

CROP PHYSIOLOGY: CSES 5013

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Catalog Description:

CSES 5013 Crop Physiology (1) (odd numbered years). Understanding and qualitative measurement of physiological processes, plant responses, and environmental parameters, in relation to the production of major crops.

Prerequisites for the Course:

According to the university graduate school catalog: BOTY 4304 or equivalent. If you have any questions about the prerequisites, come and discuss it. A knowledge of botany, plant physiology, crop science, and soil science will help. Students will be expected to have reviewed their undergraduate plant physiology notes. For review purposes, sets of slides with narrative tapes will be made available covering photosynthesis, carbohydrates, lipids, etc.

Definition of Crop Physiology:

Crop physiology is the study of the ways in which plant physiological processes are integrated to cause whole plant responses in communities. The subject matter involves a number of major disciplines (botany, chemistry, physics, etc.) and is also related to Crop Science, Crop Ecology, Ecophysiology, Environmental Plant Physiology, and Stress Physiology, but each of these terms can imply different things to different people.

Objectives and Scope of the Course:

Taught on a conceptual basis, rather than on a traditional crop basis, but there will be some focus on selected crops at the end of the course. Emphasis will be placed on the understanding and qualitative measurement of physiological processes (photosynthesis, respiration, photorespiration); plant responses (leaf area, partitioning of dry mass, root length, and surface area, water status, and transpiration); and environmental parameters (radiation, moisture, carbon dioxide, wind, temperature). The integration of these measurements into models would help to better understand and predict crop growth and yield. Intensively cultivated systems (important to Arkansas) that have been widely studied will be used as examples with some special attention given to each at the end of the course. Examples will be drawn mostly from agronomic crops, but the basic concepts and approaches will be applicable to all types of cultivated plants, from petunias to potatoes to plums, grown in a wide range of cultural systems, from greenhouses to the field.

How the Course will be Taught:

Mainly by lectures with the aid of PowerPoint presentations or overhead transparencies. Reference will also be made to the recommended textbook and selected handouts will be given to clarify or summarize. Supplementary reading will be required from books and photocopies reserved in the library. The course will be taught on a conceptual basis rather than a crop basis.

Examinations and Grading:

There will be three, one-hour examinations during the semester and a final comprehensive examination. Exams will be 50% short answers and 50% short paragraph answers. Sample examinations will be made available with the reserved books in the library. **Final exam will be Saturday December 13, 2003** in the same room as the lectures from 7.30 a.m. to 9.30 a.m. *Lack of academic integrity (cheating) will not be tolerated.*

Method of Establishing a Grade:

45-minute examination (end September)	= 100 marks (20%)
45-minute examination (end October)	= 100 marks (20%)
45-minute examination (end November)	= 100 marks (20%)
Practical assignments (x10)	= 100 marks (20%)
Final comprehensive exam	= 100 marks (20%)
Total marks:	= 500 marks (100%)

Grades: **A** = 90-100%, **B** = 80-89%, **C** = 70-79%, **D** = 60-69%, **F** = <60%.

Office Hours:

Weekdays from 8 a.m. to 5 p.m. I will be available to help with any problems you may have with the course, or to discuss your thesis or dissertation if you think I can help.

Equipment, Demonstrations and Practical Aspects:

There is no laboratory section accompanying this course. However, a course entitled "*Research Techniques in Agronomy*" CSES 5214 is now offered in alternate Fall semesters. For those interested, this course will provide the necessary techniques and skills needed to adequately tackle the more important laboratory and field measurements used in plant and crop physiology.

Guest Lectures:

Guest lecturers will be used where appropriate to broaden the scope of the course by introducing the students to horticultural physiology and pasture physiology, and to show the students that crop physiology principles still apply with other plant types. Biotechnology in relation to crop physiology will also be covered.

Practical Problem Solving Questions:

A series of ten "Practical Homework Assignments" will be given during the semester. Each assignment will consist of 1 to 4 short questions designed to apply what we have learned in class to practical "real life" situations experienced in agricultural systems. These are intended to make students think and solve practical problems using their knowledge of crop physiology. The ten homework assignments are worth 20% of the final grade.

Reference Texts:

The required textbook for the course is "**Physiology of Crop Plants**" by Gardner, Pearce and Mitchell new edition 1994 (published by Iowa State Press, cost \pm \$35). This book provides good coverage of most materials that will be covered in Crop Physiology CSES 5013. It is, however, not sufficiently detailed and does not cover all the necessary topics for CSES 5013. A compendium of selected chapters and papers from recently published books and journals will be used to supplement short falls in the required textbook, e.g. the crop microclimate and stress physiology. Recommended readings will also be indicated from books held in reserve in the library. Students will be encouraged to read the latest publications in crop physiology journals.

Footnote:

If you need an accommodation due to a disability, please make arrangements to discuss this with me prior to the beginning of the semester.

DMO/8-15-2003