BOT 480/580
PHOTOSYNTHESIS AND PHOTOBIOLOGY
CREDITS: 3
TERM: Spring
INSTRUCTOR: Michael Behrenfeld
CONTACT INFORMATION: behrenfm@science.oregonstate.edu

Lecture: .T.Th., 14:00 - 15:20

REQUIRED TEXT:
No textbook required. Reading will be based on primary literature

COURSE DESCRIPTION: This course is focused on providing an in-depth understanding of photosynthesis and a broader exploration of the diverse use of light in biological systems. Core lectures begin from a basic discussion of the nature of light and then build up through characteristics of the light environment for plants, how they absorb and use light energy for photosynthesis and production, how plants adapt and acclimate to different light environments, and how photosynthesis varies from the leaf, to whole plant, to ecosystem, to global level. During each class, a short 'side lecture' is also given on recent 'hot topics' in photosynthesis and photobiology, including topics such as plant communication, defense, and motility, as well as deleterious effects of light and its use for global monitoring satellite systems.

COURSE PREREQUISITES: One course in plant biology or physiology or the equivalent or by permission of instructor

LEARNING RESOURCES:

BOT480/580 has no textbook requirement. Reading will be based on primary literature and selected material from:

Photobiology: The science of life and light. L.O. Bjorn [ed.] Springer Publishing, © 2008.

Photobiology of higher plants. M. S. McDonald, Wiley Publishing, © 2003.

Biochemistry and molecular biology of plants. B.B. Buchanan, W. Gruissem, R.L. Jones [eds.] American Society of Plant Physiologists, Rockville, MD. © 2000.

Chlorophyll a fluorescence: A signature of photosynthesis. G.C. Papageorgiou, Govnidjee [eds.] Advances in Photosynthesis and Respiration, Vol. 19. Springer Publishing, © 2004

Light and photosynthesis in aquatic ecoystems. J.T.O. Kirk. Cambridge Univ. Press © 1994

Additional materials will be made available through Blackboard.

STUDENT LEARNING OUTCOMES:

(1) Undergraduate students will learn to identify and interpret light uses in biological systems. Graduate students will also learn to quantify light absorption and primary production and apply these skills to natural photosynthetic systems

(2) Undergraduate students will learn to trace linear- and alternative photosynthetic pathways from initial steps of light absorption and energy transfer, through electron transport, ATP formation, and carbon fixation, and finally through cell metabolism. Graduate students will also learn to quantify the partitioning of light energy to different pathways and calculate pathway quantum yields

(3) All students will learn to appreciate and understand measures of photobiological precess in natural systems and methodologies used for these measures

(4) All students will learn to identify and discuss light damage and protection in biological systems

(5) All students will learn to explain and distinguish light regulation in biological clock and metabolic processes

(6) All students will learn to appreciate and contrast biological uses of light for vision, communication, reproduction and defense

(7) Undergraduate students will learn to describe light energy and solar flux in ecosystems. Graduate students will learn to quantify light energy and solar fluxes and interconvert units of light energy used under experimental conditions.

COMMUNICATION

Lectures will be conducted with an open format so that students will be able it interact and have discussions on the material being covered. Additionally peer-reviewed articles and sections of chapters may be distributed via blackboard.

LECTURES AND READING ASSIGNMENTS

Lectures will be performed using power point presentations and students will have access to lecture material via blackboard. Reading assignments will be listed on the syllabus and it will be expected that any assignments are completed prior to lecture.

EVALUATION OF STUDENT PERFORMANCE:

The Course grade for will be based on weekly quizzes. All students will be responsible for answering 2 – 3 general questions regarding material covered during recent lectures and graduate students will be required to answer an addition 1 – 2 more detailed questions from the same lectures. At the end of the class, each student is allowed to omit their two lowest scores (including missed quizzes). The Course grade will be based on scores for all other quizzes following: A, 94-100%; A-, 90-93%; B+, 87-89%; B, 84-86%; B-, 80-83%; C+, 77-79%; C, 74-76%, C-, 70-73%; D+, 67-69%; D, 64-66%; D-, 60-63%; F, <60%.

STATEMENT REGARDING STUDENTS WITH DISABILITIES:

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting Dr. Behrenfeld prior to or during the first week of the term to discuss

accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

EXPECTATIONS FOR STUDENT CONDUCT

Student conduct is governed by the university's policies, as explained in the Office of Student Conduct: information and regulations.

ACADEMIC DISHONESTY POLICY

Students are expected to conduct themselves in a professional manner. Academic dishonesty such as plagiarism and cheating will not be tolerated. Therefore, students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

* cheating- use or attempted use of unauthorized materials, information or study aids,
* fabrication- falsification or invention of any information,
* assisting- helping another commit an act of academic dishonesty,
* tampering- altering or interfering with evaluation instruments and documents, or
* plagiarism- representing the words or ideas of another person as one's own.

For more information about academic integrity and the University's policies and procedures in this area, please refer to the Student Conduct web site at: http://www.orst.edu/admin/stucon/achon.htm and the section on Academic Regulations in the OSU Schedule of Classes.

OSU STUDENT EVALUATION OF TEACHING

Course evaluation results are extremely important and are used to help me improve this course and the learning experience of future students. Results from the university generated questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The results on the form are anonymous and are not tabulated until after grades are posted.