

LIFS 4090 DEVELOPMENTAL BIOLOGY
Fall 2018 Course Outline

Instructor: Prof. Yan YAN, Rm5511, 23585929, yany@ust.hk
Lecture Time: Tuesday 12:00-13:20, Thursday 12:00-13:20
Venue: TBC

General Course Description: This course introduces the processes and underlying mechanisms of animal development on molecular, cellular, tissue, and organ levels. In the first part of the course, we will discuss classic embryonic development topics such as fertilization, gastrulation and patterning formation as examples to highlight principles governing animal development. The second part of the course will focus on current research topics in organogenesis, stem cell self-renewal and differentiation, growth control, regeneration and aging.

Key Learning Outcomes of the Course:

At the end of the course, students should be able to:

1. Be familiar with common operational principles, key molecular players and modulating factors in developmental biology.
2. Have the ability to comprehend and evaluate current literature on a variety of developmental biology context.
3. Solve specific biological questions framed under a developmental platform by
 - Integrating the developmental principles in specific model systems
 - Designing experiment logically
4. Integrate their prior knowledge of genetics, cell, biochemistry and molecular biology to analyze processes and mechanisms guiding the making of a functional life form.
5. Communicate their theoretical interpretation of experimental data and findings effectively in oral presentation and writing.

Course Format: Two 1.5-hour sessions per week. These will include lectures, student presentations and discussion periods. Grades will be based on midterm exam (3 hours, 35%), presentation (15%), and final exam (3 hours, 50%).

Key Reference book:

S.F. Gilbert (2016) Developmental Biology, 11th edition. Earlier versions are also good.
Lewis Wolpert, Principles of Development, 5th edition. Earlier versions are also good.

Prerequisite: Senior UG students and Graduate students with sufficient background on Genetics, Cell, Biochemistry and Molecular Biology.

Course Calendar:

Week	Date	Topic
1	Sep 4, 6	Gametogenesis
2	Sep 11, 13	Early embryo development I: Cell division
3	Sep 18, 20	Early embryo development II: Pattern formation
4	Sep 27, Oct 2	Gastrulation I: Differentiation
5	Oct 4, 9	Gastrulation II: Morphogenesis
6	Oct 11, 16	Organogenesis I: Limb development
7	Oct 18, 23	Midterm review/exam
8	Oct 25, 30	Organogenesis II: Eye, Heart, Lung, and Organoid
9	Nov 1, 13	Organogenesis III: Neural development
10	Nov 15, 20	Stem cells and regeneration
11	Nov 22	Growth control
12	Nov 27	Aging
13	Nov 29	Final exam review