

Welcome to **BIOLOGY 458**

PLANT BIOCHEMISTRY AND BIOCHEMICAL ECOLOGY

Fall term 2015/2016

MR 10:00 - 11:20 CUN 146

INSTRUCTOR: Dr. Peter Constabel
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Cun 147a
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TEXTBOOK : none required. Optional textbook (Heldt, Plant Biochemistry, 3rd or 4th edition) will be on reserve at the library and should be consulted to reinforce lectures. Some material is covered by Taiz and Zeiger's Plant Physiology, also on reserve. **Readings from the primary literature will be assigned every other week (~6 in total)**. You will be asked to do very brief summaries of these readings, to be handed in and discussed in class.

COURSE OBJECTIVES:

To provide an introduction to plant chemicals, their role in the plant and ecosystem, and the biochemical basis of plant adaptation. Emphasis will be on plant-specific biochemical pathways and processes, and their regulation and molecular biology. Topics include: storage carbohydrates, cell wall biosynthesis, lipid metabolism, nitrogen fixation and assimilation; biochemistry and ecology of secondary plant metabolites such as isoprenoids, phenolics and alkaloids, and their roles in plant-animal and plant-environment interactions.

WEB-ACCESSIBLE / ADDITIONAL MATERIAL:

The outlines for each lecture will be available prior to the lecture at my lab home page (<http://web.uvic.ca/~cpc/>). **Please be aware that these are outlines, not detailed notes**, which are provided to help you organize the lecture material. **It is therefore imperative that you attend lectures**. Handouts will be provided for important figures during the lecture periods.

EVALUATION:	Mid-term examination (Oct 22, 2015)	20%
	Annotated Bibliography (for term paper)	5%
	Term Paper Final Draft	25%
	Assignments (brief questions on readings)	10%
	Final exam (cumulative): December 2015	40%
	Total	100%

Grading system: Percentages converted to letter grades

A+ 90-100	A 85-89.9	A- 80-84.9	
B+ 77-79	B 73-76	B- 70-72	
C+ 65-69	C 60-64	D 50-59	F 0-49.9

There will be no supplemental exam. Make-up final exams will only be considered if a Request for Academic Concession is provided. There will be no make-up midterm exams; if you miss a midterm, you must provide a documented medical reason.

<u>LECTURE TOPICS:</u>	<u>Text Readings (Heldt ed. 4th)*</u>	<u>Lecture Period #</u>	<u>Dates (approx)</u>
<u>Introductory lecture</u>			
• Importance of plant biochemistry & biochemical ecology		1	Sept 10
<u>Part A. Primary Metabolism (Carbon and Nitrogen)</u>			
• Intro to Enzymes; Tree Walk (weather permitting)		2	Sept 14
• Carbohydrates: starch, sucrose, fructans, & other sugars	pp 241-268	3-4	Sept 17, 21
• Structure and function of the cell wall	pp 4-9, 268-270	5-6	Sept 24, 28
• Fatty acid biosynthesis; plant oils & genetic engineering	pp 359-378, 385-387	7-8	Oct 1, 5
• Nitrogen assimilation	pp 273-288	9	Oct 8
Thanksgiving Monday - no lecture			Oct 12
• Nitrogen fixation amino acid synthesis	pp 307-318	10	Oct 15
• Shikimate pathway, aromatic amino acids, herbicides	pp 297-300	11	Oct 19
MIDTERM EXAM			Oct 22**
• Phenylpropanoid pathway & lignin biosynthesis	pp 431-440	13	Oct 26
<u>Part B. Secondary Metabolism & Chemical Ecology</u>			
• Phenolics: biosynthesis and ecological functions	pp. 399-402, 431-440	14	Oct 29
• Flavonoids and their diverse functions	pp 442- 449	15-16	Nov 2, 5
Term paper bibliographies due			Nov 5**
Fall Reading Break (Nov 9-11)			no lecture
• Isoprenoids I - Plant volatiles and signals	pp 409-424	17	Nov 12
• Isoprenoids II - carotenoids, toxins, rubber		18	Nov 16
• Alkaloids & medicinal plants I	pp 402-404	19-20	Nov 19, 23
• Glucosinolates and cyanogenic glycosides	pp 404-407	21	Nov 26
FINAL TERM PAPERS DUE			Nov 27**
• Plant-plant interactions		22	Nov 30
• Special Topics & Review		23	Dec 3

NB:* Heldt 3rd edition page numbers will be slightly different (these will be posted if needed)

** key dates.