

Biology 754: Plant Growth and Development – Fall 2009

Lectures TR 8:30 – 9:45 in Woodburn Hall 105

I. About the Instructor:

Dr. Carina Barth
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If you need to meet with me, please see me at the end of class or email me to make an appointment.

This syllabus is subject to change and meant as guidance for this course.

II. About the Course

A. Course Description:

This course will focus on developmental processes of plant growth from a structural and molecular perspective. A student completing this course should have an understanding of how environmental factors affect plant growth and development. This is a three hour credit course with two lectures per week. The course is to be taken by biology graduate students. Prerequisites: BIOL 350, organic chemistry, general physics, and consent.

B. Objectives:

- Develop an understanding of how scientists study plant growth and development.
- Learn how to think like a plant physiologist/plant molecular biologist.
- Relate the field of plant development to other biological disciplines.
- Develop critical thinking skills in evaluating/reviewing scientific papers describing recent advances in the field (Research Review Paper).
- Develop analytical skills to interpret microarray data using web-based databases to understand differential gene expression during various developmental processes (Microarray Assignment).

C. Textbooks:

Plant Physiology 4th Ed. (Taiz and Zeiger)

D. Course Requirements and Evaluation

Exams

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|--------------|---------|
| • Exam I | 100 pts |
| • Exam II | 100 pts |
| • Final Exam | 200 pts |

- Research Review Paper I on developmental aspects
(paper selection by Sept. 3, **for presentation on Oct. 15**) 50 pts
- Research Review Paper II on stress physiology aspects
(paper selection by Oct. 29, **for presentation on Dec. 1**) 50 pts
- Microarray Analysis I on developmental aspects (posted Oct. 8)
(**due Nov. 10**) 50 pts
- Microarray Analysis II on stress physiology aspects (posted Oct. 13)
(**due Dec. 10**) 50 pts

Total Possible Points = 600

Grades: A = 90%
 B = 80%
 C = 70%
 D = 60%

E. Policy on Make-Up Exams

In case of exceptional circumstances, contact me prior to exam if at all possible (voice mail or E-mail). Then, see me ASAP to reschedule the exam. If you fail to follow this policy, you will receive a grade of zero on the exam. Your Associate Dean should be able to document exceptional circumstances (examples: prolonged sickness or death of family member. Note that I do not consider leaving early for break an acceptable excuse for missing an exam.

F. Attendance, Lectures, Textbook

Although the lecture will more or less follow the textbook, lectures will also contain information not found in the suggested text readings so it is very important that you attend lecture. I have no formal attendance policy. However, if you miss class frequently, you will most likely struggle in this course. The textbook has a weblink (www.plantphys.net), which provides additional reading and study questions.

G. Lecture Notes

Lecture Notes and class assignments for this course will be posted on my webpage <http://www.as.wvu.edu/%7Ecbarth/teaching.htm>.

H. Evacuation Plan for Woodburn Hall 105

In the event of an emergency, leave the classroom in an orderly manner. Proceed down the hallway to exit the building through the center door or the two main doors located to the right and left. Once you have left the building, quickly move as far away as possible while avoiding parking lots. Do not congregate near the building or in parking lots.

I. Academic Dishonesty

Academic dishonesty will not be tolerated. As defined in section 3.1.1.3 of the Code of Student Rights and Responsibilities of Students (1987 revision), academic dishonesty includes plagiarism, cheating, and dishonest practices.

See <http://www.arc.wvu.edu/rightsa.html#Anchor-3.-33331>

Academic dishonesty will result in a zero being assigned to that component of the course (e.g., exam or course assignment).

J. Policy for Disabled Students and Social Justice Philosophy.

Please inform me if you need special assistance in this course, and make arrangements as necessary either with me or through Disability Services (293-6700). The first week of the semester is the best time for these discussions. All matters will be kept confidential.

West Virginia University is committed to social justice. I concur with West Virginia University's commitment and expect to maintain a positive learning environment based upon open communication, mutual respect and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

Biology 754: Tentative Lecture Schedule FALL 2009 Plant Growth and Development

DATE	DAY	LECTURE	TEXT READING	Lecture Material
<u>PART 1: Gene Expression, Cell Walls, Development of Plant Structures, Photoreceptors</u>				
Aug 25	T	General Introduction into the course Genome Size, Organization and Complexity Prokaryotic vs. Eukaryotic gene expression;		1
Aug 27	R	Cell Walls	Ch 15	2
Sept 1	T	Embryogenesis Meristems, Root and shoot development	Ch 16	3
Sept 3	R	Leaf development Flower development	Ch 16, 25	4
Sept 8	T	Phytochrome I: Properties, Localization, Induced Responses; Phytochrome II: Structure and Function, Modes of Action	Ch 17	5
Sept 10	R	Other Photoreceptors Signal Transduction	Ch 18	6
<u>PART 2: Phytohormones and Tropisms</u>				
Sept 15	T	Auxins I: Biosynthesis, Metabolism, Transport	Ch 19	7
Sept 17	R	Auxins II: Physiological Effects: Acid-induced growth, Phototropism, Gravitropism	Ch 19	8

Sept 22	T	Auxins III: Apical dominance, Lateral and adventitious root development, Fruit development, Vascular differentiation Discuss first reading assignment	Ch 19	9
Sept 24	R	IN-CLASS REVIEW for LM 1-9		
Sept 29	T	Exam I on LM 1-9		
Oct 1	R	Gibberellins and Cytokinins I	Ch 20, 21	10
Oct 6	T	Cytokinins II; Summary on Gibberellins and Cytokinins (Jeopardy)	Ch 21	11
Oct 8	R	Ethylene, Abscisic Acid	Ch 22, 23	12
Oct 13	T	Brassinosteroids, Jasmonic Acid, Salicylic acid, Oligosaccharines – Overview	Ch 24	13
Oct 15	R	Student Presentations of Research Review Paper I on Advances in Plant Growth and Development (10-15 min presentation)	Ch 21	
Oct 20	T	Introduction to Genomics and Microarrays; Introduction to genome databases In-Class Paper Microarray activity Microarray Analysis Assignment I		14
Oct 22	R	In-Class Review for Exam 2 on LM 10-14		
Oct 27	T	Exam 2 on LM 10-14		

PART 4: Control of Flowering

Oct 29	R	Circadian Rhythms; Photoperiodism	Ch 17, 25	15
Nov 3	T	Vernalization and Signaling involved in Flowering	Ch 25	16
Nov 5	R	Senescence, Programmed Cell Death		17

PART 6: Stress Physiology, Effect of various stresses on growth and development

Nov 10	T	Biotic stress by pathogens (plants vs. animals); Plant-Insect Interactions Microarray Assignment I due		18
Nov 12	R	Drought, Salinity, Osmotic Stress	Ch 26	19
Nov 17	T	Chilling, Freezing, Heat Stress	Ch 26	20
Nov 19	R	Oxygen Deficiency and Air Pollution	Ch 26	21
Nov 24	T	Thanksgiving Recess		
Nov 26	R	Thanksgiving Recess		
Dec 1	T	Student Presentations of Research Review Paper II on Stress Physiology (15-20 min presentation)		
Dec 3	R	Topic of choice or Plant Biotechnology, Genetic Engineering		22
Dec 8	T	Topic of choice		
Dec 10	R	In-Class Review for Final Exam on LM 15-22 Microarray Assignment II due		
Dec 14	M	FINAL EXAM: on LM 15-22		