

DEVELOPMENTAL BIOLOGY (BIOL 306) FALL 2020

Major topics include molecular and cellular mechanisms of early embryonic development in model organisms such as *Drosophila*, amphibians and mammals as well as the related subjects of animal cloning, biology of stem cells and vertebrate organ system development. Focus is placed on cell-cell communication, signal transduction and differential gene regulation in developmental processes.

LEARNING OBJECTIVES

1. Understand basic concepts related to:
 - Differential gene expression, epigenetics and reprogramming
 - Common inductive signaling pathways in development
 - Vertebrate morphogenesis and pattern formation
 - Experimental tools and animal models to study development
2. Reading and critical analysis of developmental biology research papers
3. The course emphasizes:
 - Application of developmental concepts and how they relate to each other to solve problems
 - Ability to use information to produce well-reasoned written arguments using evidence to support conclusions

INSTRUCTOR

Dr. Carmen Melendez-Vasquez

Office: Rm 912 HN

Office hours: Tuesday 9:00 -11:00 AM- ZOOM link will be posted

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e-mail: melendez@genectr.hunter.cuny.edu (Preferred method of contact. Expect reply within 24-48 hours)

STUDY RESOURCES

***Synchronous sessions via Blackboard Collaborate Ultra: Tuesdays & Fridays from 11:10 AM to 12:25 PM.** You are strongly encouraged to attend these sessions as they will be used to discuss course material and address any question you might have. These discussions will help you with your graded assignments. These sessions will also be recorded and made available in Bb Collaborate classroom:

2020 Fall Term (1) Developmental Biology BIOL 30600 01[8132] (Hunter College)

IMPORTANT All slides, articles, videos, reading materials, quizzes, assignments and exams will be posted on this page. You should **check in advance** your access to Blackboard and Blackboard Collaborate Ultra and contact technical support if you encounter any issues. For more information and resources see here:

<http://www.hunter.cuny.edu/it/blackboard/student-documentation-and-support-for-blackboard>

Suggested textbook : Developmental Biology, 12th ed., Gilbert & Barresi

Additional textbooks: Principles of Development (Wolpert, Tickle, Martinez Arias); Development of the Nervous System (Sanes, Reh & Harris)

COURSE ORGANIZATION

The course is divided into four parts:

- **Part 1. Principles of Development (8/28 to 9/22)**
- **Part 2. Early Developmental Process (9/25 to 10/20)**
- **Part 3. Stem cells and Organ Development (10/23 to 11/17)**
- **Part 4. Development of the Neurogenic Ectoderm (11/20 to 12/8)**

Each part will be evaluated by a combination of **asynchronous assessments**. Quizzes (22 total), assignments (8 total), research paper discussions (3 total) and take-home exams (4 total). The content on quizzes, assignment, discussions and exams will be restricted to the material indicated on the course schedule. Questions will be related to the topics covered in each part but they will require you to **integrate** material from sections presented independently. Exams will test your **comprehension** of the material by asking you to **apply your knowledge to situations not directly discussed during the synchronous sessions**.

Quizzes will be made available on the course Bb page immediately after each synchronous session (**by 12:30 PM on Tuesdays and Fridays**) and will be due an hour prior to the beginning of the following session (**by 10:10 AM on Tuesdays and Fridays**). **No quizzes** will be posted on the dates allocated for the discussion of the research papers (**October 16th, November 13th and December 8th**) *Quizzes are timed, once you start you need to finish. about 5 questions, 10 min ish*

Three (3) in-depth **research paper discussions** will be carried out on synchronous sessions on the following dates: **October 16th, November 13th and December 8th**. Graded discussion forums will be created by the instructor for each of these sessions addressing a specific question(s) pertaining to the research. You will be able to submit your answers **prior** and/or **after** the class. Specific instructions and rubrics for each of these discussions will be made available in advance.

Assignments will be due by 11:59 on the indicated dates. Late submissions **will not be accepted**. If a sudden medical condition prevents the timely submission of an assignment a doctor's notice will be required. Any other extenuating circumstances will be dealt on an individual basis.

