PLB 427: Plant Biochemistry

Section 001, Fall 2015

INSTRUCTOR: Dr. Aldwin Anterola, Life Science II-429, 453-3222, anterola@siu.edu

MEETING TIME: Lecture TR 2−3:15 PM LSII-450 Lab meets on Thu 3:20−5 PM in LSII-457

OFFICE HOURS: TR 9-12 PM or by appointment **Teaching Assistant:** Laxmi Sagwan

TEXTBOOK: Gleason, Florence K. (2012) Plant Biochemistry. ISBN: 978-0-7637-6401-2

Boyer, Rodney (2012) Biochemistry Laboratory: Modern Theory and Techniques, 2nd ed. ISBN: 978-0-13-604302-7 (Recommended)

Web Resources: https://online.siu.edu; http://biology.jbpub.com/gleason/plantBiochemistry/

Description: Exploration of fundamental biochemical pathways in plants with an emphasis on carbon and nitrogen metabolism.

Prerequisites: PLB 320 or consent of instructor. **Lab Fee:** $35

COURSE OBJECTIVES:

1. To know the molecular components and features of biochemical pathways in plants
2. To be familiar with the structures, properties, and functions of plant metabolites
3. To appreciate how plants differ from other organisms at the biochemical level
4. To understand how biochemical knowledge is obtained by experimentation and insight
5. To perform literature searches and experiments in order to obtain biochemical information
6. To learn biochemical techniques and be able to apply them to solve a scientific problem

GRADING SCHEME:

3 Lecture Exams (100 points each)	300 Points	**900–999 pts.**	**=**	**A** **90%**
12 Lab Exercises (25 points each)	300 Points	**800–899 pts.**	**=**	**B** **80%**
Final Exam	200 Points	**700–799 pts.**	**=**	**C** **70%**
Oral Presentation	100 Points	**600–699 pts.**	**=**	**D** **60%**
Written Project Proposal	50 Points	**000–599 pts.**	**=**	**F**
Lab and lecture performance	50 Points			
Total	1000 Points			

COURSE POLICIES: This course will adhere to published SIU-C policies. Students are expected to take the course exams at the scheduled dates and times. The final exam covers both lecture and lab. A general make-up exam for a missed lecture exam will be provided on Dec. 10, 2015. Laboratory exercises may be done as a group, but worksheets will be completed individually. Missed exercises can be made up by designing your own experiments, executing them (if approved), and submitting a report or a worksheet. Students will be graded on lab and lecture performance based on overall attitude and conduct, including punctuality, class participation, following directions, cleanliness, compliance with safety rules, & technical competence.

The syllabus attachment can be found on this url:

http://pvcaa.siu.edu/_common/documents/syllabus%20attachments/syllabus-attachment-fall-2015.pdf

PLB 427 Class Schedule

Week	Date	Lecture Topics	Laboratory Experiments
1	Aug 25	0. Introduction to Plant Biochemistry	Introduction to the Laboratory
	Aug 27	1. Photosynthesis I: The Light Reaction	
2	Sep 1	2. Photosynthesis I: The Light Reaction	Measuring Photosynthetic Electron Transport
	Sep 3	3. Photosynthesis II: Carbon Dioxide Fixation	
3	Sep 8	4. Photosynthesis II: Carbon Dioxide Fixation	Determination of Protein Concentration
	Sep 10	5. Photosynthesis II: Carbon Dioxide Fixation	
4	Sep 15	6. Fixed Carbon: Structure of Carbohydrates	Determination of Enzyme Activity
	Sep 17	7. Fixed Carbon: Carbohydrate Metabolism	
5	Sep 22	**Lecture Exam #1**	Polyacrylamide Gel Electrophoresis
	Sep 24	8. Fixed Carbon: Catabolism of Glucose	
6	Sep 29	9. Primary Cell Walls	Partial Purification of Proteins
	Oct 1	10. Nitrogen Metabolism	
7	Oct 6	11. Sulfur Metabolism	Medicinal Plant Genomics
	Oct 8	12. Amino Acid Biosynthesis I	
8	*Oct 13*	*Fall Break*	RNA isolation
	Oct 15	13. Amino Acid Biosynthesis II	
9	Oct 20	14. Fatty Acid Structure and Biosynthesis	Gene Cloning (by PCR)
	Oct 22	15. Structure and Biosynthesis of Other Lipids	
10	Oct 27	**Lecture Exam #2**	Bacterial transformation
	Oct 29	16. Acetate Mevalonate Pathway	
11	Nov 3	17. Methyl-Erythritol Phosphate Pathway	Plasmid preparation and analysis
	Nov 5	18. Shikimic Acid Pathway	
12	Nov 10	19. Phenylpropanoid Pathway	Chromatography
	Nov 12	20. Polyketides	
13	Nov 17	21. Alkaloids from Tyrosine and Phenylalanine	Makeup for the lab: Identification and Characterization of Plant Enzymes in Dietary Supplements for Digestive Health
	Nov 19	22. Alkaloids from Tryptophan and Ornithine	
14	Nov 24	23. Alkaloids from Purines and Steroids	
	Nov 26	*Thanksgiving Break*	
15	Dec 1	24. Plant Peptides and Proteins	
	Dec 3	25. Cyanogenic Glucosides and Other Topics	
16	Dec 8	**Lecture Exam #3**	**Class Presentations**
	Dec 10	Makeup for missed exams	

CUMULATIVE FINAL EXAM: Tuesday, December 15, 2015, 2:45 PM to 4:45 PM