

**BIOL 443**

**Class Time:**

Tues. & Thurs.

1:15-2:30pm

Murphey 116

**Zoom:**

https://unc.zoom.us/j/96797150859?pwd=MjhjcDdIMlI0RjRGbVJJL2h6clRtZz09

**Instructor:**Daniel J. McKay, Ph.D.

**Email:**

dmckay1@email.unc.edu

**Office Hours:**

Tuesday 2:45-3:15

Zoom: https://unc.zoom.us/j/97737272546

(or by appointment)

Developmental Biology

Course Description:

An experimental approach to understanding animal development. This class will cover developmental processes, molecular, genetic, cell biological, and biochemical techniques, with an emphasis on the molecules involved in development. It is assumed that students will have some familiarity with animal development. This course will focus deeply on selected developmental processes rather than taking a superficial approach to a broad number of developmental processes. To facilitate a deeper understanding of the scientific method, each topic will be paired with a research paper from the primary literature.

Expectations:

Students will be expected to do assigned readings before class!! Participation is a must in this course. You will be expected to contribute to class discussions on a daily basis, and you will be expected to work in groups.

Course Objectives:

Upon completion of the course, students will be able to…

* articulate the big questions being addressed in developmental biology, such as those related to gene regulation, epigenetics, cell fate specification, and patterning.
* read and interpret primary literature in developmental biology.
* understand the tools used by researchers to investigate the mechanisms underlying development.
* know the criteria for proof, and recognize good and bad experimental design.
* propose solutions to address unanswered questions in developmental biology.

Textbook

This course will use Gilbert’s “Developmental Biology”, 12th edition. I will also be providing reading assignments in the form of current articles and primary research papers, as well as information from other forms of media. Note that the 12th edition of the textbook is very similar to earlier editions, which are available at a steep discount.

Schedule

August 11: Introduction to Developmental Biology.

August 13: Model organisms and genomic equivalence.

August 18: Discussion of PAPER 1; Regulation of gene expression I.

August 20: Regulation of gene expression II.

August 25: Stem cells and developmental potency.

August 27: Discussion of PAPER 2.

September 1: Discussion of PAPER 2, continued.

September 3: Fertilization and sex determination I.

September 8: Fertilization and sex determination II.

September 10: **EXAM 1**.

September 15: *Drosophila* anterior-posterior patterning I.

September 17: *Drosophila* anterior-posterior patterning II.

September 22: Discussion of PAPER 3.

September 24: Discussion of PAPER 4.

September 29: Early vertebrate development.

October 1: Vertebrate gastrulation and neurulation.

October 6: Neurulation & ventral tube patterning.

October 8: ***Student presentations:*** PAPER 5.

October 13: ***Student presentations:*** PAPER 6.



October 15: **EXAM 2**.

October 20: Somitogenesis I.

October 22: Somitogenesis II.

October 27: Tetrapod limb development I.

October 29: Tetrapod limb development II.

November 3: ***Student Presentations***: PAPER 7.

November 5: ***Student Presentations***: PAPER 8.

November 10: Nervous system development I.

November 12: Nervous system development II.

November 17: ***Student Presentations***: PAPER 9.

*TBD*: **FINAL EXAM.**

***Please note the schedule is subject to change.***

Course Policies

**1. Exams**

There will be two exams during the semester and one final exam. The final exam will be cumulative, with an emphasis on untested material.

**2. Attendance**

All registered students (participating synchronously) are expected to:

 –be on time for all class periods.

 –attend all classes (more than two unexcused absences will incur grade penalties). Please let me know ahead of time if you need to miss class.

 –meet deadlines for homework and other assignments.

 –cell phones should be turned off and put away during class. Please avoid using social media in class; even if you are quiet/discrete, it is distracting to me and your classmates.

**3. Zoom**

I will be using Zoom for students participating remotely & synchronously. *Lectures will be recorded* for asynchronous participants and will be made available to all participants via Sakai. I would like all students (in-person and remote participants) to use Zoom during the class to facilitate discussion between in-person and remote participants. You can create a Zoom account and download the software on the UNC software acquisition page: <https://software.sites.unc.edu/zoom/>. Make sure you are signed into your UNC account on the desktop or mobile version so you have access to all of the features.

