants during the semester, rather than regular university email, except in extreme emergencies. Email, discussion posts, and phone messages will generally receive a reply by the end of the next business day (M-F). Messages usually will be checked on the weekend (5:00 pm Friday and 8:00 am Monday) but a rapid response is not guaranteed during these times. If Dr. Fraser will be unavailable for more than one business day, he will post an announcement on the class website.

## Technical Support:

**Technical support:** If you experience difficulties with accessing components of the site, including lectures, quizzes or tests, contact the UF help desk immediately. (352) 392-HELP (4357) | [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu)

If they are not able to resolve your problem, contact Dr. Fraser with your help desk ticket number and a description of the problem and steps taken to resolve it. Extensions for due dates will be granted for documented technical problems, as needed.

## Textbook:

Textbook advice: *All assignments, discussions, laboratories, and quizzes will be based on material provided in the course.* Some students may find a general developmental biology textbook useful for understanding some of the concepts covered in this course. Two suggestions are below.

*Developmental Biology* by Scott Gilbert, 10<sup>th</sup> edn. Sinauer Associates. This is an excellent textbook with multiple websites for more information, videos etc.

*Principles of Development* by L. Wolpert, Oxford University Press.

## Course Description:

**Course Description:** Analysis of embryonic development, underlying genetic mechanisms, and how these processes have driven the evolutionary diversification of animal body plans.

**Prerequisite Knowledge and Skills:** BSC 2011 and 2011L, or equivalent, with minimum grades of C.

**Course Purpose:** One of the most amazing process in biology is the development of a complex adult organism such as a human from a single cell, the fertilized egg. The egg divides to give many millions of cells and these form structures as complex and varied as eyes, arms, heart and brain. How does it do this unbelievable feat of organization? How do the cells arising from early division become different from each other? What controls the behavior of individual cells so that highly organized patterns emerge? How are the organizing principles of development embedded in the DNA of our cells and how is this translated into pattern formation?

This course is designed to answer these exciting questions by studying the developmental principles we see in various organisms – invertebrates such as the fruit fly *Drosophila*, lower vertebrates such as fish and frogs and higher vertebrates such as birds and mammals. The development of individual organ systems such as the brain, the eye and the limbs will also be studied to draw together principles of organization. Amazingly we find that that the same signaling pathways are used time and again to turn an apparently homogeneous group of cells into a structure such as a limb or a brain. By studying the development of these different animal

systems, we can also draw together principles of development which have stood the test of evolutionary time.

In addition, the course also includes a consideration of the regeneration of complex organ systems such as the limb and the principals involved in this process. Questions such as what is the role of stem cells in complex regeneration, can cells lose their differentiated state and begin development again, will be asked. This will lead us into the medical world of the role that stem cells play in regenerative medicine.

## **Instruction:**

**INSTRUCTIONAL METHODS:** The course consists of 15 modules. Three of these modules are online simulated laboratories. The rest of the modules are broken into three sections that will be completed in order.

**MODULE OVERVIEW-** The instructor will briefly introduce the main focus of the modules and provide the objectives you are working toward as you learn the new content for that week.

**INSTRUCTIONAL MATERIALS-** These are **REQUIRED** readings, lectures, websites, databases, videos, and other resources that will prepare you to demonstrate your understanding in the quizzes, assignments, and discussions. Be sure to take notes!

**TO DO LIST-** This page will outline the items that are due that week. Typically, you'll find quizzes of short answer/multiple choice questions, discussions, and assignments that are based on the lectures, readings, websites, and other resources. Do the assignments in the order they are outlined. In order to post a thoughtful, relevant, content-based discussion post, you'll need to have a good handle on the content for that week.

## **Course Policies:**

**Meeting Times:** This course is asynchronous. A module will be opened and due each week of the course. Deadlines are set for completion of modules, labs, assignments, quizzes, and discussions, but they may be completed in advance of the weekly recommended schedule.

**Quiz Policy:** Quizzes are based on lectures, readings, and/or Labs delivered in each module. Make sure that you have viewed the lectures, read the readings, and taken notes so that you are prepared for the quiz. *Once you start a quiz, you will have limited time to complete it (most quizzes have 20-minute time caps), and you may not exit and return later.* Quiz deadlines are set according to the weekly module schedule. All module quizzes will be available starting on the first day the module opens. The module quiz must be completed prior to the weekly scheduled deadlines.

