MMBB 486/586 (PISc 486/586): Plant Biochemistry

Spring 2013

Time: 3 credits, Tuesday and Thursday 11:00-12:15 AM
Place: Ag Sci Building 323

Instructor: Zonglie Hong
Office: AgBiotech Building 207
Phone: 885-5464
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Prerequisite: MMBB 300/380 (Introductory Biochemistry) or by permission

Textbook: ***Biochemistry and Molecular Biology of Plants***, B. Buchanan, W. Gruissen & R. Jones, 2000, ASPP (ISBN 0-943088-39-9).

Handouts: Available for download at https://bblearn.uidaho.edu/ (for registered students only).

Learning Outcomes:
This course covers basic and exciting aspects of plant biochemistry and molecular biology including carbon and nitrogen metabolism, secondary plant products, and signal transduction pathways. The course is designed for upper-level undergraduate students and graduate students who are interested in the biochemical nature of plants and in the frontiers of research in plant biochemistry and molecular biology. Through this course, students will learn biochemical reactions of major carbon and nitrogen compounds and signal transduction pathways of plants. Students will participate in discussion of current topics in plant biology research including food safety and biofuels. Emphasis will be placed on the relevance of plant biochemistry and molecular biology to molecular farming and the survival of humanity.

Grading: There will be three exams, each covering the material presented after the previous exam. For undergraduate students, final grading will be based solely on the total points from the three exams (each worth 30, 30 and 40 points, respectively). Graduate students will be required to submit a minireview paper on a research topic in plant biochemistry. Final grading for graduate students will be determined on the basis of the minireview paper (20% of the final grade) and the total points of the three exams (80%). On the scale of a possible total of 100 points, final course grades will be determined as follows:
A: > 90 B: 75-89 C: 50-74 F: < 49

Examinations: The examinations will test your knowledge and understanding of the materials covered in the course. All exams will be close-book! Therefore, you may not bring your text, handouts and notes to exams.

Minireview paper (applicable to graduate students only): The review should focus on a hot topic of research in plant biochemistry and molecular biology, and provide a critical-yet-balanced view of the topic so that it is accessible to researchers in other

areas. The review may include: 1) a brief introduction describing the nature and significance of the topic, 2) current status of knowledge and unsettled questions, and 3) future research directions. The length of the review should be in the range of 5-15 pages, excluding references cited. Students are strongly encouraged to discuss with the instructor before choosing a topic. The review is due on **Friday April 26, 2013**.

Assistance: The instructor will have office hours between 9:30 am -11:00 am every Tuesday and Thursday. Students are also encouraged to make an appointment to meet with the instructor.

Lecture Topics

1. Light absorption
2. Photosystems
3. The Calvin cycle
4. Photorespiration
5. Photosynthate transport
6. Polysaccharides
7. Cell wall structure
8. Biofuels

(Exam 1)

9. Nitrogen fixation
10. Nodule formation
11. Nitrogen assimilation
12. Aminotransferases
13. Aromatic amino acids
14. Aspartate-derived amino acids
15. Proline and osmoprotection
16. Sulfate assimilation

(Exam 2)

17. Food safety
18. Acrylamide in food
19. Signal perception in plant cells
20. Signal transduction pathways
21. Calcium and protein kinases
22. Ubiquitination and sumoylation
23. Stem cells and floral meristem
24. Floral organ determination
25. Gametogenesis
26. Embryogenesis

(Exam 3; Friday May 10, 2013, 10:00 – 12:00, Ag Sci 323)