Developmental Biology

BIOL 3090-001/091 - FALL 2011

Classes: TR from 9:30-10:45 a.m. in SM2100

Instructor

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Hrs: M 10-11 am & Th 1-2:30 pm

Course Description

This course will introduce students to the molecular and cellular mechanisms that underlie the early development of organisms. The focus will be on the genes and proteins involved in controlling the behavior of cells in the processes of differentiation, morphogenesis and growth. Developmental mechanisms and processes will be examined in genetic model organisms such as the fruit fly (*D. melanogaster*) and the worm (*C. elegans*) as well as in vertebrates such as the frog (*X. laevis*), chicken, mouse and humans.

Required Materials

- Textbook: Principles of Development (Third Edition), Lewis Wolpert editor. Oxford University Press (ISBN 978-0-19-927537-3). The 4th edition is also acceptable (978-0-19-955428-7). Some new information from the 4th edition will be discussed in class, but that information will be available on the lecture slides.
- Turning Technologies response card ("clicker").

Clicker Registration

- **Your clicker must be registered at student.turningtechnologies.com by 5 pm on August 29.**
- Follow the web site instructions carefully, paying particular attention to the following points:
  - Be careful NOT to enter the letter "o" in place of zero (0) when entering your device ID. The letter "o" is not used in any devise ID.
  - For "Step One" on the web site, under "Other Info" please enter your Rocket ID.
  - For "Step Two" my email address is "robert.steven2@utoledo.edu". "Add" BIOL3090 and click "Next".
  - For "Step Three" click on "Complete Registration".
  - If you have any problems registering your clicker please call 1-866-746-3015.
- **If you change clickers during the semester** please **email** me with your new clicker ID as soon as possible. I will only access the registration web site once so you must email me after August 29. You will not receive points for clicker questions unless I have your clicker ID registered.

General Information

- BIOL 3030 (Cell Biology) is a prerequisite for this course.
- Please attend every class. Material presented during class will be emphasized for the exams. Discussing the material in class and reading it from the textbook (preferably before the class) will aid in your ability to understand and retain the presented concepts.
- This course is web assisted: lecture slides will be available for download the day before class.
- Please ask questions during the lecture if you feel something was not explained clearly. You also have the option of asking questions by email or discussing the topics during my office hours.
- Please turn OFF cell phones while in the class.
- Please do not bring food into the room, although a drink is acceptable.
- If you wish to make audio recordings of the lectures please ask me first.

Student Evaluation

Exams

- There will be three midterm exams during the semester and each will be worth 100 points (**20%** of your final grade). The midterm exams will cover only new material (since the last exam). Exam questions will be based on the lecture material and assigned readings from the textbook.
- The final exam will be comprehensive and it will count for 150 points (**30%** of your final grade). Approximately 80 points will count for the last section of the course and 70 points for the first three sections.
- All exams will be a mix of multiple choice, definitions and short answer questions.
- On exam days:
    - Bring a #2 pencil.
    - Students will be asked to present a picture ID when turning in exams.
    - Note that make-up exams will only be provided for serious medical or personal reasons. They will consist of essay questions, which tend to be more difficult than the multiple choice and short answer formats. Please let me know as soon as possible if you find that you cannot take an exam.

Clicker Questions

- In each lecture approximately four questions about the lecture material will require your response using the Turning Technologies response card. To encourage students to arrive on time the first question will be at the start of class.
- Clicker questions will begin in the third lecture (August 30).
- In total these questions will count for **10%** of your final grade.
- The grading system for these questions is set so that you can still receive the full 10% even if you miss up to three classes, therefore, extra points or make-up clicker questions will not be given for absences.
- Bringing a clicker to class for someone else is considered academic dishonesty for both students involved and the penalty for doing so is severe.

Class Discussion

- Participation in class discussion throughout the year may result in up to a 10-point **bonus** added to your final grade.

Grading Summary

- (20% x 3 = 60%) Midterms + 30% Final Exam + 10% Clicker Questions = 100%

Grading Scale:

90-100%	A
87-89%	A-
83-86%	B+
79-82%	B
75-78%	B-
71-74%	C+
67-70%	C
63-66%	C-
59-62%	D+
55-58%	D
50-54%	D-
<50%	F

Course Schedule

Date	Lecture	Topic	Chapter	
			3rd ed	4th ed
Aug 23	1	Introduction and History	1	1
Aug 25	2	Concepts In Development	1	1
Aug 30*	3	Development of the *Drosophila* Body Plan I	2	2
Sept 1	4	Development of the *Drosophila* Body Plan II	2	2
Sept 6	5	Development of the *Drosophila* Body Plan III	2	2
Sept 8	6	Patterning the Vertebrate Body: Model Organisms	3	3
Sept 13	7	Patterning the Vertebrate Body: Axis Specification	3	4
Sept 15		**Exam I**		
Sept 20	8	Patterning the Vertebrate Body: Germ Layers	3	4
Sept 22	9	Patterning the Vertebrate Body: Somite Formation	4	5
Sept 27	10	Patterning the Vertebrate Body: Neural Induction	4	5
Sept 29	11	*C. elegans* Development I	5	6
Oct 4	12	*C. elegans* Development II	5	6
Oct 6	13	Plant Development	6	7
Oct 11		**Exam II**		
Oct 13	14	Morphogenesis: Adhesion and Cleavage	7	8
Oct 18		Fall Break		
Oct 20	15	Morphogenesis: Gastrulation	7	8
Oct 25	16	Morphogenesis: Migrations	7	8
Oct 27	17	Cell Differentiation: Control of Gene Expression	8	10
Nov 1	18	Cell Differentiation: Models of Differentiation	8	10
Nov 3	19	Cell Differentiation: Plasticity of Gene Expression	8	10
Nov 8	20	The Vertebrate Limb	9	11
Nov 10		**Exam III**		
Nov 15	21	Organogenesis	9	11
Nov 17	22	NS Development: Specification and Organization	10	12
Nov 22	23	NS Development: Axon Guidance and Synapse Formation	10	12
Nov 24		Thanksgiving Day		
Nov 29	24	Germ Cell Development	11	9
Dec 1	25	Fertilization and Sex Determination	11	9
Dec 6	26	Growth and Aging	12	13
Dec 8	27	Review		
Dec 14		**Final Exam (8-10am)**		

Other Important Dates:

Clicker registration must be completed by August 29 at 5 pm.
*Clicker questions begin: Aug. 30
Last day to drop: Sept. 5
Last day to withdraw: Oct. 28