**Make-up Policy:** This course is designed to be flexible to the students' schedule. With that in mind, be sure to schedule time to complete all quizzes and assignments before the scheduled

deadlines. There are no make-ups available for technical difficulties (unless accompanied by a ticket number) or missing a deadline. Be sure to check your tech well ahead of deadlines.

Assignments submitted within one week of the stated deadline will receive 50% of the total score achieved on the assignment. For example, for an assignment that was 100% correct but submitted a week late, 50% of the total points will be awarded towards your final grade. Assignments submitted >7 days or later will receive no points.

Quizzes and Discussions must be completed the week that they are due. There are no make-up quizzes or Discussions.

## Grading and Course Success:

This course is designed to be as flexible as possible to accommodate the variation of schedules typical of a remote student. For that reason, all content for each week will open on Saturday at 5:00 a.m. and be due the following Sunday at 11:59 p.m.

Beware! With flexibility comes the temptation to put assignments off until the last minute. The mastering of the content of this course will require that you take careful notes during lectures and while reading to prepare for each week's quiz. It is very important that you follow the sequence of the instructional materials and assignments in order to be successful.

There is no "grading curve" for this course.

Assignment	Description	Points Each	Points	Percent	Day and Time Due
Syllabus Quiz	This quiz ensures that you are familiar with the requirements of the course.	3	3 points extra credit	N/A	Week 1 Sunday 11:59
3 Labster Online Lab Simulations	Each online lab simulates experiments that played key roles in the discovery of pathways responsible for organ and tissue patterning. The labs are designed to provide real-world examples of common techniques used in developmental biology. In most cases, due to cost/time, the online laboratories are not possible to reproduce in a residential setting. The lab experiences are unique opportunities for students to perform experiments that are only possible in an online setting.	50	150	15%	Week 4, 11, 16 Sunday 11:59

	The 50 points/lab is based on correctly answering question contained within the online lab.				
15 Quizzes	Quizzes are designed to test your understanding of the lecture and reading materials, or what you learned during your lab experience. The quizzes are timed and only available one time. Your notes and course materials will be available to you, but you will need to study your course material prior to beginning the quiz, to finish in the allotted time.	22	330	33%	Sundays 11:59
12 Assignments	Assignments allow you to use the information you learned in the module to investigate questions related to the module's topic.	20	240	24%	Sundays 11:59
12 Discussions	Discussions are thought provoking conversation with your classmates. Each discussion requires you to post a reply to the week's topic and comment on your classmates' posts.	15	180	18%	Initial post and 2 responses  Sundays 11:59
Final Project	The final project will require you to use information you learned about in this course to develop experiments designed to uncover the function of a transcription factor. It will open three weeks before the last day of class.	100	100	10%	Dec. 8 <sup>th</sup>
Total			1000	100%	

## Grading Scale:

Grade Values for Conversion May 11, 2009 and After													
<b>Letter Grade</b>	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	I, NG, S- U, WF

<b>Percent Grad</b>	100-95	94-90	89-87	86-83	82-80	79-77	76-73	72-70	69-67	66-63	62-60	>60	N/A
<b>Grade Points</b>	4.0	3.67	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	.67	0.00	0.00

For more information, see <http://www.isis.ufl.edu/minusgrades.html>

**NOTE: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.**

## UF Policies:

University Policy on Accommodating Students with Disabilities: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive; therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

University Policy on Academic Misconduct: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at <http://www.dso.ufl.edu/students.php>.

\*\*Netiquette: Communication Courtesy: All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. [Netiquette Guide for Online Courses \[pdf\]](#)

## Getting Help:

For issues with technical difficulties for E-learning in Canvas, please contact the UF Help Desk Monday-Fridays 8:00am-5:00pm at:

- [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu)
- (352) 392-HELP - select option 2
- <https://lss.at.ufl.edu/help.shtml>

\*\* Any requests for make-ups due to technical issues MUST be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You MUST e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Other resources are available at <http://www.distance.ufl.edu/getting-help> for:

- Counseling and Wellness resources
- Disability resources
- Resources for handling student concerns and complaints
- Library Help Desk support

Should you have any complaints with your experience in this course please visit <http://www.distance.ufl.edu/student-complaints> to submit a complaint.