**4. Zoom etiquette**

As we are all getting used to having classes in virtual environments, keep in mind these best practices when using Zoom.

 –turn your camera on if you have one. Seeing each other is a good way to make the conversation feel grounded in reality. If you don’t have a camera or you’ll only be using audio, be sure to let me know.

 –use the chat feature to supplement, but not distract from, the main conversation.

 ­–mute your audio whenever you are not speaking. Noise in your background can interrupt the audio of others who are speaking.

 –please add the name you would like to go by. Feel free to add your pronouns of choice.

**5. Participation**

Participation during the class period is required. *Ideally, every student will participate verbally in every class*. This would include asking a question, commenting on other student’s comments (respectfully), responding when asked questions directly, and participating in small group work. Keep in mind that we strive to create an inclusive learning environment.

Students are expected to:

 –be courteous and respectful to other participants and ideas. Listen respectfully. Don’t interrupt.

–be aware of how much you are contributing to in-class discussions. Try not to silence yourself out of concern for what others will think about what you say. If you have an idea, don’t wait for someone else to say it; say it yourself. On the other hand, if you have a tendency to contribute often, please give others the opportunity to speak.

 –actively contribute in a substantial way to class discussions and small group work.

 –comply with the Honor Code.

**6. Homework and Quizzes**

Homework will be assigned in advance as much as possible; however, the flexible and dynamic nature of this class may make it difficult to do so far in advance.

**7. Grading:**

75% Exams

25% Participation, homework & class preparedness

Please note that I reserve the right to make changes to the syllabus, including project due dates and test dates (excluding the officially scheduled final examination), when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.

**DIVERSITY AND INCLUSION**: I value the perspectives of individuals from all backgrounds reflecting the diversity of our students. I broadly define diversity to include race, gender identity, national origin, ethnicity, religion, social class, age, sexual orientation, political background, and physical and learning ability. I strive to make this classroom an inclusive space for all students. Please let me know if there is anything I can do to improve using this anonymous Google Form. I appreciate all suggestions and comments. <https://forms.gle/8uDLCb9earBfz4WP8>

**COMMUNITY STANDARDS IN BIOL443 AND MASK USE**:This fall semester, while we are in the midst of a global pandemic, all enrolled students are required to wear a mask covering your mouth and nose at all times in our classroom. This requirement is to protect our educational community — your classmates and me — as we learn together. If you choose not to wear a mask, or wear it improperly, I will ask you to leave immediately, and I will submit a report to the [Office of Student Conduct](https://cm.maxient.com/reportingform.php?UNCChapelHill&layout_id=23).  At that point you will be disenrolled from this course for the protection of our educational community. An exemption to the mask wearing community standard will not typically be considered to be a reasonable accommodation. Individuals with a disability or health condition that prevents them from safely wearing a face mask must seek alternative accommodations through the [Accessibility Resources and Service](https://ars.unc.edu/). For additional information, see [Carolina Together](https://carolinatogether.unc.edu/university-guidelines-for-facemasks/).

**HONOR CODE***: All work done in this class must be carried out within the letter and spirit of the UNC Honor Code. You must sign a pledge on all graded work certifying that no unauthorized assistance has been given or received. You are expected to maintain the confidentiality of examinations by divulging no information about any examination to a student who has not yet taken that exam. You are also responsible for consulting with your professors if you are unclear about the meaning of plagiarism or about whether any particular act on your part constitutes plagiarism. I am required to report honor code violations to the University. Please talk with me if you have any questions about how the Honor Code pertains to this course.* ***Note****. Harassment of other students in any manner will not be allowed and will be reported.*

**Course Copyright Information:**

All course materials including your notes and assignments are covered by University Copyright Policy <http://policies.unc.edu/files/2013/05/Copyright.pdf>

Unauthorized sale, duplication, or posting is a violation of the Honor Code.