



AGS 51 - Fertilizers and Plant Nutrition

Catalog Description

Transfer Status: CSU

Unit(s): 3.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

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Course Description: This course examines the composition, value, selection, and application of fertilizer materials and soil amendments, including natural organic and synthetic amendments, in relation to soil, plant, and fertilizer interactions. Emphasis is placed on current application practices utilized in California agriculture.

Objectives

Upon successful completion of this course, the student should be able to:

1. Name the effect of major nutrients on plant growth, development, and disease resistance.
2. Identify the basic fertilizer requirements of major crops grown in the area.
3. Explain the importance of fertilizers in agricultural production.
4. List the different methods of applying fertilizers including the advantages and disadvantages of each method.
5. Explain the effect on pH that fertilizers have regarding crops, soil and fertilizer interactions.
6. Analyze the role of natural and organic fertilizers within ecological systems, including their impact on soil health, nutrient cycling, and environmental sustainability.

Course Content

Topic Titles / Suggested Time Topic	
	<u>Lecture</u>
<u>Topics</u>	<u>Lec Hrs</u>
Essential plant growth elements and soil relationships	8.00
The fertilizer industry	3.00
Nitrogen, Phosphorus, Potassium (N-P-K)	10.00
Secondary elements	6.00
Methods of application	5.00
Fertilizer-pesticide combinations	2.00
Economics of fertilizer usage	4.00
pH effect on nutrients and pH control	5.00
Farm wastes	3.00
Trace elements	3.00
Nutrient budgets and regulatory compliance	2.00
Total Hours: 51.00	

Methods of Instruction

- A. Guest Speakers
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Lecture
- D. Problem-Solving Sessions
- E. Reading Assignments
- F. Agriculture Science

Methods of Evaluation

- A. Quizzes
- B. Oral Presentation
- C. Homework
- D. Mid-term and final examinations
- E. Essays and research papers

Examples of Assignments

Reading Assignments

1. Read through the information provided by the instructor on essential plant nutrients. Be prepared to identify deficiency symptoms, causes, and treatments.
2. Read the chapter on your text on information on soil pH and implications for macro and micro nutrient interactions. Be prepared to compare and contrast low and high pH soils.

Writing Assignments

1. Select an essential plant nutrient and indicate 1) mode of action in the plant, 2) fertilizer sources, 3) methods of application. Summarize in 3-4 page plan and accompanying PowerPoint.
2. Select from the following low productivity soils: Saline, Sodic, Alkaline, Acidic. And develop a 3-4 page plan that identifies methods of remediation.

Out-of-Class Assignments

1. Visit a wholesale fertilizer distributor. Prepare a 2-page written analysis of the products and services they provide. Alternative options to complete this assignment will be identified in the instructions.
2. Locate at least three plants that exhibit signs of nutrient deficiency symptoms and take digital photographs of each. Be prepared to present your photographs to the class in a PowerPoint presentation.

Recommended Materials of Instruction

IPNI. (2019). Soil Fertility Manual. *International Plant Nutrition Institute, 2019 update*. 9781734386004.

Havlin, J., et al. (2021). Soil Fertility and Fertilizers. *Pearson, 8th*. 9780135033739.

Zero Cost Textbook

Magdoff, F. & van Es, H. Building Soils for Better Crops - Ecological Management for Healthy Soils 4e. (OER).

[https://geo.libretexts.org/Bookshelves/Soil_Science/Building_Soils_for_Better_Crops_-_Ecological_Management_for_Healthy_Soils_4e_\(Magdoff_and_van_Es\)](https://geo.libretexts.org/Bookshelves/Soil_Science/Building_Soils_for_Better_Crops_-_Ecological_Management_for_Healthy_Soils_4e_(Magdoff_and_van_Es))

Minimum Qualifications

Ag Business And Related Serv.

Agricultural Production

Agriculture (Masters Required)

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Date: 12/01/2025