

# Developmental Biology | PCB 4253 | Fall 2017 | U01

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**Instructor:** Dr. Saldana-Caboverde

**Class Meeting Time:** Tu & Th 9:30am – 10:45am

**Class Location:** OE 105

**Office:** OE 210

**Office Hours:** Tu 11:00am – 12:30pm & Th 11:00am – 1:00pm

**Email:** [asaldana@fiu.edu](mailto:asaldana@fiu.edu) (please include 'PCB 4253' in the subject)

**Course Website:** See Blackboard

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## Course Description & Learning Outcomes

Have you ever wondered how a single cell can give rise to the more than 200 different types of cells in the human body? This is one of the fundamental questions the field of developmental biology seeks to answer. Developmental biologists study the molecular and cellular processes driving growth and development in various species. An understanding of these processes is essential to gaining insight into pathological conditions that arise as a result of developmental abnormalities. Some of the topics we will explore include the establishment of the axes of the body, the role of embryonic stem cells during development, limb formation, and brain development. Upon completing this course, you will be able to answer the following questions:

- How can a single fertilized egg give rise to so many different types of cells?
- What processes allow the cells of the body to become organized into functional structures?
- How do cells in developing organisms know when to stop dividing?
- What are the instructions present in germ cells that allow these cells to form new organisms?
- How do stem cells retain the capacity to give rise to various cell types and can this capacity be manipulated and used in medicine?
- How do genetic and environmental mechanisms alter development?

## Prerequisites

You are expected to have completed and passed Genetics (PCB 3063).

## Course Materials

**Required Text:** Developmental Biology (11<sup>th</sup> Edition). Gilbert and Barresi, Sinauer Associates, Sunderland Massachusetts (ISBN: 9781605354705).

Please Note: You only need the textbook; you do not need to purchase access to any website. The textbook has a companion website that is freely available to anyone.

**Additional Readings:** These will be posted to Blackboard. Please bring copies of the assigned readings to class so that you will be able to participate in the class assignments.

**iClicker:** Clicker questions will be provided during every lecture as extra credit. You may purchase an iClicker device at the FIU Bookstore. Although it is possible to use a smartphone as a clicker, many students have reported this feature to be defective; consequently, an iClicker device is required. If you forget your iClicker at home on a particular day you may use the mobile REEF polling application (with an active registration) on your smartphone, but please beware that your answers may not be recorded (affecting your grade). Due to their nature, **make-ups will not be possible** for clicker questions whether due to an absence or failure to register responses.

**Blackboard:** All lecture notes, reading materials, and scores for assignments and exams will be posted to Blackboard. In addition to in-class announcements, students will also be notified of any changes to the lecture/exam schedules via Blackboard.

## Attendance

Although attendance is not required, you are expected to attend class regularly, to arrive on time, and to remain in class until the end of the period. There will be 11 quizzes throughout the semester (see schedule for dates) that will take place during the first 10 minutes of class. **These quizzes cannot be made up**, so make sure you arrive on time. In order to get the most out of class, I encourage you to be engaged in class discussions and take good notes. Doing so will help you master the material and serve as a guide when preparing for exams. You are responsible for all material covered in class as exams may include material not directly addressed in your textbook.

## Grading Scale

**There is no curving and no rounding-up.**

Letter Grade	Range
A	100% - 90%
B+	<90% - 86%
B	<86% - 80%
C+	<80% - 76%
C	<76% - 70%
D	<70% - 60%
F	<60%

## Grade Breakdown

Description	Points
<b>Exam 1</b>	13
<b>Exam 2</b>	13
<b>Exam 3</b>	13
<b>Exam 4</b>	13
<b>In-Class Exercises (3 @ 6 points each)</b>	18
<b>2 In-Class Paper Assignments (2 @ 5 points each)</b>	10
<b>11 Reading Quizzes (10 @ 2 points each)</b> <i>*The lowest quiz score is dropped</i>	20
<b>TOTAL</b>	<b>100</b>

**NOTE: Please see the section titled "Make-Ups" for the make-up policy on each of the categories below.**

**Exams:** There will be 4 exams during the semester. Although each of the first 4 exams will not be cumulative in nature, you may be asked to synthesize material learned in previous units. The exams will cover the class lectures as well as the assigned readings from the textbook. Each exam will be worth 13 points (out of 100) of your final grade. **We do not drop any exam score in this course.**

Exams will consist of a variety of questions (T/F, fill-in the blank, multiple choice, short answer). Please be prepared to provide either your Panther ID card or a Florida driver's license on the day of the exam. If for any reason exam dates or the material covered in an exam have to be adjusted, you will be given at least one week's notice in class and via Blackboard.

