

## Advanced Developmental Biology

(146:472, 148:504)

Spring 2021

Tuesday & Thursday 1:40pm – 3:00pm

Classroom – Online Canvas Conference or WebEx see Canvas Course Site for link

Office hours via Zoom – Thursdays from 11:30p -12:30p or by appointment

See Canvas Course Site for link or email for an appointment

Dr. Arnold Hyndman,

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**Course Focus:** This course considers the genetic, molecular and cellular processes that lead from egg to embryo to mature organism. Development is the complex cascade of progressive and typically irreversible changes during which cells become specialized and fashioned into functional fabrics with predictable organization along major body axis. It accomplishes two basic functions: it generates cellular diversity and order within each generation and provides continuity of life from one generation to the next. This course will emphasize the cellular and molecular mechanisms underlying pattern formation and cellular specialization, and will present model organisms used in the study of developmental. You are accepted to demonstrate understanding of: the basic of the basic molecular and cellular mechanism involved in embryogenesis, organ system development and differentiation, the variation in developmental pathways of representative invertebrate and vertebrates; and how a modern understanding of development shapes our understanding of human health, disease and ethical decision making.

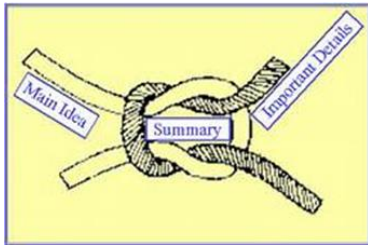


**Course Text:** DEVELOPMENTAL BIOLOGY, 12th Edition, by Scott Gilbert. Published by Sinauer Associates. Students may use format of the text: Hardbound text ISBN: 9781605358222, Looseleaf ISBN: 9781605358246. Supplementary reading will be provided throughout the course and uploaded to Canvas.

**Method of Instruction and Assessment:** You will gain information and insight into the course material from lectures, class discussions, the reading of the text, supplementary readings, group work and personal reflection.

**Examinations:** There will be four hourly exams. Three of these exams will be held during regularly scheduled class periods. The last exam will be during the final exam period. If an emergency should arise that prevents you from taking an examination at the scheduled time, you must notify me (Dr. Hyndman) as soon as you are aware of the emergency and provide written documentation of the emergency which clearly indicates why the exam could not be taken as scheduled. Make-up exams must be taken within one week of the scheduled examination. Final approval to give a makeup exam rests with me.

**Canvas:** The course will make use of the Canvas learning tool for posting reading materials and supplementary information. Canvas will also be the site for submission of the learning journals and group. **This site will also contain various tools that you are encouraged to use to enhance your learning experience.**



Learning Journals: You are required to maintain a learning journal. A learning journal is a regularly kept record of the ongoing learning process involved in exploring a subject matter. This is a tool to record information, observations, insights and questions that occur as you examine, review and ponder developmental biology lectures and readings. It is designed to reinforce and enrich your learning experience. Journaling in this class has two major components: recording

and reflecting, the emphasis should be on reflecting. **Details for how to structure your learning journal will be provided in class with examples found on Canvas.**

Current Research Article Review: Students be required to submit a written review of a current research article in the field of developmental biology. Details for this assignment will be given in class on **March 23<sup>rd</sup> attendance this day is critical for the successful completion of this assignment.** Additional graduate student assignments: All graduates students registered for 148:504 will be required to write a short research review paper (6 – 10 pages). The format and topic of the paper must be approved in advance by me, details will be provided in class.

Group Work: You will be assigned to groups. These groups will be for discussion as breakout sessions during class. Occasionally, groups will be given short graded assignments. Students must be present in that class to received credit for these assignments.



*Unit Class Forums* –At the end of each unit, an online forum will be opened. Its aim is for students to: 1) discuss course concepts, 2) present real-world applications, or 3) comment on contributions from others students. Points will be given to students who contribute in one of the above elements.

