

Course: BZ311 Developmental Biology

Semester/Year:

Spring 2024

Instructor:

Medora Huseby, Associate Professor

Pronouns: she/hers

Office: B109A Microbiology Building

Telephone: 970-491-6122

Email: Medora.Huseby@colostate.edu (Please allow 48 hour response time for emails)

Office hours:

Wednesday 10:00am-11:00am (Microbiology C229) and by appointment (Microbiology B109A or Zoom). Office hours are time set aside so I can support you. Together we can go over class content, exams, or anything else. The best part of being an instructor is digging into the material with students. Please come to office hours!

Lab Coordinator:

Alpana Damle

Office: Yates 210

Office phone: 491-0860

Email: Alpana.Damle@colostate.edu

Lab Teaching Assistants (TAs):

Owen Bevis

Office hours: 1-3PM Fridays

Brandon Hylton

Office hours: 11AM-12PM Thursdays and 10-11AM Fridays

Nathan Ooms

Office hours: 5-6PM Thursdays and 12-1PM Fridays

Alia Zieg-Link

Office hours: 8-9AM and 2-3PM Thursdays

Land Acknowledgement:

Colorado State University acknowledges, with respect, that the land we are on today is the traditional and ancestral homelands of the Arapaho, Cheyenne, and Ute Nations and peoples. This was also a site of trade, gathering, and healing for numerous other Native tribes. We recognize the Indigenous peoples as original stewards of this land and all the relatives within it. As these words of acknowledgment are spoken and heard, the ties Nations have to their traditional homelands are renewed and reaffirmed.

CSU is founded as a land-grant institution, and we accept that our mission must encompass access to education and inclusion. And, significantly, that our founding came at a dire cost to Native Nations and peoples whose land this University was built upon. This acknowledgment is the education and inclusion we must practice in recognizing our institutional history, responsibility, and commitment.

Course Description:

This course investigates cellular and molecular mechanisms that regulate animal and plant development. Topics include fertilization, cleavage, gastrulation, axis specification, organogenesis, morphogens, patterning and stem cells. Laboratory sessions focus on experimental manipulations of early invertebrate and vertebrate embryos and include student-designed research projects.

Course Prerequisites:

BZ310 (Cell Biology) required. BZ350 (Molecular and General Genetics) recommended.

Class Meeting Time and Location:

MWF 8:00-8:50 AM, Behavioral Sciences Building 131

Class expectation:

You are expected to spend at least 2 hours per week outside of class for each credit. BZ311 is a four-credit course, so please plan to spend on average 8 hours per week either preparing for or carrying course/lab work and obligations.

Important Dates:

- First day of class: January 16th
- Spring Recess: March 9th-17th
- Last day to withdraw: April 12th
- Last day of class: May 3rd
- Final exam: Thursday, May 9th 4:10-6:10 PM

Required Materials/Textbook:

Developmental Biology, 13th edition, by Gilbert and Barresi, is required. The accompanying website, <http://www.devbio.com/> is optional.

A copy is on reserve at the Morgan Library. Reserved copies are a PDF version of the textbook that is free to all students enrolled in BZ311. Access the reserved copy at this link: <https://reserve.colostate.edu>

Due to copyright restrictions the reserved textbook is available starting January 16th for the duration of the semester.

Lab Manual: Available at the CSU Bookstore, required. You are expected to read each lab prior to coming to the lab and performing the experiments.

Course Web Page:

<http://info.canvas.colostate.edu/login.aspx>

Course Learning Objectives:

Upon completion of this course, you can expect to:

- Describe and contrast the events of gametogenesis, fertilization, cleavage, gastrulation, organogenesis, and body axis specification, and define what they accomplish for the organism.
- Explain and give examples of fundamental concepts related to developmental biology including cell fate, morphogens, morphogenetic gradients, lateral inhibition, homeotic transformation, maternally inherited components, induction, cell signaling, and gene networks.
- Describe the strengths and limitations of major model organisms used to investigate plant or animal development.
- Explain and give examples of the relationships of genotype, phenotype, environment, and developmental timing.
- Give examples of how genetic tools can uncover gene function.
- Describe the relationship of genes and embryonic development to disease or morphological variation.
- Describe common experimental approaches used in developmental biology, and relate them to specific information the approach could provide. Describe modern experimental tools and how they work.
- Give examples of cutting-edge stem cell work designed to address a problem of development or disease.
- In lab, demonstrate competence in using tools of developmental biology to observe specimens and interpret changes in the organism during embryonic development.
- In lab, design and perform experiments with appropriate controls, acquire and interpret results, and present findings in oral or written format.