**In-Class Exercises:** In-class exercises will be designed to help you prepare for the exams. I will present you with questions and/or case studies that you will discuss with your group (3-4 students) and provide written answers on the days specified in the schedule. These assignments will be closed-book so you should study the pertinent chapters and lecture notes prior to class.

**In-Class Paper Assignments:** There will be 2 in-class assignments throughout the semester. These assignments will consist of short-answer questions based on scientific articles, which will be posted on Blackboard at least one week prior to the day of the assignment. Questions will be projected during class; and you will have one hour to work on the assignment, in groups of 3-4 students. Please read the articles ahead of time, and bring them to class on the day of the assignment. Each assignment will count toward 5 points (out of 100) of your final grade.

**Reading Quizzes:** There will be 11 quizzes throughout the semester, of which 10 will count toward 20% of your final grade (10 quizzes each worth 2 points). Quizzes will be on the material from the chapters indicated on the schedule and will take place during the first 10 minutes of class. The purpose of the quizzes is to help you stay on top of the reading and to give you an idea of the types of questions you can expect to see on the exams.

**Extra Credit (iClicker Questions):** Your performance in the clicker questions can earn you up to 5% extra credit towards your final grade. For example, if your performance in the clicker questions throughout the semester was 91%, this means that you would have earned  $(.91)(5) = 4.55$  points toward your final grade. To calculate your clicker question percentage at any point during the semester:

$$\frac{\text{total number of points you have earned so far}^*}{\text{total number of points possible so far}^*}$$

\*You will need to add these values yourself from Blackboard.

For each question, you will first answer the question individually before discussing it in small groups; you will then be given another opportunity to answer the question. You will receive 1 point for each correct answer and 0.5 points for each incorrect answer. Clicker scores will be uploaded to Blackboard on a weekly basis (Please see "Extra Credit" below for more details). Although we will have clicker questions during the first week of class, these will not count toward your extra credit. **Clicker questions that will count toward extra credit will begin on Tuesday, August 29<sup>th</sup>; please, make sure you register your iClicker before then.**

## Make-Ups

**Exams:** If you are unable to take an exam because of an emergency, you will be given a make-up exam as long as you are able to provide valid documentation (please see below for descriptions of what constitutes an emergency and the forms of accepted documentation). Please note that the make-up exam may not be in the same format as the exam given during class (will likely consist of 10 short essay questions). Although there may be circumstances that may prevent you from giving prior notification for missing an exam, you should email me as soon as possible with the reason and documentation so that proper accommodations can be made.

**In-Class Exercises and In-Class Paper Assignments:** If you are unable to make it to class for an in-class exercise or in-class paper assignment because of an emergency, you will be given a make-up as long as you are able to provide valid documentation (please see below for descriptions of what constitutes an emergency and the forms of accepted documentation).

**Quizzes:** There will be 11 quizzes throughout the semester, of which the lowest one will be dropped to allow for an absence. If you happen to miss a second quiz as a result of an emergency, you will be given a make-up as long as you are able to provide valid documentation (please see below for descriptions of what constitutes an emergency and the forms of accepted documentation).

**Clicker Questions:** Clicker questions are extra credit and the answers will be provided during class. These questions cannot be 'made-up' later.

**Emergencies:** Emergencies are unforeseeable and unavoidable events that preclude you from being able to attend class. Emergencies include:

- Serious illness/hospitalization
- Death of an immediate family member
- Car accident in which you were directly involved

You will be required to provide documentation (e.g., doctor's note [Note: NOT an R.N.'s note], copy of death certificate, police report) in order to be excused and be able to make-up an exam or assignment.

Examples that do not constitute an emergency:

- Having the common cold or the flu
- Getting stuck in traffic
- Oversleeping

Although these are unfortunate circumstances, they are not emergencies and will not be treated as such.

