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 | 1.5 Lab | 4.5 Total

IV. PRE-REQUISITE: AG111

V. STUDENT LEARNING OUTCOMES:

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

1. Discuss the importance of soil.
2. Describe atoll soil.
3. Name and describe the different classification of parent materials and factors responsible in soil formation.
4. Identify the different physical properties of soil.
5. Identify the chemical properties of soil

VI. COURSE CONTENT

A. Life-supporting Layer of Material

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

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

F. Physical Properties of Soil
   1. Texture
   2. Structure
   3. Color
   4. Consistency

G. Chemical Properties of Soil
   1. pH
   2. Cation Exchange Capacity
   3. Minerals

6. Identify the biological properties of soil	H. Biological Properties of Soil 1. Bacteria 2. Fungi 3. Earthworms 4. Pathogens 5. Insects and others
7. Explain water movements in the soil.	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
8. Discuss the factors that influence Soil Fertility.	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
9. Identify the primary, secondary plant nutrients and micronutrients and apply to growing crops.	J. Soil and Plant Nutrition 1. Primary Elements 2. Secondary Elements 3. Micronutrients
10. Demonstrate efficiency in preserving and improving soil fertility.	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
11. Demonstrate efficiency in composting using the proper materials.	K. Composting 1. Steps and procedures of composting 2. Materials used in composting 3. Temperature 4. Moisture content 5. Particle size
12. Prepare ideal soil mixes using organic amendments.	L. Organic Amendments 1. Manures 2. Compost M. The Ideal Soil Composition N. Soil Sterilization Methods
13. Identify and use the different mulching materials.	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.

16. Integrated Soil Fertility Management

Q. Soil pH and Salinity

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

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%

Components	Weight
LECTURE	
Participation	05%
Quizzes	15%
Midterm/Final	30%
Assignments	10%
LABORATORY	
Participation	15%
Laboratory Write-ups	10%
Project	15%
TOTAL	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 1.5 24
Lec Lab Total Lab hrs

TASK	TIME
SLO#9 1. Apply primary, secondary and micro nutrients properly to crops	6 hrs
SLO# 10 1. Collect and use of organic amendments to improve fertility status of soil.	6 hrs
SLO# 11 1. Identify and collect organic materials 2. Compost making	6 hrs
SLO #13 1. Identify mulching materials 2. Demonstrate proper use of mulching materials a. Use of synthetic Materials b. Use of Organic Materials	3 hrs
SLO# 14 1. Collect soil samples and determine the pH and N-P-K levels.	3 hrs
TOTAL	24 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 • 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 • Accurately follow the steps and process of soil samlping 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 inacurate 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 • Accurately diagnose plants' responses to soil pH • Correctly identify inadequate nutrional 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 inacurate or incomplete
1	Unable to complete the task mentioned above

CLO # 4

Numerical Value	**Students will be able to demonstrate efficiency in composting using proper materials.**
4	Perform all the following tasks accurately • Correctly identify and collect proper materials needed in composting • Correctly follow the procedures of piling the materials • Maintain the required temperature and moisture content regularly
3	Perform the task mentioned above but most with minor mistakes
2	Perform the task mentioned above but most are inacurate or incomplete
1	Unable to complete the task mentioned above

CLO # 5

Numerical Value	**Students will be able to prepare ideal soil mixes using organic amendments.**
4	Perform all the following tasks accurately • Correctly identify and collect ideal organic soil mixes • Correctly follow the procedures of preparing the materials • Correctly follow the required ratio of each of the materials
3	Perform the task mentioned above but most with minor mistakes
2	Perform the task mentioned above but most are inacurate or incomplete
1	Unable to complete the task mentioned above