Grades:

Student grades are based on the following:

Lecture: 600 points (75% of your total grade)

Lecture exam 1	100 pts
Lecture exam 2	100 pts
Lecture exam 3	100 pts
Lecture exam 4	100 pts
Comprehensive final	150 pts
Clicker questions (2.5 pts each)	50 pts
(600 pts total)	

Lab 200 points (25% of your total grade)

Lab Assignments 1	5 pts
Lab Assignments 2	10 pts
Lab Assignments 3	10 pts
Lab Assignments 4	10 pts
Lab Assignments 5	10 pts
Lab Assignments 6	10 pts

Lab Assignments 7	10 pts
Lab Assignments 8	10 pts
Lab Assignments 9	10 pts
Lab Assignments 10	10 pts
(Lowest 2 scores dropped)	-20 pts
	(75 pts total)

Lab practical 1	14 pts
Lab practical 2	23 pts
Lab practical 3	23 pts
	(60 pts total)

Writing assignment 1	10 pts
Writing assignment 1	10 pts
Writing assignment 1	10 pts
Attitude/participation	10 pts
Poster	25 pts

Total possible points: 800 pts

Grading Scheme:

A	< 92%
A-	< 90%
B+	< 88%
B	< 82%
B-	< 80%
C+	< 78%
C	< 70%
D	< 60%
F	< 50%

Note: There is no curve for grades in BZ311. Grades are not rounded for any reason. I encourage you to prepare for the review sessions to maximize extra credit points.

Course Assessment:

A. Lecture Exams (50% of total grade)

There will be four lecture exams. I will give make-up exams if you have a documented medical or family emergency. I expect that you notify me before the exam is due so that we can schedule an alternative exam. I may require documentation that verifies the illness or emergency through student case management. I reserve the right to

administer a different version of the test for the makeup exam OR to weigh the final exam with the missed points. Exams are non-cumulative, though do build on previous material.

You are welcome to create and use a cheat sheet for each exam. The cheat sheet should be hand written and hand drawn. You are encouraged to keep your cheat sheets and use them on future exams (including the final exam).

You have one week to request regrades once your exam is graded and you have access to your scores and feedback. A regrade request means that you think there was an error in adding up points or in the rubric. I am very careful with grading, and I still make mistakes...please, bring these to my attention. Your exam score cannot be changed after this regrade period.

Lecture exams will be given during class time (8:00AM-8:50AM) and will cover material we cover in lecture. Exams will be hosted through Canvas. You are expected to access a Canvas compatible device and reliable internet. You can take the exam any location. Exams will have multiple choice, true-false, fill-in-the-blank, and analyze diagram questions. Please notify me if you have exam accommodations through SDC.

You are expected to access a canvas compatible device that can be used on exam dates. Laptops are available through Morgan library. There are several computer labs on campus (though these may be a disruptive or noisy environment). Please contact me and I can assist in locating a device.

The day prior to each exam I will run an in class review session. This session will have 10 practice problems presented as clicker questions. Each question will be graded for accuracy and will be worth 0.5 points. You can earn a maximum of 5 points per review session.

Regrade requests:

You will see your exam score soon after you take the exam. Sometimes you will see your results before I have time to go through exam statistics and double check my answer key. If you have a question on the exam question or answer key, as I ask that you please:

1. Wait 48 hours after the exam before emailing me. This gives me time to look at statistics, make changes to the key, and update scores on Canvas.
2. Come to office hours to discuss the question and/or answer.
3. Email me the question, your answer, and why your answer is a better choice than the other answers.

B. Clicker questions (6.25% of total grade)

Course attendance is correlated with grades. If you come to class you will earn a higher grade than if you do not come to class. I will give unannounced clicker questions 23 times throughout the semester. Each clicker question is with 2.5 points. These points are divided into two categories: correct answer (1.5 point) and participation (1 point). The three lowest clicker scores will be dropped and not considered part of your final grade. It is OK if you can't make it to class in person-you can participate in the clicker questions if you stream the lecture via Echo360.

