

COURSE OUTLINE

SOIL TECHNOLOGY

Course Title

AG122

Dept. & Course No.

I. COURSE DESCRIPTION

This course covers identification, preparation and fertilization of soils, amendments, potting media, sterilization, mulching, and composting methods. It also includes soil testing, microbiology, and soil moisture.

II. SEMESTER CREDITS: 4

III. CONTACT HOURS PER WEEK:

3
Lecture

3
Lab

6
Total

IV. PRE-REQUISITE: AG111

V. STUDENT LEARNING OUTCOMES:

Upon completion of this course, the student will be able, with **65%** accuracy, to:

VI. COURSE CONTENT

1. Discuss the importance of soil.

- ### A. Life-supporting Layer of Material

2. Describe atoll soil.

- ### B. Medium for Plant Growth

- ### C. Overview of atoll soils

- #### D. Types of atoll soils

1. Unaltered sand and gravel
2. Stony and very stony complex
3. Shioya series
4. Arno atoll series
5. Jemo series
6. Miscellaneous soil types

3. Name and describe the different classification of parent materials and factors responsible in soil formation.

- ## E. Parent Materials and Soil Formation

1. Classification of Parent Materials
2. Physical and Chemical Weathering
3. Soil Forming Factors
 - a. Climate
 - b. Biological Activity
 - c. Relief
 - d. Time
4. Soil profile

4. Identify the different physical properties of soil.

- ## F. Physical Properties of Soil

1. Texture
2. Structure
3. Color
4. Consistency

5. Identify the chemical properties of soil
 6. Identify the biological properties of soil
 7. Explain water movements in the soil.
 8. Discuss the factors that influence Soil Fertility.
 9. Identify the primary, secondary plant nutrients and micronutrients and apply to growing crops.
 10. Demonstrate efficiency in preserving and improving soil fertility.
 11. Demonstrate efficiency in composting using the proper materials.
 12. Prepare ideal soil mixes using organic amendments.
 13. Identify and use the different mulching materials.
- G. Chemical Properties of Soil
 1. pH
 2. Cation Exchange Capacity
 3. Minerals
 - H. Biological Properties of Soil
 1. Bacteria
 2. Fungi
 3. Earthworms
 4. Pathogens
 5. Insects and others
 - G. Soil Water
 1. Water retention forces
 2. Classification of moisture
 3. Water flow in soil
 4. Water uptake by plants
 5. Consumptive Use and water-use efficiency
 - H. Factors that influence soil fertility
 1. Plant essential nutrients
 2. Sources of plant nutrients
 3. Soil minerals
 4. Soil colloids
 5. Soil microorganisms
 6. Cation exchange capacity
 7. Nutrient uptake
 - I. Soil fertility vs soil productivity
 - J. Soil and Plant Nutrition
 1. Primary Elements
 2. Secondary Elements
 3. Micronutrients
 - K. Importance of Soil Organic Matter
 1. Composition and decomposition of organic matter
 2. Plant residues
 3. Functions of organic matter
 4. Maintaining organic matter
 - K. Composting
 1. Steps and procedures of composting
 2. Materials used in composting
 3. Temperature
 4. Moisture content
 5. Particle size
 - L. Organic Amendments
 1. Manures
 2. Compost
 - M. The Ideal Soil Composition
 - N. Soil Sterilization Methods
 - O. Mulching
 1. Synthetic Materials

2. Organic Materials
3. Benefits of Mulching

14. Perform the process of soil sampling and recommend fertilizers and lime applications.

P. Soil Diagnosis

1. Soil Sampling steps
2. Fertility level
3. pH
4. Fertilizers and Lime Recommendation

15. Determine the effects of soil pH to plants and describe methods to treat and manage saline and sodic soils.

Q. Soil pH and Salinity

16. Integrated Soil Fertility Management

R. Concepts to Practice

1. Crop rotation
2. Green manure
3. Conventional fertilizers
4. Organic fertilizers
5. leguminous intercropping
6. Soil amendments
7. Cover crops

- VI MATERIALS AND EQUIPMENTS
1. Electronic pH meter
 2. Soil Testing Kit
 3. Liming Materials
 4. Mulching Materials
 5. Teacher-made visual aids
 6. Routine classroom materials

VII TEXT

A. Text:

Plaster, Edward J. *Soil Science and Management* 6th Ed. Delmar Publishers Inc., 2014.

