

**PLANT MOLECULAR AND CELLULAR BIOLOGY**  
**FALL 2008 M, W, F – 3<sup>rd</sup> Period 9:35-10:25AM - PSF 0004**  
**PCB 5530 Section**  
**3 Credits**

**INSTRUCTORS**

**Fredy Altpeter**

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**John Davis**

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**Gary Peter, Course Coordinator**

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Off. Hrs TBA on an Individual Basis

**Prerequisites**

Undergraduate molecular and cellular biology or biochemistry

**COURSE LEARNING OBJECTIVES**

*Upon completion of this course, students will be able to:*

1. Explain current knowledge of fundamental molecular mechanisms that mediate plant growth, function, and adaptation
2. Explain experimental methods and strategies used to elucidate molecular mechanisms
3. Interpret and design experiments to elucidate molecular mechanisms controlling plant growth, function, and adaptation
4. Read and critically analyze primary literature in molecular biology and genomics

## OUTLINE

LEC	DATE	TOPIC	INSTR	HMWK/READINGS
		<b>DNA REPLICATION &amp; REPAIR</b>		
1	M 8/25	Course Overview & Introduction to Molecular and Cellular Analyses	Peter	
2	W 8/27	DNA replication I. Fidelity	Peter	
3	F 8/29	DNA replication II. DNA Repair	Peter	Ann. Rev. Biochem. 74: 283-315
	M 9/1	<b>NO CLASS- LABOR DAY</b>		<b>HMWK #1 Due</b>
4	W 9/3	DNA replication III. DNA Polymerases	Peter	
5	F 9/5	DNA replication IV. DNA Replication	Peter	
6	M 9/8	DNA replication V. DNA Replication	Peter	<b>HMWK #2 Due</b>
7	W 9/10	DNA replication VI. Origins/regulation	Peter	
8	F 9/12	Cell Cycle I. S	Peter	
9	M 9/15	Cell Cycle II. G <sub>0</sub> -G <sub>1</sub>	Peter	<b>HMWK #3 Due</b>
10	W 9/17	Cell Cycle III. Plant Cell Cycle	Peter	
11	F 9/19	Chromosome Structure, Chromatin, DNA Packaging, Nucleosomes	Peter	
12	M 9/22	Chromatin Dynamics		<b>HMWK #4 Due</b>
	<b>TBD</b>	<b>OUT OF CLASS EXAM</b>	<b>Peter</b>	
		<b>GENE EXPRESSION</b>		
13	W 9/24	Prokaryotic Transcription I	Altpeter	MCB- Chap 6, 299-309
14	F 9/26	Prokaryotic Transcription II	Altpeter	MCB- Chap 7, 395-400 Cell 98: 1-4
15	M 9/29	Transcription of the Eukaryotic Nuclear Genome	Altpeter	MCB- Chap 6, 309-313
16	W 10/1	Regulation of Transcription of the Eukaryotic Nuclear Genome	Altpeter	MCB- Chap 7, 400-408 Curr. Opin. Struc. Biol. 9: 48-55 Plant Phys. 118: 1111-1120 Cell 108: 475-487 Eur. J. Biochem. 262: 247-257
17	F 10/3	Processing of Transcripts of the Eukaryotic Nuclear Genome	Altpeter	MBC page 315-329 Curr. Opin. Plant Biol. 5: 452-459 Cell 108: 439-451 Genes and Dev. 14: 1415-1429
18	M 10/6	Eukaryotic Translation	Altpeter	MBC page 335-351 TIBS 28: 182-187 Curr. Opin. Plant Biol. 5: 460-465
19	W 10/8	Analysis of Protein-Protein and Protein-Nucleotide Interaction, Engineering Transcription Factors	Altpeter	Molecular and Cellular Biochemistry 172: 67-79 RNA 11:227-233. Methods in Enzymology 328: 333-358 J Mol Biol 354: 507-519. Nucleic Acids Res. 34(Web Server issue):W516-23
20	F 10/10	Transgene Expression in Plants I	Altpeter	Microbiol. Mol. Biol. Rev. 67: 16-37
21	M 10/13	Transgene Expression in Plants II	Altpeter	Trends Biotechn. 21: 20-28 Curr. Opin. Biotechn. 13: 136-141 Trends Plant Sci. 7: 84-91 Mol. Breeding 15: 305-327
22	W 10/15	Biology of Gene Silencing	Altpeter	Cell 108: 489-500 Science292: 2277-2280 Science 297: 2215-2218 Genes Dev. 17: 49-63

