



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Architecture

ARC 411 – Building Structure (Steel and Timber Design)

COURSE PARTICULARS

Course Code: ARC 411

Course Title: Building Structure (Steel and Timber design)

No. of Units: 3

Course Duration: Three hours per week for 16 weeks.

Status: Compulsory

Course Email Address:

Course Webpage:

Prerequisite: ARC 211 and ARC 212

COURSE INSTRUCTORS

Arc. A. J. Afolami

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and

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COURSE DESCRIPTION

Application of principles of structural design and analysis of members used in contemporary timber and steel frame buildings. The design of beam girders and trusses. Welded and riveted connections, columns, bearing plate etc. Theories of wind braces and effect on building design. Topics also include design for stability in structure; trusses and lattice girders, space frame and rigid frames; plates and shells; cable, tent and arch structures; foundations and retaining walls; design dependence on method of construction.

COURSE OBJECTIVES

The objectives of this course are to:

- introduce students to the theory and design of wooden and steel frame buildings
- design of welded and riveted connections, columns and bearing plates
- Provide students with opportunities to interpret structural drawings in conjunction with architectural drawings

COURSE LEARNING OUTCOMES / COMPETENCIES

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

(Knowledge based)

- explain the properties of wood and steel as a construction material
- understand structural implications of architectural design

(Skills)

- design simple steel and wooden beams and columns
- increase capability for the students to understand the cost implications of steel and wooden structural system

GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance	5%
Assignments	15%
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 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. Failure to submit an assignment as at when due will earn such candidate zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

Code of Conduct in Lecture Room: 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 lecture room.

READING LIST

¹Morgan & Williams, (1980). Pitman Education Limited, London.

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	Analysis of Steel/Timber Structure <ul style="list-style-type: none"> • Definition of structures • Standard Steel section and Plates 	During this first class, the general course outline will be introduced.
2 & 3	Analysis of Steel/Timber Structure <ul style="list-style-type: none"> • Wood and Trusses Analysis • Frame structures 	
4 & 5	Analysis of Steel/Timber Structure <ul style="list-style-type: none"> • Method of Joints • Section/Elastic Modulus • Symmetrical Section 	
6	Welded, Bolted and Riveted Connections of Column, Trusses and Bearing Plates <ul style="list-style-type: none"> • Single Shear • Double Shear 	
7 & 8	Welded, Bolted and Riveted Connections of Column, Trusses and Bearing Plates <ul style="list-style-type: none"> • Bearing • Criterion value 	Students will be requested to prepare hand written assignments.
		MID-SEMESTER TEST
9 & 10	Welded, Bolted and Riveted Connections of Column, Trusses and Bearing Plates <ul style="list-style-type: none"> • Welding 	
11 & 12	Structural Design of a Building <ul style="list-style-type: none"> • Floors • Roofs 	
13 & 14	Structural Design of a Building <ul style="list-style-type: none"> • Roofs • Wind Pressure 	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.
REVISION		