Syllabus
BIO 528 Developmental Biology (ONLINE)
Spring 2017

Time and Place: ONLINE.

Instructor: Judy Leatherman, Ph.D.
Ross 2510
judith.leatherman@unco.edu
970-351-2453
Office hours: Mon 2:30-4, Weds 2:30-4, or by appointment

Credits: 3
Prerequisites: BIO 220 Genetics or consent of instructor

Course description: Exploration of animal development. Emphasis on the genetic basis of cell organization and identity during embryogenesis and differentiation. Topics include fertilization, gastrulation, axis specification, patterning, organogenesis, stem cells.

Course Purpose: There is a most incredible biological event that is continually occurring in the world, but it is so routine that most people never even give it a second thought. Highly complex organisms—yes, humans, but also fish, insects, birds, whales—form themselves, using nothing more than the instructions found in their own DNA. How do initially identical cells take on different fates to form muscle, bone, neurons, or skin? How do the genetic instructions lead cells to cooperate together and form a tube, or a sheet of cells? Why do humans have 33 vertebrae and four limbs, and snakes have 200-plus vertebrae and no limbs? The purpose of this course is to introduce students to the field of developmental biology, and to help them understand the experimental approaches by which these complex events can begin to be broken down into answerable questions. For the medically-inclined, understanding the processes involved in development are the foundation for understanding the origin of congenital malformations in humans.

Course objectives:
- For each of the major content areas of the course (see course schedule for topics), students will be able to
  - Describe the events in the developmental process,
  - Predict the results of genetic or embryological manipulations, based on their knowledge of the developmental process,
  - Make hypotheses about the mechanisms involved in the process based on experimental results, and
  - Design experiments to test hypotheses about the developmental process.
- Read, summarize, and present data from primary research articles.
- Critically analyze and evaluate experiments from research articles, and articulate those criticisms to the class via discussion board.
- Independently research what is known about a specific developmental process, and teach the topic to the class.
**Text:** Gilbert and Barresi, Developmental Biology, 11th edition (Sinauer)
Available in hardback and looseleaf options.

**Required Technology:** Because this course is online, there are certain technical competencies that are required for course completion. You must have the ability to use a common word processor, use email, and work with a browser to access the online course content in Canvas, participate in online course discussions, and upload assignments.

Online students will also require:
- Reliable internet service.
- A webcam or video camera with microphone to record your own presentations.
- A camera or scanner to turn in assignments that may have drawn diagrams. Usually a smartphone camera is adequate.

Lecture videos from the face-to-face section will be posted by the end of the day each Monday, Wednesday, and Friday in which a lecture is scheduled.

**Course requirements and evaluation:** Students will be given a letter grade (A-F) based on completion of assignments. Grading will be no more rigorous than the following scale: A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: below 60%.

Assignments will be weighted as follows:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% of total grade</th>
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<tbody>
<tr>
<td>Exams (3 exams, 100 points each)</td>
<td>60%</td>
</tr>
<tr>
<td>Journal article summaries (10 @ 10 points each)</td>
<td>15%</td>
</tr>
<tr>
<td>Journal article discussions (10 @ 5 pts each)</td>
<td>10%</td>
</tr>
<tr>
<td>Topic presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Participation in other online discussions and completion of worksheets</td>
<td>5%</td>
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**Exams:** There are three scheduled exams for this course. For each exam, there are two parts, a proctored portion, and a take-home portion. Each exam will cover only the topics within that unit; there is no comprehensive final exam.

**Journal articles (article summaries and discussions):** Through the course of the semester, students will be assigned to read ten primary research articles. Each student will complete an article summary, and will be assigned one aspect of the paper to present to the rest of the online class (often one figure from the paper). This presentation can be either a written description or analysis of the experiment, or it can be an audio and/or video recording of you doing your analysis. The article summary and presentation of your assigned figure will be due one day, then the online discussion will be open for approximately 4 additional days. Students will be graded on their initial figure presentation and their participation in the ensuing discussion (for a maximum of 5 points/article discussion). Grading rubric for these discussions will be posted.
**Topic presentation:** Each student will choose a topic, and prepare an oral presentation to ‘teach’ the topic to the rest of the class. In the first week of class, possible presentation topics will be posted on Canvas, and students will be asked to rank their top three choices. The instructor will then assign topics based on students’ preferences. These presentations should be approximately twenty minutes in length. The presentations should be recorded and uploaded by the due date. A rubric for the topic presentation will be posted on Canvas. In addition, students will be asked to write 2 or 3 exam questions on their topic; some of these questions will be included in the exams. The other students in the class are expected to watch these presentations—the material presented will be included on the next exam.

*Note: if any student has a particular interest not represented within the proposed topics, they should contact the instructor to discuss whether their alternative topic could be acceptable.*

**Participation in online discussions/Completion of worksheets:** There will be a number of discussion questions posted on Canvas over the course of the semester, each will be worth a small number of participation points. Occasional review or application of the material worksheets will be assigned. Students should download and complete these, then upload them again by the due date.

