

**PLANT CELL AND DEVELOPMENTAL BIOLOGY**  
**PCB 6528, section 7354, 3 credits**  
**SPRING 2019**

**MEETING TIME and PLACE**

MWF, 3<sup>rd</sup> Period (9:25 - 10:15 a.m.), 2318 Fifield Hall

**INSTRUCTORS**

**Gilles J. Basset, Course Coordinator**

Horticultural Sciences Department  
1109 Fifield Hall

[gbasset@ufl.edu](mailto:gbasset@ufl.edu)

352-273-4808

Office hours TBA on an individual basis by appointment

**Harry Klee**

Horticultural Sciences Department  
Plant Cell & Mol Biol Lab

Building 885, Rm 5

[hjkleee@ufl.edu](mailto:hjkleee@ufl.edu)

352-392-8249

Office hours TBA on an individual basis by appointment

**Kevin Folta**

Horticultural Sciences Department  
1251 Fifield Hall

[kfolta@ufl.edu](mailto:kfolta@ufl.edu)

352-273-4812 or 352-273-4766

Office hours TBA on an individual basis by appointment

**A. Mark Settles**

Horticultural Sciences Department  
Plant Cell & Mol Biol Lab

Building 885, Rm 3

[settles@ufl.edu](mailto:settles@ufl.edu)

352-392-7571

Office hours TBA on an individual basis by appointment

**COURSE DESCRIPTION**

The main objective of this course is for students to obtain a basic knowledge of the organization, dynamics, and development of plant cells and organs. Students should additionally learn the experimental approaches commonly used in plant cellular and developmental biology research and critically evaluate literature that forms the basis for current knowledge in these fields.

This course has four modules that are classified as: cellular organization and evolution, organelle genomes and transcription, signal transduction, and plant development. Each module reintroduces student to the basic concepts of cell and organelle biology. Students are quickly propelled into analyzing primary literature as a source of scientific knowledge and taught how to read and critique papers, gather information from multiple sources independently, design experiments, and interpret data. Successful completion of PCB 6528 will establish a strong foundation for advanced specialty courses, will complement advanced courses in molecular biology, and will provide the tools necessary for a career in experimental sciences.

## LEARNING OBJECTIVES AND OUTCOMES

Students who successfully complete the reading and discussion of current research papers and lecture presentations in all four modules will be able to:

- Critically read in detail and evaluate experimental science in the covered topics and be able to explain the experiments to others.
- Find the required background material necessary to understand primary papers through web and reference database searches and textbook consultation.
- Interpret experimental data in these areas in the context of the scientific question.
- Design experiments to test hypotheses using the information and techniques presented to them in lectures and papers.

## PREREQUISITES

PCB 5065 Advanced Genetics and PCB 5530 Plant Molecular Cell Biology or equivalent

## CLASS AND EXAM SCHEDULE

Month	Date	Topic	Instructor
<b>Sections 1 and 2</b>			
January	M07	Cell organization and organelle origins [1]	Basset
	W09	Cell organization and organelle origins [2]/ Witnessing endosymbiosis	Basset
	F11	Witnessing intracellular gene transfer (mitochondria> nucleus) [1]	Basset
	M14	Witnessing intracellular gene transfer (plastids > nucleus) [2]	Basset
	W16	Structure and content of land plant plastomes	Basset
	F18	Observing plastids in living cells (micrographs and movies) [1]	Basset
	M21	Martin Luther King Holiday	Basset
	W23	<b>Homework 1 (Horizontal gene transfer of organelle genomes and transplastomics)/</b> Observing plastids in living cells (micrographs and movies) [2]	Basset
	F25	Structure and content of land plant chondromes/ organellar transcription	Basset
	M28	Observing mitochondria in living cells (micrographs and movies)	Basset
February	W30	Import machineries of organelles- Plastids and mitochondria	Basset
	F01	Retention of membrane proteins in the ER and the Golgi apparatus	Basset
	M04	<b>Homework 2 (Predictions of subcellular targeting)</b>	Basset
	W06	Import machineries of organelles- Peroxisomes and nucleus	Basset
	F08	Observing peroxisomes, ER, Golgi and nucleus in living cells (micrographs and movies) [1]	Basset
	M11	Observing peroxisomes, ER, Golgi and nuclei in living cells (micrographs and movies) [2]	Basset
	W13	<b>Homework 3 (Experimental designs for GFP-fusion strategies)</b>	Basset
	F15	Plasmodesmata	Basset
	M18	<b>Homework 4 (Project)</b>	Basset
	<b>Section 3</b>		
March	W20	Covalent Protein Tagging/Proteolysis	Klee
	F22	Introduction to hormones-what they are and how they work	Klee
	M25	Auxins	Klee
	W27	Discussion paper	Klee
	F01	Two-component regulators, ethylene and cytokinins	Klee
	M04-F08	Spring Break	
	M11	Strigolactones	Klee
	W13	SA, JA and pathogens	Klee
	F15	Discussion paper	Klee
	M18	Discussion paper	Klee