## Incomplete Grades

In the case of extreme circumstances arising from reasons beyond your control (please, see description of emergencies above), an incomplete (IN) grade may be given at the instructor's discretion. Please Note:

- Official documentation will be required
- IN grades will not be given prior to the drop date or after the course has ended.
- In order to receive an IN grade, you must have completed at least half of the assigned course work and have a passing grade.
- An unfortunate event, such as the death of a family member, does not automatically guarantee that you will be granted an incomplete for the course. Each case will be carefully evaluated, and your overall performance will be taken into account when making a decision.

- The course must be completed within two terms; otherwise, you will receive the grade you would have earned without being given credit for any incomplete assignments (this will likely be a failing grade).

## How Will You Succeed in This Course?

**Come to class prepared.** You can do this in one of two ways: (a) read the chapter (this is the best way to prepare), or (b) review all figures and read figure legends prior to coming to class (you may not ace the quiz but this is better than not reading at all). Doing this will help you remember and understand the material much better than attending the lecture with a blank slate. Please keep in mind that we will have regular quizzes throughout the semester and that these count toward your final grade. The purpose of the quizzes is to encourage you to keep up with the reading and to help you prepare for the exam.

**Go over your notes after class.** Reviewing your notes right after class will help you retain the information. It will also make you aware of important points you may have missed or are confused about, and allow me the opportunity to help you with sufficient time.

**Communicate.** If you are not doing as well as you would like, please seek help early on in the semester. If you wait until the end of the semester to email me about your grade, there is little, if anything, I can do to help you then.

## Class Rules and Academic Conduct

### **Class Rules:**

In order to promote an environment conducive to learning, please adhere to the following common-sense rules:

- **Cell phone use:** Cell phones are not allowed during class; please keep them silenced/off. If you are expecting an emergency phone call/message, you must notify me BEFORE class begins.
- **Computers:** Although I encourage students to take handwritten notes, you may use your laptop in class to take notes. However, please, refrain from web surfing/social media/Amazon/etc. Not only is this a poor use of the class time you have already paid for, but it is also disruptive to your fellow classmates.
- **Audio/video recording & photography:** Audio recording is allowed, but please NO video recording or photography. All material will be posted on Blackboard for your convenience.
- **Posting class material:** Posting of class lecture notes and course materials to the internet is not allowed.
- **Disruptive Behavior:** It is your responsibility to help maintain a professional environment that promotes learning, minimizes distractions, and protects students'/instructor's rights. Students who fail to adhere to the standard code of conduct set forth by the instructor and the FIU Student Handbook may be subject to disciplinary action in accordance to the FIU Student Handbook.

**Email Etiquette:** Please feel free to email me if you have any questions or concerns. I will try to respond within 24-48 hours, but please keep in mind that I may not be able to respond right away if I receive your email in the evening or over the weekend.

**Academic Honesty:** The purpose of this course, and of a college education in general, is to provide you with the knowledge you will need as a professional, and to empower you to think independently. Cheating is counterproductive to this purpose, disrespectful to your colleagues, and will not be tolerated. How you conduct yourself now is an indication of the kind of professional (physician, dentist, pharmacist,

nurse, scientist, etc.) you will be in the future. Any instances of cheating will be dealt with according to FIU's academic misconduct policies, which can be found at:  
<http://academic.fiu.edu/polman/sec2web.htm#two-forty-four>.

**Sexual Harassment:** Sexual harassment violates student and faculty rights and will not be tolerated. FIU's sexual harassment policy can be found at:  
[http://hr.fiu.edu/uploads/file/EOP/Sexual\\_Harassment\\_Policy\\_as\\_of\\_02-10.pdf](http://hr.fiu.edu/uploads/file/EOP/Sexual_Harassment_Policy_as_of_02-10.pdf)

### **ADA Accommodation Statement**

Students with documented disabilities as per the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973 (PL 933-112 Section 504) may request accommodations (physical or academic) by contacting the Disability Resource Center (tel. 305-348-3532, TTY/TDD 305-348-3852). The student is also responsible for contacting the instructor as soon as possible so that reasonable accommodations can be made.