University policy only allows excused assignments and exams for university sanctioned events. This means if you are sick or traveling or something else comes up I will not excuse or extend the clicker question. Instead this will be one of the three clicker scores that you can drop. You will also use one of your dropped clicker scores if you have a low battery, non-functional, or forgotten device, or if you have technical difficulties.

You can learn more about iClicker apps and instructions at the [student resource website](#).

C. Final lecture exam (18.75% of total grade)

The final exam will be given during finals week. It is comprehensive, with 25 points allocated to new material and 125 points allocated towards previous material. I will give make-up exams if you have a documented medical or family emergency. I expect that you notify me before the exam is due so that we can schedule an alternative exam. I may require documentation that verifies the illness or emergency through student case management. I reserve the right to administer a different version of the test for the makeup exam.

The final exam will be hosted through Canvas. You are expected to access a Canvas compatible device and reliable internet. You can take the exam any location. Exams will have multiple choice, true-false, fill-in-the-blank, and analyze diagram questions.

Please notify me if you have exam accommodations through SDC.

On the last day of class I will run an in class review session. This session will have 10 practice problems presented as clicker questions. Each question will be graded for accuracy and will be worth 0.5 points. These points will be added as extra credit.

The final exam is cumulative and is **Thursday, May 9th by 4:10-6:10PM**.

D. Extra credit:

There are a possible 25 extra credit points to be earned during the in class exam review sessions. Each review session will have 10 clicker questions. Each question is worth 0.5 points. Only correct answers will earn credit. These points can only be earned in class during the review session. Only university sanctioned events can result in earning extra credit points outside the scheduled times.

General Laboratory Information

Lab Learning Objectives:

Upon completion of the laboratory, students can expect to:

- Observe phenotypes in the major model systems, including opportunity to work with live organisms.
- Apply cutting edge technologies (e.g. RNAi, transgenic organisms, and fluorescence microscopy).
- Learn to observe even subtle features (very important in developmental biology!).
- Test experimental questions and start to design your own experiments.

See laboratory manual for schedule of labs.

Laboratory attendance:

Attendance is very important. If you are not in lab, you are missing a significant portion of the information for the semester. Labs are impossible to set up at alternate times, as often times they use living materials. Therefore, if you miss the lab, you miss the points associated with it (e.g., Lab assignment). If you have a legitimate conflict with lab, inform your lab instructor as soon as possible so they can try to arrange your attendance in another scheduled lab section. You are expected to attend all laboratory sessions. If you have a university excused absence, please get in touch with your GTA as soon as possible to see what arrangements can be made. Missing more than two laboratory sessions during the semester will result in an automatic grade of 0% for the lab. Due to the nature of this lab, it will be necessary to come in outside of your scheduled lab time to check on experiments later in the week. Lab times are only scheduled for one hour and forty minutes, with the idea that some weeks you will return to follow up. This will not always be the case, and often only one member of the group will need to take the data, so this duty can be traded off.

Your own work:

Although you will work in teams on some experiments, all lab assignments, practicals and commentaries should be independently prepared and submitted by each student. Write everything up in your own words with citations where appropriate.

General Information

iClicker:

We will use iClicker cloud in class. iClicker cloud is provided free to all CSU students with funds from the university technology fee. CSU has a site license with iClicker, so the use of iClicker on a mobile device, tablet, or a computer is free for all students. Physical iClicker remotes will not be used in BZ311.

To participate in iClicker cloud polling, all students must [create an iClicker account](#) through the campus portal.

To participate in polling on a mobile device download the [iClicker Student mobile app](#) via the App Store or Google Play. Students may also participate in polling by going to the [iClicker Student website](#) from a web browser.

See <https://canvas.colostate.edu/iclicker/student-information/> for more information.

Special Needs Statement:

Students with disabilities are encouraged to contact Student Disability Center (SDC) at 970-491-6385 or <https://disabilitycenter.colostate.edu/> to arrange for accommodations and support services.

