



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Forestry and Wood Technology

FWT 320 – Forest Soils

COURSE PARTICULARS

Course Code: FWT 320

Course Title: Forest Soils

No. of Units: 2

Course Duration: One hour of theory and three hours of practical per week for 15 weeks.

Status: Compulsory

Course Email Address:

Course Webpage:

Prerequisite: NIL

COURSE INSTRUCTORS

Dr D.O. Oke

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COURSE DESCRIPTION

Forest soils and forestry practices will be discussed, with emphasis on tropical soils. Attention will be given to forest soil development, forest land capability and the effects of management practices (harvesting, fertilization, and site preparation) on soil properties. Interrelationships among nutrients and carbon cycling and environmental concerns will be examined. This course will provide students with basic knowledge and skills in forest soil management. It will cover topics such as Physical properties of forest soil. Features of forest soils: soil physics, chemistry, or organism and water movement. Determination and maintenance of forest soil fertility with reference to tropical conditions. Value of forest as soil conservation agents. Mychorrhizae and their importance to forest trees

COURSE OBJECTIVES

The objectives of this course are to ensure that students:

- have a good understanding of the uniqueness of forest soil
- become acquainted with the physical, chemical and biological properties of forest soils
- are aware of dynamics of nutrients in the forest ecosystem
- understand the roles of soil organic matter in fertility management
- know the process of rehabilitating damaged forest soils
- are able to diagnose and treat soil nutrient deficiencies

COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will understand:

(Knowledge based)

- the origin of soil nutrients and how they are made available to plants;
- the production and cycling of nutrients in forest environments and forest soil
- the uniqueness of soils under forest cover;
- the role of macro and micro organisms in the process of nutrient cycling and supply;
- the process of rehabilitating damaged forest soils;

(Skills)

- perform laboratory analytical procedures for determining soil properties;
- diagnose and treat soil nutrient deficiencies;

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Practicals	20%
Test(s)	20%
<u>Final Examination</u>	<u>60%</u>
<u>TOTAL</u>	<u>100%</u>

GENERAL INSTRUCTIONS

Attendance: It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must communicate as soon as possible with the instructor, indicating the reason for the absence.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, *etc.*) during lectures. Students should come to the laboratories in their lab coats. Food and drinks are not permitted in the laboratories.

READING LIST

¹Pritchett, W.L. (1979). Properties and management of Forest soils. John Wiley & Sons, Toronto, Canada, 500pages.

⁴Agbede, O.O. (2009). Understanding soil and plant nutrition. Petra Digital Press. 300 pages

^{2,4}Nwoboshi, L.C. (2000). The Nutrient Factor in Sustainable Forestry, Ibadan University Press 303 pages.

³Whalen J.K and Sampedro L. (2010). Soil Ecology and Management. CAB International

Legend

- 1- Available in the University Library
- 2- Available in Departmental/School Libraries
- 3- Available on the Internet.
- 4- Available as Personal Collection
- 5- Available in local bookshops.

COURSE OUTLINE

Week	Topic	Remarks
1	Introduction and Course Overview Definition and soil composition <ul style="list-style-type: none">• solid particle• soil solution• soil air	During this first class, the expectation of the students from the course will also be documented.
2	Soil Formation	
3	Uniqueness of forest soil Forest soil profile	

4 & 5	Physical properties of forest soils <ul style="list-style-type: none"> • Soil texture • Soil structure • Bulk density • Pore volume • Soil atmosphere • Soil colour • Soil temperature 	Practical exercise will involve soil sampling and determination of soil bulk density.
6	Soil Nutrients	Practical exercise will involve determination of soil nitrogen, calcium and phosphorus contents.
7	Kinds of organisms and their functions in soils <ul style="list-style-type: none"> • Bacteria • Actinomycetes • Fungi • Algae 	At the end of the week, students should be able to discuss soil organisms and their roles in forest soil development
8	Soil Animals <ul style="list-style-type: none"> • Vertebrates • Worms • Protozoa 	Students should understand the various processes by which microorganisms can influence nutrient availability to tree
	Microbial Roles in Nutrient Sourcing for trees <ul style="list-style-type: none"> • Biological nitrogen fixation • Mycorrhiza 	MID-SEMESTER TEST
9 & 10	Soil organic matter <ul style="list-style-type: none"> • Non humic substances • Humic substances 	Practical exercise will involve determination of soil organic matter contents.
11 & 12	Nutrient cycling in forest ecosystems <ul style="list-style-type: none"> • Geochemical nutrient cycling • Biological nutrient cycling 	
13 & 14	Forest Management and Soil Productivity	
15	REVISION	This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met.