## Tentative Schedule

Date	Day	Topic	Reading	Quiz
<b>Aug 22</b>	Tues	Introduction / Dev. Bio Main Questions & Overview	Chapter 1 (pp. 1-11)	
<b>Aug 24</b>	Thurs	Dev. Bio Main Questions & Overview	Chapter 1 (pp. 11-27)	
<b>Aug 29</b>	Tues	Cell Specification	Chapter 2	
<b>Aug 31</b>	Thurs	Differential Gene Expression I	Chapter 3	<b>Ch. 2</b>
<b>Sep 5</b>	Tues	Differential Gene Expression II	Chapter 3	<b>Ch. 3</b>
<b>Sep 7-14</b>	<b>Tues</b>	<b>IRMA</b>		
<b>Sep 19</b>	Tues	Cell-Cell Communication: ECM	Chapter 4	
<b>Sep 21</b>	Thurs	Cell-Cell Communication: Signaling	Chapter 4	
<b>Sep 26</b>	<b>Tues</b>	<b>In-Class Exercise</b>	<b>Chapters 3 and 4</b>	<b>Ch. 4 (95 – 107)</b>
<b>Sep 28</b>	<b>Thurs</b>	<b>EXAM 1</b>	<b>Chapters 1-4</b>	
<b>Oct 3</b>	Tues	Stem Cells & The Neural Stem Cell Niche Stem Cells: The Human Model System	Chapter 5 (pp. 143-149 & 153-158) Chapter 5 (pp. 167-177)	<b>Chapter 5 (143-149)</b>
<b>Oct 5</b>	<b>Thurs</b>	<b>Stem Cells – Paper Assignment 1</b> Fertilization	<b>Read Paper Posted on BB</b> Chapter 7 (pp. 217-226)	
<b>Oct 10</b>	Tues	Fertilization	Chapter 7 (pp. 226-248)	<b>Chapter 7 (217-232)</b>
<b>Oct 12</b>	Thurs	Drosophila Axis Specification	Chapter 9 (pp. 277-301)	
<b>Oct 17</b>	Tues	Drosophila Axis Specification Early Development in Invertebrates	Chapter 9 (pp. 301-307) Chapter 10	<b>Ch. 9 (277-301)</b>
<b>Oct 19</b>	<b>Thurs</b>	<b>In-Class Exercise 2</b> Amphibian Axis Formation/Organizer	<b>Chapter 7 and 10</b> Chapter 11 (pp. 333-343)	
<b>Oct 24</b>	<b>Tues</b>	<b>EXAM 2</b>	<b>Chapters 5*, 7, 9, 10</b>	
<b>Oct 26</b>	Thurs	Amphibian Axis Formation/Organizer Early Development in Birds and Mammals	Chapter 11 (pp. 343-365) Chapter 12 (pp. 379-386)	
<b>Oct 31</b>	Tues	Early Development in Birds and Mammals	Chapter 12 (pp. 386-409)	<b>Ch. 11 (343-359)</b>
<b>Nov 2</b>	Thurs	Ectoderm: Neural tube formation and patterning	Chapter 13	
<b>Nov 7</b>	Tues	Ectoderm: Brain Growth	Chapter 14	<b>Chapter 13</b>
<b>Nov 9</b>	<b>Thurs</b>	<b>In-Class Exercise 3</b>	<b>Chapters 12 and 14</b>	
<b>Nov 14</b>	<b>Tues</b>	<b>EXAM 3</b>	<b>Chapters 11*, 12, 13, 14</b>	
<b>Nov 16</b>	Thurs	Ectoderm: Neural Crest	Chapter 15 (pp. 463-488)	
<b>Nov 21</b>	Tues	Mesoderm: Somites	Chapter 17 (pp. 539-560)	<b>Ch. 17</b>
<b>Nov 23</b>	<b>Thurs</b>	<b>Happy Thanksgiving</b>		
<b>Nov 28</b>	Tues	Limb Development	Chapter 19	<b>Ch. 19</b>
<b>Nov 30</b>	Thurs	Limb Development	Chapter 19	
<b>Dec 5</b>	Tues	Medical Implications	Chapter 24	<b>Ch. 24</b>
<b>Dec 7</b>	<b>Thurs</b>	<b>Development in Context – Paper Assignment 2</b>	<b>Read Paper Posted on BB</b>	
<b>TBA</b>	<b>TBA</b>	<b>EXAM 4 (9:45am-11:45am)</b>	<b>Chapters 15*, 17*, 19, 24</b>	

**\*NOTE: Chapter not covered in its entirety. Please refer to the calendar above for the pages covered.**

**Last Day to drop with a DR: Monday, October 30th**