Gender Inclusive Restrooms:

There are gender inclusive restrooms located on the first, fourth, and fifth floors of the behavioral sciences building.

Service Animals & Support Animals:

Service Animal

A **service dog (or mini-horse) is considered necessary for access, much like a wheelchair**. An emotional support animal is considered an accommodation to allow someone the ability to benefit from housing. **Subject to some limitations, a service dog may generally accompany students throughout campus, such as classrooms, recreational facilities and campus residences**. It is expected that a service dog be identifiable to others through a visible signifier (e.g., vest or harness) although it is not required. The service animal must behave unobtrusively and always be under the handler's direct control. Students with non-apparent disabilities who use a service dog are strongly encouraged to use the Student Disability Center (SDC) as a means of verifying the need as an accommodation while on campus. **Misrepresenting a dog as a service dog is a violation of Intentional Misrepresentation of Entitlement to an Assistance Animal, Colo. HB16-1426.**

Emotional Support Animal

In some instances, **students with a verifiable disability** may be allowed to have an emotional support animal within campus housing facilities, *but it may not be allowed to enter classrooms*. Requests for accommodations beyond the residential scope will be assessed on a case-by-case basis by the Student Disability Center (SDC). All requests for emotional support animals as an accommodation in campus housing facilities must be approved by the Student Disability Center.

For additional information on disability documentation guidelines and/or the accommodation process, go to Accommodation Process or call the Student Disability Center at (970) 491-6385.

Title IX:

CSU's Discrimination, Harassment, Sexual Harassment, Sexual Misconduct, Domestic Violence, Dating Violence, Stalking, and Retaliation policy designates faculty and employees of the University as "Responsible Employees." This designation is consistent with federal law and guidance, and requires faculty to report information regarding students who may have experienced any form of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation. This includes information shared with faculty in person, electronic communications or in class assignments. As "Responsible Employees," faculty may refer students to campus resources (see below), together with informing the Office of Support and

Safety Assessment to help ensure student safety and welfare. Information regarding sexual harassment, sexual misconduct, relationship violence, stalking and retaliation is treated with the greatest degree of confidentiality possible while also ensuring student and campus safety.

Any student who may be the victim of sexual harassment, sexual misconduct, relationship violence, stalking or retaliation is encouraged to report to CSU through one or more of the following resources:

- Emergency Response 911
- Deputy Title IX Coordinator/Office of Support and Safety Assessment (970) 491-1350
- Colorado State University Police Department (non-emergency) (970) 491-6425

Confidential victim advocates are available 24 hours a day, 365 days a year to provide support related to the emotional, physical, physiological and legal aftermath of interpersonal violence. Contact the Victim Assistance Team at: 970-492-4242.

Academic Integrity

(From the CSU catalog <http://www.catalog.colostate.edu>) The CSU Honor Pledge

The foundation of a university is truth and knowledge, each of which relies in a fundamental manner upon academic integrity and is diminished significantly by academic dishonesty. Academic integrity is conceptualized as doing and taking credit for one's own work. A pervasive attitude promoting academic integrity enhances the sense of community and adds value to the educational process. All within the University are responsible for and affected by the cooperative commitment to academic integrity. As such CSU has instituted an Honors pledge that you will all be asked to sign, which states that you pledge your honor not to give or receive unauthorized assistance on assignments and exams in this course.

Academic dishonesty (see examples below) undermines the educational experience at Colorado State University, lowers morale by engendering a skeptical attitude about the quality of education, and negatively affects the relationship between students and instructors.

Instructors are expected to use reasonably practical means of preventing and detecting academic dishonesty. Any student found responsible for having engaged in academic dishonesty will be subject to academic penalty and/or University disciplinary action.

Students are encouraged to share responsibility for the academic integrity of the University by reporting incidents of academic dishonesty.

Examples of academic dishonesty include (but are not limited to):

1. *Cheating in the Classroom* -- Cheating includes using unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work. Examples include copying the work of another student on an exam, problem set, or quiz; taking an exam or completing homework for another student; possessing unauthorized notes, study sheets, answer codes, programmed calculators, or other materials during an exam, and falsifying exams or other graded paper results.
2. *Plagiarism* -- Plagiarism includes the copying of language, structure, ideas, or thoughts of another, and representing them as one's own without proper acknowledgment. Examples include a submission of purchased research papers as

one's own work; paraphrasing and/or quoting material without properly documenting the source.

