PLANT CELL AND DEVELOPMENTAL BIOLOGY
PCB 6528, section 7354, 3 credits
SPRING 2026

MEETING TIME and PLACE

MWF, 3rd Period (9:35 - 10:25 a.m.), 1304 Fifield Hall

https://ufl.zoom.us/j/98299739683
[please below see the sections '*classroom etiquette*' and '*physical presence requirement*' about attendance via Zoom]

INSTRUCTOR

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By appointment

COURSE DESCRIPTION

The main objective of this course is for students to obtain a fundamental understanding of the organization, dynamics, and development of plant cells and organs. Students will also learn the experimental approaches commonly used in plant cellular biology research and critically evaluate the literature that forms the basis for current knowledge in this field.

Students will analyze primary literature as a source of scientific knowledge and will learn how to read and critique papers, gather information from multiple sources, 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 and evaluate experimental science related to endosymbiosis, cellular evolution, cellular organization, and cellular dynamics, and development of plant cells and organs, and be able to explain the experiments to others.
- Find and utilize computational biology methods that graduate students can apply to their own research. This includes AI-generated predictions of subcellular targeting, co-expression analysis, gene network modeling, and phylogenomics inference methods.
- Find the required background material necessary to understand primary papers through web and database mining (*e.g.* KEGG, SUBA4, BRENDA) and textbook consultation.
- Design experiments to test hypotheses using the information and techniques presented to them in lectures and papers.

PREREQUISITES

None

CLASS SCHEDULE

Month	Date	Topic
January	M12	Introduction-The evolution of Life in geological context (1)
	W14	The evolution of Life in geological context (2)
	F16	Organelle origins- Primary endosymbiosys [1]
	M19	*Martin Luther King Jr. Day*
	W21	Primary endosymbiosis [2]- Origin of the eukaryotic cell
	F23	Plastid evolution throughout eukaryotic lineages (1)
	M26	Plastid evolution throughout eukaryotic lineages (2)
	W28	Secondary endosymbiosis in contemporary organisms
	F30	Intracellular gene transfer (mitochondria> nucleus) [1]
February	M02	Intracellular gene transfer (plastids > nucleus) [2]
	W04	Witnessing intracellular gene transfer (plastids > nucleus) [3]
	F06	Structure and content of plastomes
	M09	Structure and content of plant chondromes
	W11	Homework 1 (Horizontal gene transfer of organelle genomes and transplastomics)
	F13	Observing plastids in living cells (micrographs and movies) [1]
	M16	Observing plastids in living cells (micrographs and movies) [2]
	W18	Transcription in plastids and mitochondria
	F20	Plastid division
	M23	Protein import into plastids [1]
	W25	Protein import into plastids [2]
	F27	Protein import into mitochondria
March	M02	Retention of membrane proteins in the ER and the Golgi apparatus
	W04	Protein import into peroxisomes and the nucleus
	F06	Subcellular fractionation methods
	M09	Observing mitochondria in living cells (micrographs and movies) [1]
	W11	Observing mitochondria in living cells (micrographs and movies) [2]
	F13	Discussion paper (Cryptic targeting signals/Dual targeting)
		Spring Break (March 14 – March 21)
	M23	Homework 2 (Predictions of subcellular targeting)
	W25	Observing peroxisomes, ER, Golgi and nucleus in living cells (micrographs and movies) [1]
	F27	Observing peroxisomes, ER, Golgi and nuclei in living cells (micrographs and movies) [2]
	M30	Observing peroxisomes, ER, Golgi and nuclei in living cells (micrographs and movies) [3]
April	W01	Homework 3 (Experimental designs for GFP-fusion strategies)
	F03	Discussion paper (endomembrane system targeting)
	M06	Cytokinesis (micrographs and movies)
	W08	Discussion paper (Peroxisome purification and proteomics)
	F10	Plasmodesmata [1]
	M13	Plasmodesmata [2]
	W15	Discussion paper (protein targeting to plasmodesmata)
	F17	Discussion paper (protein targeting to secondary plastids)
	M20	Homework 4 (Plastoglobule targeting)
	W22	Discussion paper (cell-to-cell movement of mitochondria)

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. 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.

CLASSROOM ETIQUETTE
On-campus students are expected to attend all class sessions in person. Attendance via zoom is reserved for students located at extension centers or for emergencies (*e.g.* illness, traveling issues, caring for a family member, ...). Students who will be attending classes via zoom are expected to turn on their camera and to participate in lectures and paper discussions as if they were present in person.

Please 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
Homework will be assigned and graded and will constitute 80% of the grade. Active participation in lecture and paper discussions is an essential part of this course and will constitute 20% of the grade.

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
D+	1.33	<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 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
There will be no exam for PCB6528; this course will be graded based on the continuous evaluation of homework and participation.

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/**

PHYSICAL PRESENCE REQUIREMENT
Students have to attend homework corrections and article presentations in classroom (Fifield 1304) or, for students at Research and Education Centers, from their laboratory/offices.

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**
  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**

Disclaimer (UF Board of Governors regulation 8.003): Instructional materials for this course consist of only those materials specifically reviewed, selected, and assigned by the instructor. The instructor is only responsible for these instructional materials.