**Academic integrity:** In this course, you are expected to conduct yourself in manner consistent with the Rutgers University Policy on Academic Integrity (<http://academicintegrity.rutgers.edu>). Academic integrity requires that academic work presented in the class for evaluation be wholly the product of the identified individual. Academic misconduct includes: cheating, fabrication, facilitating academic dishonesty, denying others access to information or material, and plagiarism. You should be aware that all allegations of academic dishonesty will be fully investigated and any evidence of academic dishonesty will be handled by me or reported to the Office of Student Judicial Affairs for appropriate action. **The public posting of course syllabus, exams or other course material is a violation of the University Academic Policy.**



**Grading Policy:** Grades are not negotiable in this course. Your final grade will be determined on the four in class assignments, unit forums, examinations, written paper and learning journal submissions. In additional, for graduate students, the research paper and presentation will be factored into the final grade. **NO EXTRA CREDIT WORK WILL BE ALLOWED**

**How to Succeed in an Online Course** – please review this link – [Online success](#)

**Recording devices:** Students may use audio recording devices for their own learning purposes. Recordings, course materials, and lecture notes may not be exchanged or distributed for commercial purposes, for compensation, or for any other purpose other than study by students enrolled in this class. No video recordings are allowed of any lecture.



**Power Outage or other emergencies:** In the event of a power outage or other emergency, that prevents a scheduled *Canvas Class Meeting*. A record lecture will be posted on Canvas as soon as possible.



**The final grade will be determined as follows\*:**

Examination 1	70 points
Examination 2	60 points
Examination 3	60 points
Examination 4	60 points
In class assignments	10 points
Unit Forums	15 points
Current Research Article Review	20 points
Unit 1 Learning Journal	20 points
Unit 2 Learning Journal	20 points
Unit 3 Learning Journal	25 points
<u>Reflective Analysis - within Unit 3 Journal</u>	<u>15 points</u>

**TOTAL = 355 points**

Graduate students' grades will also be determined by

Research paper 30 points

**TOTAL for GRADUATE STUDENTS = 395 points**

**\*This is a guide and is subject to modification.**



# topics

## Topic Unit 1

## Readings

Jan 19	Orientation	Special Reading
21	Approaches	Ch. 1 pp 2-8 & 20-28
26	Patterns of Early Development	Ch. 1 pp8 – 19 & Ch. 2
28	Genes & Gene expression	Ch. 3
Feb 2	Cell-cell communication	Ch. 4
9	Gametogenesis & Fertilization	Ch. 6 pp 196-206, Ch. 7 pp215-240
11	Current Issues	Special Readings*
12	<i>Unit 1 Learning Journal Due</i>	
16	<b>Examination I</b>	

## Unit 2

18	C. elegans	Ch. 8 pp 263-272
23	Drosophila	Ch. 9
25	Early Amphibian and Teleost Development	Ch. 11
Mar 2	Early Avian & Mammalian Development	Ch. 12

*Graduate students must submit research paper topics for approval 3/2/21*

Mar 4	Floral Development	Ch. 2 pp 46-47, Ch 3.pp.76-78, Ch.6 pp.206-209 Ch 7 pp 241-245, Ch. 8 pp 256-259 Special Readings*
9	Current Issues	
10	<i>Unit 2 Learning Journal Due</i>	
11	<b>Examination II</b>	

**March 15-19 Spring Break**

## Unit 3

23	Organ Assembly	Ch. 17
	Research Article assignment - details provided in class	
	<b>All students must be in class this day</b>	
25	Cardiovascular	Ch. 18 p 551-559
30	Digestive & Urogenital Systems	Ch. 18 p 542-550 & Ch. 20
Apr 1	Nervous System I	Ch. 13
Apr 6	Nervous System II	Ch. 14 & 15
13	<b>Examination III</b>	
15	Development of Limb	Ch. 19
20	Reproductive System	Ch. 6 p 180-195
22	Postembryonic Development I	Ch. 21 & Ch. 22

**Research Article Review due 4/21/21**

27	Postembryonic Development II – Aging	Special Reading*
	<i>Reflective Analysis Assignment given in class 4/22/21</i>	
	<b>Graduate Students review paper due 4/26/21</b>	
29	Development and Disorders	Ch. 23 & 24
29	Current Issues	Special Readings*
May 5	<i>Unit 3 Learning Journal with Reflective Analysis Due</i>	
11	<b>Examination IV @ noon</b>	

- **\* Special Readings will be upload to Canvas**



**Course feedback:** Because I am interested in enhancing the learning experience of this course, feedback from you is important. I am open to any constructive comments you would like to make to me personally or via email either during the semester or at the end of the course. I also encourage you to complete the online survey at the end of the semester.