**How the Course Requirements Fulfill the Objectives of the Course**

In the table below, each course objective is linked with the course assignments/requirements that assess that particular objective.

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>ACTIVITIES</th>
<th>ASSESSMENT</th>
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<tbody>
<tr>
<td>For each of the major content areas of the course students will be able to describe the events in the developmental process, predict the results of genetic or embryological manipulations, make hypotheses about the mechanisms involved in the process based on experimental results, and design experiments to test hypotheses about the developmental process.</td>
<td>The text readings, journal article readings, and lectures (with accompanying powerpoint slides) will give students the background knowledge to accomplish this objective. Worksheets and discussions will give students a chance to practice the type of critical thinking analysis necessary for these objectives.</td>
<td>Performance on exams and worksheets, and participation in online discussions.</td>
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<td>Students will be able to read, summarize, and present data from primary research articles.</td>
<td>The journal article readings, written article summaries, and journal article discussion participation will enable students to accomplish this objective.</td>
<td>Performance on journal article summaries and discussions.</td>
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<tr>
<td>Students will be able to critically analyze and evaluate experiments from research articles, and articulate those criticisms to the class.</td>
<td>Journal article discussions will enable students to accomplish this objective.</td>
<td>Performance on journal article discussions.</td>
</tr>
<tr>
<td>Students will be able to independently research what is known about a specific developmental process, and teach the topic to the class.</td>
<td>The topic presentation will allow students to accomplish this objective.</td>
<td>Performance on topic presentation.</td>
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**Expectations/Communication:** **What I expect from you:** I expect that you will take ownership of your learning. I expect you to log in to Canvas frequently, and participate in discussions. All students should regularly check their UNC bears email addresses—I will contact you occasionally this way.
This is not a self-paced course! For online students, there are REQUIRED assessments with due dates. I strongly suggest that you watch the lecture videos the same day it occurs in person, or the next day. There will be discussion questions with short time-frames, and it will be difficult to participate fully if you are behind in the material.

I also expect that you contact me with questions or concerns as soon as they develop, so I can make sure you stay current with your assignments. If you have an illness or personal obligation that prevents you from staying up-to-date with the material, I am generally willing to work with you; however, contacting me after the fact except in cases of extreme emergency will not likely result in a great deal of sympathy for your cause.

Communication - What you can expect from me: I will do my best to make you aware of the upcoming schedule, and any pending assignments. Generally, expect an email from me once a week with general announcements.

I will respond to your emails within 24 hours Monday- Friday. On weekends and holidays, I will generally not respond to emails. I aim to provide timely feedback for your assignments. Be sure to look for the feedback in the Grades area. Please email me at Judith.Leatherman@unco.edu if you have any questions or concerns. I am also happy to talk on the phone with you, or do a video chat.

Time Commitment: In a regular semester, for a 3 credit hour class, you are expected to spend 3 hours in class each week and about 6 hours outside of class studying and completing assignments. This time commitment per credit hour is actually mandated by the Higher Learning Commission for accreditation. For online students, please realize that it will take you at least as much time, work, and dedication to complete this online course as it does for an on-campus course. Taking an online course gives you flexibility – allowing you to attend class from any location. But because you are not made to attend at a specific time or place, it requires extra self-discipline:

- You must determine when you attend
- You must make sure that you attend regularly
- You must make sure that you reserve or, better yet, actually schedule enough time to check announcements, read the Course Materials, study, and complete assignments.

Students with Disabilities: Any student requesting disability accommodation for this class must inform the instructor giving appropriate notice. Students are encouraged to contact Disability Support Services at (970)351-2289 to certify documentation of disability and to ensure appropriate accommodations are implemented in a timely manner.

Cheating and Plagiarism: One of the student responsibilities at UNC is to act in accordance with commonly accepted standards of academic conduct. If a student is found to be cheating or plagiarizing, they will receive a zero for the assignment in question. Depending upon the nature of the infraction, the student may also receive a grade of F for the course and be referred to the University for disciplinary action. For more information please see the Dean of Student’s website at www.unco.edu/dos.
**Netiquette Policy:** Netiquette is online etiquette. It is important that all participants in online courses be aware of proper online behavior. Please review the “netiquette” document in “Academic and Support Resources” in the Start Here module for more details. These are the key points:

- Since written communication is the primary communication between students and instructor for online courses, please make every effort to use proper grammar, spelling, and complete sentences. Avoid slang and foul language of any kind. Avoid typing in all capital letters.
- Make every effort to show respect to your instructor and your fellow classmates in *every single interaction*.
- Avoid the use of sarcasm in online communications; what you really meant to say may not be properly interpreted by the reader without the use of visual cues.
- **Abusive language and rudeness will not be tolerated.** Students may expect significant consequences for displaying this type of behavior, including receiving zeros on associated assignments.