VIII METHOD OF INSTRUCTION

1. Lecture-Discussion
2. Presentation
3. Demonstration/Reinforcement
4. Laboratory Activities

IX METHOD OF EVALUATION

The lecture portion of this course will account for 60% of the grade while the laboratory will provide the other 40%

<u>Components</u>	<u>Weight</u>
<u>LECTURE</u>	
Participation	05%
Quizzes	15%
Midterm/Final	30%
Assignments	10%
<u>LABORATORY</u>	
Participation	15%
Laboratory Write-ups	10%
Project	15%
T O T A L	100%

The computation of letter grade is as follows:

90% - 100%	A
80% - 89%	B
70% - 79%	C
65% - 69%	D
00% - 64%	F

TASK LISTING SHEET

AG122 SOIL TECHNOLOGY
Course Number and Title

Credits: 3 3 48
 Lec Lab Total Lab hrs

TASK

TIME

SLO#9

6 hrs

1. Apply primary, secondary and micro nutrients properly to crops

10 hrs

SLO# 10

1. Collect and use of organic amendments to improve fertility status of soil.

18 hrs

SLO# 11

1. Identify and collect organic materials
2. Compost making

SLO #13

6 hrs

1. Identify mulching materials
2. Demonstrate proper use of mulching materials
 - a. Use of synthetic Materials
 - b. Use of Organic Materials

SLO# 14

8 hrs

1. Collect soil samples and determine the pH and N-P-K levels.

TOTAL

48 hrs

* Lab hours are subject to change as necessary.

Palau Community College
AG122- Soil Technology
Course Learning Outcomes

During the course experience, the **course learning outcomes** (CLOs) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 4, 3, 2 and 1 are not intended to represent the traditional school grading system of A, B, C, D and F. The descriptions associated with each of the numbers focus on the level of student performance for each of the course learning outcomes listed below.

Rating Scale:	4	Outstanding
	3	Proficient
	2	Developing
	1	Emerging

CLO # 1

Numerical Value	Students will be able to identify the primary, secondary, and micro nutrients and properly apply to growing crops.
4	Perform all the following tasks accurately <ul style="list-style-type: none"> • Accurately identify plant nutrients and apply to growing crops • Determine which of the major, minor, or micronutrient is most needed by the crops. • Correctly apply the needed plant nutrient to growing crops
3	Perform the task mentioned above but most with only minor mistakes
2	Perform the task mentioned above but most are inaccurate or incomplete
1	Unable to complete the task mentioned above

CLO # 2

Numerical Value	Students will be able to perform the process of soil sampling and recommend fertilizers and lime applications.
4	Perform all the following tasks accurately <ul style="list-style-type: none"> • Accurately follow the steps and process of soil sampling and correctly recommend fertilizer and lime applications • Determine the correct amount of each of the material required
3	Perform the task mentioned above but most with minor mistakes
2	Perform the task mentioned above but most are inaccurate or incomplete
1	Unable to complete the task mentioned above

CLO # 3

Numerical Value	Students will be able to determine the effects of soil pH to plants.
4	Perform all the following tasks accurately <ul style="list-style-type: none"> • Accurately diagnose plants' responses to soil pH • Correctly identify inadequate nutritional deficiencies of soil to certain pH • Correctly identify toxicity levels of minerals
3	Perform the task mentioned above but most with minor mistakes
2	Perform the task mentioned above but most are inaccurate or incomplete
1	Unable to complete the task mentioned above