



## Course Syllabus: Concepts of Developmental Bio & Genetics - PS 201

<b>Division</b>	Biological and Environmental Sciences & Engineering Division
<b>Course Number</b>	PS 201
<b>Course Title</b>	Concepts of Developmental Bio & Genetics
<b>Academic Semester</b>	Spring
<b>Academic Year</b>	2018/2019
<b>Semester Start Date</b>	01/27/2019
<b>Semester End Date</b>	05/23/2019
<b>Class Schedule</b> (Days & Time)	10:30 AM - 12:00 PM   Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
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Teaching Assistant(s)	
Name	Email

Course Information	
<b>Comprehensive Course Description</b>	The basic concept of general growth and development will be introduced, treating how specific plant organs develop as the plant grows from an embryo to a flowering plant. How does the cell cycle and growth control contribute to plant development and how is cell cycle and growth controlled, how are cell walls and metabolism integrated into development. How do stresses impact on growth and development and what kind of molecular mechanisms underly these processes.
<b>Course Description from Program Guide</b>	The course provides a basic understanding of important developmental processes. It explains core developmental mechanisms, including pattern formation, cell determination, differentiation and specification of tissue types. The course will illustrate the mode of action of developmental control genes, in particular those encoding transcription factors, cell-cell communication molecules and signal transduction components. The course will cover different aspects and mechanisms in developmental biology and compares them between different model organisms. In addition to lectures, computer cases and literature presentations complementary to each topic will be implemented To provide "hands-on" insight into the topics of interest, recent sophisticated techniques for developmental analysis will be introduced and observations on real samples will be performed.
<b>Goals and Objectives</b>	Students will be able to describe basic concepts in growth and development and explain the genetics and molecular basis underlying growth, reproduction, development, nutrition, cell signaling and stress adaptation. Students will be able to develop critical thinking, analysis and evaluation skills in applying knowledge in the class to solve research questions.
<b>Required Knowledge</b>	Basic course knowledge in molecular, genetics and developmental biology at the BSc level is required.
<b>Reference Texts</b>	Textbook: - Principles of Development fourth edition by Lewis Wolpert and Cheryll Tickle. - Plant Development, Volume 91, 1st Edition, Authors: Marja Timmermans, eBook ISBN: 9780123809117 Hardcover ISBN: 978012380910 Scientific papers: reviews and research papers related to the themes course.

<b>Method of evaluation</b>	<b>20.00%</b> - Scientific review article presentation <b>10.00%</b> - Quiz(zes) <b>20.00%</b> - Oral presentation <b>20.00%</b> - Midterm exam <b>25.00%</b> - Final exam <b>5.00%</b> - Attendance and Participation
<b>Nature of the assignments</b>	A. Lectures B. Weekly paper presentation. C. Assigned reading D. case study
<b>Course Policies</b>	see above
<b>Additional Information</b>	

### Tentative Course Schedule

*(Time, topic/emphasis & resources)*

Week	Lectures	Topic
1	Mon 01/28/2019 Thu 01/31/2019	Stem cell niches (comparison between mammalian, <i>Drosophila</i> , <i>C. elegans</i> and <i>Arabidopsis</i> )
2	Mon 02/04/2019 Thu 02/07/2019	Morphogen gradients 1(insect development)
3	Mon 02/11/2019 Thu 02/14/2019	Computer study case
4	Mon 02/18/2019 Thu 02/21/2019	Morphogen gradients 2 (plant development)
5	Mon 02/25/2019 Thu 02/28/2019	Growth regulators: Signaling and development
6	Mon 03/04/2019 Thu 03/07/2019	Study case + literature presentations
7	Mon 03/11/2019 Thu 03/14/2019	Stem cells and meristem maintenance in the <i>Arabidopsis</i> shoot (CLV, WUS network in shoot)
8	Mon 03/18/2019 Thu 03/21/2019	Organ separation and leaf formation
9	Mon 03/25/2019 Thu 03/28/2019	<b>General discussion and Mid term exam</b>
10	Mon 04/01/2019 Thu 04/04/2019	Mechanisms regulating flower development
11	Mon 04/08/2019 Thu 04/11/2019	Regulatory networks
12	Mon 04/15/2019 Thu 04/18/2019	Literature presentation + computer case study
13	Mon 04/22/2019 Thu 04/25/2019	Technical advances in development I
14	Mon 04/29/2019 Thu 05/02/2019	Technical advances in development II
15	Mon 05/06/2019 Thu 05/09/2019	From fundamental science to application in diseases and improving plant growth and production
16	Mon 05/13/2019 Thu 05/16/2019	Mechanisms regulating plant growth and disease
17	Mon 05/20/2019 Thu 05/23/2019	Summarizing lecture, questions hour

#### Note

The instructor reserves the right to make changes to this syllabus as necessary.