Plant Nutrition

Plant Science 537
Spring 2021

I. COURSE DESCRIPTION:

- PS 537 is a 3 credit hour course
- Lecture and Discussion periods are from 2:50 to 4:05 pm, Tuesday and Thursday. The class is online synchronous on Zoom and all class materials (including reports, quizzes and exams) will be on Canvas.

This course will focus on the macro- and micronutrient elements and their function in the growth and development of plants. Emphasis will be placed on the uptake and transport of mineral elements from the soil into and throughout the plant, the role of single elements, interactions/balances between elements, physiology/biochemistry of uptake and transport of elements in plants, and nutrient deficiency/toxicity symptoms as they affect the physiology of the whole plant.

II. COURSE STUDENT LEARNING OBJECTIVES:

- identify deficiency and toxicity symptomology of essential plant nutrients
- evaluate, solve, and recommend corrective procedures for plant growth and production problems (through the extensive use of case studies)
- solve complex fertilizer problems (mM and ppm) in order to design complete fertilizer solutions as a part of experimental protocol
-relate nutrient movement within soils and soilless mixes to uptake and transport in plants
-understand the biochemical and physiological pathways affected by the presence, absence and excess of mineral elements
- acquaint student with sources of information for future reference (i.e. Refereed Journals, books, web sites, bulletins, government agencies, extension specialist, etc...).

III. CLASS FORMAT:

There will be two lecture/discussion sessions each week (75 min). Sessions will often include discussion/questions/answer periods. It is strongly suggested that you review and print out the Powerpoint presentations before the lecture and bring them to lecture to use as an aid to taking notes on the discussions.

This is an interactive discussion-format class and students should read assignments before class and be prepared to participate.

III. INSTRUCTOR:

Instructor: Dr. Carl Sams

Office: 257 Plant Biotechnology Building
Phone: 974-8818, E-mail: carlsams@utk.edu.
Contact Hours: One hour following each class.
Individual sessions available by appointment as requested.

IV. GRADES:

A. Points:

Source	Points
Exam 1	250 (Will drop the lowest score of the 3 exams.)
Exam 2	250
Exam 3	250
Final Exam	400 (The final will cover all course material.)
Report/Presentation	100 (Individual Report on a Nutritional Problem)
Total	1000

B. Grading Scale:

Grade	Points
A	900-1000
B+	850-899
B	800-849
C+	750-799
C	700-749
D	600-699
F	<600

Reports/Presentation:

Each student will complete a project report on a topic in Plant Nutrition. All work is to be done independently from others in the class.
If reports are late, then the grade will be lowered by a letter grade per day late.
REPORTS ARE LATE AFTER 5:00 pm on Wednesday, APRIL 28.

Exams:

Read ALL assignments (material will be on exams).

Exams will be a mix of discussion, short answer, problems, and multiple choice. All exams are comprehensive in the sense that you are expected to be able to use material from early in the semester to understand and explain later material. If you must miss an exam for any reason, discuss the absence with me **BEFORE** the exam if at all possible. I will drop one exam. If you miss 2 of the first three exams, and have a Dr's excuse you may take a makeup exam.

NOTE:
The MAKEUP EXAM WILL BE HELD Friday APRIL 16 at 5:00 PM.

The make-up will be MORE DIFFICULT than either scheduled exam and will cover material from all exams. The final will be comprehensive, covering material from the entire semester.

V. Disabilities:

If you need course adaptations or accommodations because of a documented disability or if you have emergency information to share, please contact the Office of Disability Services at 191 Hoskins Library at 423.974.6087. This will ensure that you are properly registered for services.

VI. Academic Integrity:

Scholastic dishonesty will not be tolerated. Forms of scholastic dishonesty include, but are not limited to: plagiarism (be careful on your papers), utilization of unauthorized materials during academic evaluations, and giving or receiving unauthorized assistance during evaluations. The first offense will result in a grade of 0 for that particular assignment. A second offense will result in disciplinary action at the College/University level.

VII. TEXT BOOKS:

None required.

Suggested supplemental texts: (Will be supplied as PDF files or placed on reserve in Agric. Library as needed).

VIII. Class Rules:

Turn of cell phones, etc. during online presentations. Outlines of notes will be posted on Canvas and students are expected to use these outlines and take notes in class. Questions and discussion are encouraged. We will schedule five minutes every 20 -30 minutes for open discussions of class material. Questions are also welcome at any other time during class. Be polite and avoid non-class related conversations during class.

Lec # Date Plant Science 537 Plant Nutrition

1 Th	Jan. 21	Introduction, Background, Interest Survey, History	Sams/Hammock
2 T	Jan. 26	History and Background on Plant Nutrition	Sams
3 Th	Jan. 28	History cont./Terminology and General Review	Sams
4 T	Feb. 02	Terminology and General Review Soils chemical and physical properties/ Essential Nutrients: Nitrogen	Sams
5 Th	Feb. 04	Review of Essential Nutrients:Nitrogen/Phosphorus	Sams
6 T	Feb. 09	Phosphorus/Potassium/Calcium/Magnesium/Sulfur	Sams
7 Th	Feb. 11	Review of Micronutrients	
8 T	Feb. 16	Micronutrients Review (cont).	Sams
Th	**Feb. 18**	**Exam 1**	Sams/Hammock
9 T	Feb. 23	Nutrient Uptake and Transport	Sams
10 Th	Feb. 25	Nutrient Uptake and Transport	Sams
11 T	Mar.02	Nutrient Uptake and Transport	Sams
12 Th	Mar.04	Nutrient Uptake and Transport	Sams
13 T	Mar.09	Nutrient Uptake and Transport	Sams
14 Th	Mar.11	Nutrient Uptake and Transport	Sams
15 T	Mar.16	Nutrient Uptake/Chelates/Slow Release Fertilizers	Sams
Th	**Mar.18**	**Exam 2**	Sams/Hammock
16 T	Mar.23	Chelates/Slow Release/Foliar Fertilization	Hammock
17 Th	Mar.25	Soil Analysis/Plant Analysis	Sams
18 T	Mar.30	Water Analysis/Visual Diagnosis	Sams
19 Th	Apr.01	Visual Diagnosis/ Case Studies	Sams
20 T	Apr.06	Case Studies	Sams
21 Th	Apr.08	Case Studies	Sams
22 T	Apr.13	Case Studies	Sams
Th	**Apr.15**	**Exam 3**	Sams
23 T	Apr.20	Student Presentations:	Students
24 Th	Apr.22	Student Presentations:	Students
25 T	Apr.27	Student Presentations:	Students
	Apr.28	**Last Day of Classes**	
	Apr.29	**Study Day**	
	Apr.30	**Final Exam Period Starts**	
Final PS 537	**May 6**	**Final Exam: 3:30-6:00 pm, Thursday May 6.**	Sams/Hammock