Exams will be made available by 11:10 AM on the following dates: **September 22nd, October 20th, November 17th, and December 15th**. You will be able to take it anytime during the day but they will be due by 11:59 PM on the same day. **Make up exams** are strongly discouraged. You **must** inform the instructor well beforehand if you are unable to take an exam on the scheduled date. Exam dates **will not** be changed, as this is unfair to those who plan around these dates. Sudden medical conditions require a doctor's note and **do not automatically warranty** a make-up exam. Each case will be dealt on an individual basis.

exams are asynchronous, but once you open you need to finish it

GRADING

Your course grade will be calculated as follows:

- QUIZZES: 20%
- RESEARCH PAPER DISCUSSIONS: 20%
- ASSIGNMENTS: 30%
- EXAMS: 30%

IMPORTANT A grade of **IN** can only be given if two conditions apply: (1) You are unable to complete the course due to an unforeseen emergency **AND** (2) You are **passing** the course at the time you become unable to continue. Please do not ask for an incomplete unless both requirements are fulfilled. **The last day to drop with the grade of “W” this semester is Thursday, November 5th.**

REASONABLE ACCOMODATIONS (ADA)

It is my goal to create a learning experience that is as accessible to all students. If you anticipate any issues related to the format, materials, or requirements of this course, write to me to request an appointment so we can explore potential options. Students with disabilities should register with the Office of AccessABILITY to discuss official accommodations. Please visit their website (<http://www.hunter.cuny.edu/access/students/Register>) for contact and additional information.

COLLEGE NOTICE Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

Course Schedule Developmental Biology (BIOL306) FALL 2020

Synchronous Sessions on Blackboard Collaborate on Tuesdays and Fridays 11:10 to 12:25 PM

Part. 1. Principles of Development

Gilbert/Baresi 12th Ed

F 8/28	Introduction to Developmental Biology	Ch. 2
T 9/1	Genes & Development	Ch. 3
F 9/4	Differential Gene Expression I	Ch. 3

***Assignment 1.1-due 9/7**

T 9/8	Differential Gene Expression II	Ch. 3
F 9/11	Induction/Signaling Pathways I	Ch. 4
T 9/15	Induction/Signaling Pathways II	Ch. 4

***Assignment 1.2- due 9/21**

T 9/22 End of Part 1. Take Home Exam- Due by 11:59 PM

Part 2. Early Developmental Processes

F 9/25	Fertilization	Ch. 7
F 10/2	Model System: Drosophila	Ch. 9
T 10/6	Hox Genes	Ch. 9

***Assignment 2.1- due 10/9**

F 10/9	Comparative Early Development I	Ch. 11
T 10/13	Comparative Early Development II	Ch. 12
F 10/16	Primary Literature Paper Discussion	

***Assignment 2.2- due 10/19**

T 10/20 End of Part 2. Take Home Exam- Due by 11:59 PM

Part 3. Stem Cells and Organ Development

F 10/23	Stem Cells and Reprograming I	Ch. 5
T 10/27	Stem Cells and Reprograming II	Ch. 5
F 10/30	Mesoderm/Somites	Ch. 17

***Assignment 3.1-due 11/2**

T 11/3	Limb Development	Ch. 19
F 11/6	Solid Development	Ch. 18,20
T 11/10	Epidermal Development	Ch.16
F 11/13	Primary Literature Paper Discussion	

***Assignment 3.2-due 11/16**

T 11/17 End of Part 3. Take Home Exam- Due by 11:59 PM

Part 4. Development of the Neurogenic Ectoderm

F 11/20	Neural Induction	* REF
T 11/24	CNS Patterning	Ch. 13
W 11/25	Neurogenesis	Ch. 14

***Assignment 4.1-due 11/30**

T 12/1	Gliogenesis	Ch. 15
F 12/4	Neural Crest	Ch. 15
T 12/8	Primary Literature Paper Discussion	

***Assignment 4.2-due 12/14**

T 12/15 End of Part 4. Take Home Exam- Due by 11:59 PM