3. *Unauthorized Possession or Disposition of Academic Materials* -- Unauthorized possession or disposition of academic materials includes the unauthorized selling or purchasing of examinations or other academic work; stealing another student's work; unauthorized entry to or use of material in a computer file; theft or mutilation of library materials; and using information from or possessing exams that an instruction did not authorized for release to students.
4. *Falsification* -- Falsification encompasses any untruth, either verbal or written, in one's academic work. Examples include receiving unauthorized assistance or working as a group on a take-home exam, independent exam, or other academic work without authorization, or lying to avoid taking an exam or turning in other academic work.

Furthermore, falsification of any University document is a violation of academic integrity. Examples include student identification numbers, transcripts, grade sheets, credentials, University status, or letters of recommendation. Forging a signature is another specific example of falsification.

5. *Facilitation of Cases of Academic Dishonesty* -- Facilitation of any act of academic dishonesty including cheating, plagiarism, and/or falsification of documents also constitutes violation of Colorado State University's academic integrity. Examples include knowingly discussing specifics of the content of a test or examination you have taken with another student who has not yet taken that test or examination or facilitating, by sharing one's own work, a student's efforts to cheat on an exam or other academic work.

The use of online "homework helper" sites including, but not limited to, Chegg, NoteHall, Quizlet, ChatGPT, and Koofers is not permitted in this course. Please reach out to me to discuss if a specific service you are thinking about using for this course is acceptable.

Use of these types of resources will be considered receiving unauthorized assistance and, therefore, a violation of the student conduct code. Using them may result, at the discretion of the instructor, in a zero for the course, assignment, quiz, or exam. All incidents of this type will be referred to the CSU Student Resolution Center and may be subject to additional University disciplinary action.

If an instructor has evidence that a student has engaged in an act of academic dishonesty, the instructor will notify the student of the concern and make an appointment to discuss the allegations with the student. The student will be given the opportunity to give his/her position on the matter. If the student admits to engaging in academic dishonesty or if the instructor judges that the preponderance of evidence supports the allegation of academic dishonesty, the instructor may then assign an academic penalty. Examples of academic penalties include receiving a reduced grade for the work, a failing grade in the course, or other lesser penalty as the instructor deems appropriate. If, after making reasonable efforts, the instructor is unable to contact the student or collect all relevant evidence before final course grades are assigned, they shall assign an interim grade of incomplete and notify the student of the reason such grade was given.

If the student disputes the allegation of academic dishonesty he/she should request a hearing with Conflict Resolution and Student Conduct Services. The University Hearing

Officer will determine whether or not a preponderance of evidence exists in support of the allegation of academic dishonesty.

If the University Hearing Officer finds insufficient evidence or clears the student of the charges, the instructor will determine a grade based upon academic performance and without reflection of the academic dishonesty charge and change any previously assigned grade accordingly. If the University Hearing Officer finds the student culpable, the Hearing Officer may impose additional University disciplinary sanctions.

Instructors should report to Conflict Resolution and Student Conduct Services all cases of academic dishonesty in which a penalty is imposed. Instructors may recommend that a hearing be conducted to determine whether additional University disciplinary action should be taken.

Information about incidents of academic dishonesty is kept on file in Conflict Resolution and Student Conduct Services. No further action is initiated unless the incident constitutes a major infraction, the student has a prior record of University infractions, or there are subsequent reports of misconduct.

Information regarding student rights, administrative hearing procedures, classifications and definitions of University disciplinary action, University Discipline Committee, appeal procedures, and the maintaining of disciplinary records is contained in the "Student Rights and Responsibilities" document available through the Vice President for Student Affairs' Office.

In BZ311 incidents of academic dishonesty will result in a score of zero for any assignment, or examination on which academic dishonesty occurs.

I reserve the right to change this syllabus and schedule and will notify students of any changes during regularly scheduled lectures. It is the responsibility of all students to find out if any changes were announced during classes that are missed.

Dr. Huseby reserves the right to modify this syllabus.

January 15th, 2024