23	F 10/17	Gene Silencing II	Altpeter	<a href="http://www.nature.com/focus/rnai/animations/animation/animation.htm">http://www.nature.com/focus/rnai/animations/animation/animation.htm</a>
	<b>TBD</b>	<b>OUT OF CLASS EXAM</b>	<b>Altpeter</b>	
		<b>METABOLOMICS &amp; FLUX</b>		
24	M 10/20	Web Resources for Metabolism	Hanson	
25	W 10/22	Web Resources for Metabolism	Hanson	
	F 10/24	<b>NO CLASS- HOMECOMING</b>		
26	M 10/27	Phylogenomics & Metabolism	Hanson	
27	W 10/29	Phylogenomics & Metabolism	Hanson	
28	F 10/31	Phylogenomics & Metabolism	Hanson	
29	M 11/3	Metabolomics	Hanson	
30	W 11/5	MCA & Metabolic Engineering	Hanson	
31	F 11/7	MCA & Metabolic Engineering	Hanson	
32	M 11/10	MCA & Metabolic Engineering	Hanson	
	<b>TBD</b>	<b>OUT OF CLASS EXAM</b>	<b>Hanson</b>	
		<b>FUNCTIONAL GENOMICS</b>		
33	W 11/12	Web Resources for Functional Genomics	Davis	
34	F 11/14	Genome I. Assembly and Annotation	Davis	
35	M 11/17	Genome II. Structure and Evolution	Davis	
36	W 11/19	Genome III. Variation	Davis	
37	F 11/21	Transcriptome I. Promoters	Davis	
38	M 11/24	Transcriptome II. mRNA Profiling	Davis	
39	W 11/26	Transcriptome III. Networks	Davis	
	F 11/28	<b>NO CLASS - THANKSGIVING</b>		
40	M 12/1	Proteome Analysis	Davis	
41	W 12/3	Determining Function: Reverse Genetics	Davis	
42	F 12/5	Reverse Genetics paper discussion	Davis	
43	M 12/8	Determining Function: Forward Genetics	Davis	
44	W 12/10	Forward Genetics paper discussion	Davis	
	<b>TBD</b>	<b>OUT OF CLASS EXAM</b>	<b>Davis</b>	

## GRADING

The final grade will be determined by the performance on 4 sections each worth 100 points. The instructor of each module will communicate their breakdown of points between, participation, homework, and exams.

**Note:** EXAMS will be scheduled in the evenings outside of normal class hours or they will be take home exams.

## Additional Reading Materials

*Biochemistry and Molecular Biology of Plants*, (Buchanan, Grissem, Jones, ed. 2000)  
*Molecular Biology of the Cell* (Alberts et al., 4<sup>th</sup> Edition, 2002) **ISBN:** 0815332181  
*Molecular Biology of the Cell: A Problems Approach*  
*Genes IX* (Lewin, 2008)

*Methods in Enzymology Guide to Molecular Cloning Techniques* (Berger, Kimmel, ed. 1987)

Papers from the primary literature will be assigned

## PROFESSIONALISM STATEMENT

Scientists are professionals guided by specific values and behaviors. These values and behaviors include respect, cooperation, active participation, intellectual inquiry, timeliness, and attendance. In addition to your performance on the graded materials, you will be evaluated on your growth as a professional. Professional characteristics include punctuality, attendance, participation, collegial attitude, and willingness to help others learn. If you are ill or an emergency occurs, contact your instructor PRIOR TO the scheduled class time; otherwise your attendance and participation are firm expectations.

## COURSE WEBSITE

<http://sfrc.ifas.ufl.edu/class/PCB5530>

## CLASS POLICIES

**MAKEUP EXAMS-** Make-up exams or course work will be accepted only by special permission of the course instructors. Permission to make up work will be granted on a case by case basis and not all requests will be approved.

### **Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities**

In 1995 the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**

On all work submitted for credit by students at the university, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court.

*(Source: 2007-2008 Undergraduate Catalog)*

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

**ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES-** Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodations.

**UF COUNSELING SERVICES-** Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling

Student Mental Health, Student Health Care Center, 392-1171, personal counseling  
Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual assault counseling

Career Resource Center, Reitz Union, 291-1601, career development assistance and counseling