

BIOL 309 – Developmental Biology

Lectures: Mondays and Thursdays from 1:00-2:20, Cunningham 146

Wet labs: 2:30-5:30, Cunningham 240

Dry labs: Tuesdays: ELL 162; Wednesday afternoon: ELL 160, Wednesday evening: ECS 128

Course coordinator: Bob Chow (250-472-5658), bobchow@uvic.ca

Office hours: Cunningham 259c, Thurs 3-4 or by appointment

Lab instructor: Sarah Ewing <ewings@uvic.ca>

Course description

This course examines animal development and will focus on cellular and molecular mechanisms that underlie developmental processes. A solid understanding of basic principles in molecular and cellular biology is required. Effort will be made to highlight relevance of developmental biology to our understanding of disease and lectures will incorporate recent discoveries from the primary literature. A major goal of this course is to help develop skills to: (i) evaluate the primary scientific literature, (ii) develop hypotheses based on pre-existing knowledge and (iii) design experiments to test hypotheses.

Reading material

- (i) Gilbert Developmental Biology, 11th edition (lectures draw from, but do not strictly follow text)
- (ii) reading material will also be drawn from the primary literature, review articles and other sources, which will be posted on Course Spaces.

Evaluation

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| (1) Lab | 40% |
| (2) Midterm exam | 30% |
| (3) Final exam | 30% |

Lab

The lab component is broken down into 2 sections: (i) a practical lab and (ii) a journal article review/“dry” lab (each worth 17% of final grade). There will be 5 practical labs and 4 journal article review/dry labs. Detailed information (including lab schedule) is posted in the **BIOL 309a Lab Manual**, which can be purchased from the UVic Bookstore.

Breakdown of the lab grade:

<u>Wet lab</u>	<u>17%</u>	<u>Dry lab (journal article review)</u>	<u>18%</u>
In class assignments	5%	Pre-lab quizzes	4%
Lab report	12%	Oral presentation	5%
		Paper/mini-proposal	9%

Wet and dry lab participation grade (5 %) - this grade will cover participation in dry lab (brainstorming questions, involvement in class discussion) and wet labs (i.e. complete all procedure steps, make an effort to visualize the specimens provided during the lab period and contribute to laboratory discussions).

Midterm and final exam

The midterm is compulsory and will be held on Thursday Feb 25. It will cover material up to Feb 14 (i.e. including Vertebrate early development). The final exam will be similar in format and length to the midterm exam, and will be held during the exam period. It will cover material starting from “Fly development” through to the end of the course.

Exams will test understanding of fundamentals, concepts and mechanisms underlying developmental systems as well as ability to develop hypotheses and to design experiments to test them. Format for both exams: mostly short answer. The exams will cover anything presented in the lectures.

Tentative lecture schedule:

Date	Topics	9 th Edition	10 th Edition	11 th Edition
Jan 7,10	Fertilization/early cleavage	121-156	117-151	218-247
Jan 14-24	Invertebrate early development	31-45,69-96,159-178,187-190,193-196	31-45, 69-96, 153-161, 170-173,217-239	11-19, 45-65, 95-139, 238-239, 251-254, 265-268, 311-332
Jan 28-Feb 14	Vertebrate early development	241-272,287-321,323-332	241-270, 286-318, 319-331	333-364, 380-411, 143-153, 167-179
Feb 18, 21	Reading break			
Mon Feb 25	Midterm exam			
Feb 28-Mar 7	Fly axis specification and patterning	203-239	179-213	277-309
Mar 11-18	Eye development	79-82,359-365	79-81, 359-367	108-111, 520-527
Mar 21, 25	Neural crest and neuronal development	373-409	375-414	413-437, 463-508
Mar 28	Vertebrate limb development	485-510	489-517	613-651
Apr 1	No lecture			
Apr 4	Germ cell determination	583-597	591-605	181-193

Molecular techniques discussed in the course: a good description of the following can be found on pages 85-91 in the 11th Edition of Developmental Biology (Gilbert)

- in situ hybridization
- chromatin immunoprecipitation/sequencing
- deep sequencing, RNA seq
- forward/reverse genetics
- Crispr/Cas9 gene editing
- Gal4/UAS system
- cre-lox system