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: Tuesday lab in ELL 162, both Wednesday labs in ELL 060
Course coordinator: Bob Chow (250-472-5658), bobchow@uvic.ca
Office hours: Cunningham 259c, Thurs 3-4
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
(ii) reading material will also be drawn from the primary literature, review articles and other sources, which will be posted on Course Spaces.

Evaluation

(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 Manua**l, which can be purchased from the UVic Bookstore.

Breakdown of the lab grade:

Wet lab	17%
In class assignments	5%
Lab report	12%

Dry lab (journal article review)	18%
Pre-lab quizzes	4%
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 22. It will cover material up to Feb 19 (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**	**9th Edition**	**10th Edition**	**11th Edition**
Jan 4-8	Fertilization/early cleavage	121-156	117-151	218-247
Jan 11-22	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 25-Feb 19	Vertebrate early development	241-272,287-321,323-332	241-270, 286-318, 319-331	333-364, 380-411, 143-153, 167-179
Feb 12, 15	Reading break			
Thurs Feb 22	**Midterm exam**			
Feb 26-Mar 5	Fly axis specification and patterning	203-239	179-213	277-309
Mar 8-15	Eye development	79-82,359-365	79-81, 359-367	108-111, 520-527
Mar 19, 22	Neural crest and neuronal development	373-409	375-414	413-437, 463-508
Mar 26	Vertebrate limb development	485-510	489-517	613-651
Mar 29	No lecture			
Apr 5	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