

BIOL390 — Development
Spring 2016

Course description: Development is the process by which multicellular organisms increase in complexity as they grow from single cell to adult. By considering classical embryology and recent advances in cellular and molecular biology, we will take up the most interesting questions of developmental biology, including how individual cells "know" where they are in the developing animal, similarities and differences in developmental processes, how an organism self-corrects developmental mistakes, and the role of development in evolution. Topics include fertilization, regulatory genetic cascades, cell-fate determination, emergence of complex organ systems, and handedness in organisms from slime molds to vertebrates. Prerequisites: BIOL112 and BIOL210

Course objectives:

By the end of the course, you should:

- Be familiar with the vocabulary of modern developmental biology and be confident in your own use of it.
- Be introduced to and experienced with many of the methods used by developmental biologists.
- Know the sequence of developmental events from fertilization through organogenesis in a variety of animal groups.
- Be familiar with our current understanding of the genetic mechanisms driving this sequence of events.

Required textbook: Essential Developmental Biology, 3rd. edition, by Jonathan Slack

Attendance: Strongly advised. This is a small class covering a lot of challenging material, so it will be very difficult to make up lost ground. Attendance and participation will also factor into your grade for the course.

Policy on electronic devices: It is important that you are in class mentally as well as physically. Laptops, tablets, and their ilk can be very valuable for searching out, organizing, and recording information, but can also be distracting to the user and to those around them. Cell phones must be turned off during lecture. If you feel it is vital to bring a laptop to take notes, you must: 1. Convince us it is necessary. 2. Take notes.

Reading assignments: The pages that are relevant to each lecture are indicated on the lecture syllabus. We expect you to scan the relevant pages BEFORE each lecture to get a feel for the material that will be covered. After class, read the sections covered in the lecture more carefully, and amplify your lecture notes in areas you don't understand. Key points to remember are summarized at the end of each chapter. Though not included in the reading assignments, we suggest that you take advantage of them. In order to clarify the terminology, there is a glossary at the end of the book. The textbook also provides access to a variety of online resources, including animations, self-tests with answers, useful weblinks, etc. These are located at the website for the text (Links to an external site.).

Presentations and paper: At the end of the semester, you will be required to give one 15-minute presentation on an article of your choice from the primary literature of developmental biology. Each student will also write a 5–10 page paper, due on the last day of class. The paper can be on the same topic as the presentation (or not), but should be a synthesis of information drawn from more than one article and should not focus on the same article as the presentation. We will discuss these requirements more later in the semester.

Grading: Your grade will be more or less evenly divided between the labs and the lectures. Your scores for all assignments and exams will be posted on Canvas, so you can see how you are doing at any time. There will be no extra credit options, so please focus your energy on what we are doing in class and lab.

3 exams (1-hour) — 100 points each

Final exam — 200 points

Presentation — 200 points

Paper — 200 points

Lab write-ups — 100 points each (approximately 10)

Attendance/participation — 25 points

This totals 1925 points.

There may be a few miscellaneous assignments over the course of the semester; if so, we will announce the specifics about them as they arise.

Policy on honesty: Students are expected to abide by the college policy on academic honesty.

Academic and disability support: The Academic Support Center houses Disability Support and Greyhound Tutoring. Students who wish to request accommodations in this class for a disability should visit the Academic Support Center, located in the lower level of Monocacy Hall, or call 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Tutoring: Greyhound Tutoring provides course-specific tutors to Moravian students, free of charge. If you would like to work with a Greyhound Tutor to boost your academic success, please request a tutor via this URL (Links to an external site.). Please email Dana Wilson (wilsond@moravian.edu), Tutor Coordinator, for more information about tutoring.

Course Meeting Schedule

<u>Date</u>	<u>Class session</u>	<u>Background reading</u>	<u>Discussion Leader</u>
Mon, January 18	1		Irish & Jones
Wed, January 20	2	Chapters 1 & 2	Irish
Fri, January 22	3	Chapter 3	Jones
Mon, January 25	4	Chapter 4	Irish
Wed, January 27	5	Chapter 5	Jones
Fri, January 29	6	research article TBA	Irish & Jones
Mon, February 1	7	exam 1	
Wed, February 3	8	Chapters 6 & 7, pp. 80–92	Irish
Fri, February 5	9	Chapter 7, pp. 92–104	Irish
Mon, February 8	10	Chapter 8	Jones
Wed, February 10	11	Chapter 9, pp. 121–129	Irish
Fri, February 12	12	Chapter 9, pp. 129–139	Irish
Mon, February 15	13	Chapter 10, pp. 140–154	Irish
Wed, February 17	14	Chapter 10, pp. 154–168	Irish
Fri, February 19	15	Chapter 11, pp. 171–180	Jones
Mon, February 22	16	Chapter 11, pp. 181–196	Jones
Wed, February 24	17	Chapters 12 & 13	Jones
Fri, February 26	18	exam 2	
Mon, February 29	19	Chapter 14, pp. 231–240	Irish
Wed, March 2	20	Chapter 14, pp. 240–249	Irish

Fri, March 4	21	Chapter 14, pp. 250–257	Irish
Mon, March 7	[Spring Break]		
Wed, March 9	[Spring Break]		
Fri, March 11	[Spring Break]		
Mon, March 14	22	Chapter 15, pp. 259–269	Jones
Wed, March 16	23	Chapter 15, pp. 269–283	Jones
Fri, March 18	24	Chapter 15, pp. 284–293	Jones
Mon, March 21	25	Chapter 16, pp. 296–303	Irish
Wed, March 23	26	Chapter 16, pp. 303–312	Irish
Fri, March 25	[Easter Break]		
Mon, March 28	27	Chapter 17	Jones
Wed, March 30	28	Chapter 18, pp. 333–347	Jones
Fri, April 1	29	exam 3	
Mon, April 4	30	Chapter 18, pp. 347–359	Jones
Wed, April 6	31	Chapter 19, pp. 362–371	Irish
Fri, April 8	32	Chapter 19, pp. 371–381	Irish
Mon, April 11	33	Chapter 20, pp. 384–390	Jones
Wed, April 13	34	Chapter 20, pp. 390–399	Jones
Fri, April 15	35	Chapter 21, pp. 401–410	Jones
Mon, April 18	36	Chapter 21, pp. 411–417	Jones
Wed, April 20	37	Chapter 22, pp. 419–428	Irish
Fri, April 22	38	Chapter 22, pp. 428–438	Irish
Mon, April 25	39	student presentations	
Wed, April 27	40	student presentations	
Fri, April 29	41	student presentations	

May 3, 3:00 pm

FINAL EXAM