	W20	Phytochrome Signaling and Integration	Folta
	F22	Blue Light Signaling and Response/Circadian Clocks	Folta
	M25	Discussion paper	Folta
<b>TBA</b>	<b>TBA</b>	<b>Evening exam</b>	<b>Klee/Folta</b>
		<b>Section 4</b>	
	W27	Cytoskeleton	Settles
	F29	Cell Wall	Settles
April	M01	Cytokinesis	Settles
	W03	Discussion paper	Settles
	F05	Cell Development- Intercellular Signaling	Settles
	M08	Cell Development- Transcription Factors	Settles
	W10	Cell Development - Imprinting	Settles
	F12	Discussion paper	Settles
	M15	Organ Development - Polar Auxin Transport	Settles
	W17	Organ Development - Transcription Factors	Settles
	F19	Organ development - Epigenetic regulation	Settles
	M22	Student Presentations	Settles
	W24	Student Presentations	Settles

**Classes end on April 24**  
**Reading days April 25-26**  
**Final exams April 27-May 3**

### **READING**

There is no required textbook for this course. However, there will be a great quantity of required reading in the form of review and research articles from the primary literature. These will be provided in electronic format. Discussion papers will be provided one week prior to the scheduled discussion. Papers will be emailed to students or the references given, allowing students to download papers, which will be freely available to members of the UF faculty and student body through the library system. Students are queried for availability of computers and color printers and accommodations will be made to ensure that each student has access to high quality reproductions of class notes and research papers. Each section of the course will feature a discussion paper from the current literature. The following books may be useful for background reading on various topics.

1. Molecular Biology of the Cell, 4th edition. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. New York: Garland Science; 2002. This book is available in search mode on NCBI's Pubmed
2. Biochemistry and Molecular Biology of Plants, B. Buchanan, W.Gruissem & R. Jones, 2000, ASPP (ISBN 0-943088-39-9) Wiley and sons.

### **CLASS ATTENDANCE**

**Students are expected to attend all class sessions.** Attendance at sessions featuring a Discussion Paper is mandatory. Class attendance and participation are a major component of student's grades.

## CLASSROOM ETIQUETTE

You are expected to be courteous to your fellow students, be on time and turn off your cell phones. Your attendance at all classes is a firm expectation, but if you are ill or an emergency occurs, you are expected to contact your instructor prior to the scheduled class time.

## GRADING POLICY

The four sections of this course will be graded independently and non-cumulatively. The final grade will be determined by performance on 4 sections. In general, each will be worth 100 points, but this value will be normalized based on the number of class periods. For Sections 1/2 (Basset) and 4 (Settles), homework will be assigned and graded and will constitute 80% of the grade. Active participation in class discussions of research papers is an essential part of this course and will constitute 20% of the grade. For Sections 3 (Klee/Folta), a section exam will test student comprehension of the material and ability to apply it to novel situations and will constitute 80% of the grade. Instructors for each module will communicate their breakdown of points among participation in lecture discussions, paper discussions, homework, and exams.

The final grading scale is based on historical performance cut offs, as shown in the table below:

Letter Grade*	Grade Points**	Percentage
A	4.0	80-100
B+	3.33	70-79
B	3.0	60-69
C+	2.33	55-59
C	2.0	40-54
E	0	<39

\*Letter grades below C are not considered passing grades at the graduate level, therefore not included. Letter grades A- and B- do not reflect a statistically different performance at the graduate level and are not included.

\*\*Information on current UF general grades and grading policies can be found at <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> and at the Graduate Catalog at <http://gradcatalog.ufl.edu/content.php?catoid=2&navoid=762#grades>

## EXAMS

The course is divided into four sections. Sections 1/2 and 4 will be graded based on the continuous evaluation of homework. Sections 3 will have an exam following the completion of the section (see schedule). Exams are either closed book/notes or take-home (see schedule). If a student has another exam scheduled for the time of a PCB 6528 exam, or if a PCB 6528 exam falls on a religious holiday that a student traditionally observes, an alternate time will be arranged for that student's exam. Please notify the instructor of these conflicts in advance of the exam. Students who cannot take a scheduled exam due to illness or last minute emergencies should contact the instructor prior to the exam if at all possible. Arrangements will be made for a makeup exam in those cases.

## ACADEMIC HONESTY, SOFTWARE USE, CAMPUS HELPING RESOURCES, SERVICES FOR STUDENTS WITH DISABILITIES

### ACADEMIC HONESTY

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on

all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

## **SOFTWARE USE**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

## **Services for Students with Disabilities**

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. 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 accommodation.

- **Disability Resource Center, 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)**

## **CAMPUS HELPING RESOURCES**

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- **University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc](http://www.counseling.ufl.edu/cwc)**
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database
- **Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu](http://www.crc.ufl.edu)**