



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Forestry and Wood Technology

FWT 503 - Engineering Properties of Wood

COURSE PARTICULARS

Course Code: FWT 503

Course Title: Engineering Properties of Wood

No. of Units: 3

Course Duration: 2 hours of theory and two hours of practicals per week for 15 weeks.

Status: Compulsory

Course Webpage:

Prerequisite: NIL

COURSE INSTRUCTORS

Dr. J. S. Fabiyi

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COURSE DESCRIPTION

The course outline will include: Structural models of wood. The effect of orthotropic nature of wood on its physical and mechanical properties. Concept of stress and strain. Elastic constants of wood. Strength properties of wood: bending strength – Modulus of Rupture (MOR) and Modulus of Elasticity (MOE), compression parallel and perpendicular to grain. Methods of determining strength properties of wood. Factors affecting strength properties of wood: specific gravity, moisture content and temperature. Allowable stresses in wood. Application of Harkinson's formula in estimating strength of wood at an angle to the grain. Rheology of wood: creep and relaxation. Shear stress and strain. Duration of load. Fatigue.

COURSE OBJECTIVES

The objectives of this course are to:

- give the students an understanding of the engineering properties of wood; and
- furnish students with information on the influences of wood chemicals on wood engineering properties of wood.

COURSE LEARNING OUTCOMES / COMPETENCIES

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

(Knowledge based)

- describe fundamental aspects of wood chemistry and how these will impact wood processing and utilization; and
- understand the opportunities available in lignocellulosic modification for various uses

(Skills)

- determine the mechanical and viscoelastic properties of wood.

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance	5%
Assignments	5%
Practicals	20%
Test(s)	10%
<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 any of the instructors, indicating the reason for the absence.

Academic Integrity: Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

Assignments and Group Work: Students are expected to submit assignments as scheduled. **No late assignments will be accepted without prior arrangement.** Missing assignments due to improper submission by the student will be given a grade of zero.

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. Food and drinks are not permitted in the laboratories.

READING LIST

²⁻³Forest Products Laboratory. (2010). Wood handbook—Wood as an engineering material. General Technical Report FPL-GTR-190. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 508 p.

³Haygreen, J.G. and Bowyer, J.L. (1989). Forest Products and Wood Science. 2nd Edition. Iowa State University Press. Ames. 495p. [ISBN 0-8138-1800-1].

Legend

- 1- Available in the University Library
- 2- Available in Departmental/School Libraries
- 3- Available as Personal Collection

COURSE OUTLINE

Week	Lecture	Lab.
1	The nature of wood	
2	Strength properties of wood	No Lab.
3	Strength properties determination Factors affecting strength properties of wood	No Lab.
4	Structural models of wood	Collection of various Nigerian wood species.
5	Allowable stresses in wood	Collection of various Nigerian wood species.
6	Harkinson's formula	No Lab.
7	Review for the Mid Semester Test	Mechanical properties determination
8	MID-SEMESTER BREAK	MID-SEMESTER BREAK
9 & 10	Viscoelasticity of wood	Mechanical properties determination
11	Creep	Mechanical properties determination
12	Fatigue	Mechanical properties determination
13&14	Nigerian wood classification	No Lab.
15	REVISION	