



# THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

## *Department of Architecture*

### **ARC 304 – Building Structures: Reinforced Concrete Design**

**Course Code:** ARC304

**Course Title:** Reinforced Concrete Design

**No. of Units:** 3

**Course Duration:** Two hours of theory and One hour of tutorial per week for 15 weeks.

**Status:** Compulsory

**Course Email Address:** [arc304@gmail.com](mailto:arc304@gmail.com)

**Course Webpage:**

**Prerequisite:** NIL

### **COURSE INSTRUCTORS**

**Dr. A.A. Taiwo**

*Room 028, Ground Floor, SET Building,*

*Department of Architecture,*

*Federal University of Technology, Akure, Nigeria.*

**Phone:** +2348035888286,

**Email:** [abraham\\_taiwo@gmail.com](mailto:abraham_taiwo@gmail.com), [aataiwo@futa.edu.ng](mailto:aataiwo@futa.edu.ng)

**Arc. J.A. Afolami**

*Room 029, Ground Floor, SET Building,*

*Department of Architecture,*

*Federal University of Technology, Akure, Nigeria.*

**Phone:** +2348033744936

**Email:** [dewscapex@yahoo.com](mailto:dewscapex@yahoo.com), [ajafolami@futa.edu.ng](mailto:ajafolami@futa.edu.ng)

And

**Arc. O.A. Onanuga**

*Room 110, First Floor, SET Building,*

*Department of Architecture,*

*Federal University of Technology, Akure, Nigeria.*

**Phone:** +2348066245729

**Email:** [oaonanuga@futa.edu.ng](mailto:oaonanuga@futa.edu.ng), [bathmathy@yahoo.com](mailto:bathmathy@yahoo.com)

### **COURSE DESCRIPTION**

This course introduces the student to the theory and design of simple reinforced concrete structures: Development of elastic theories of reinforced concrete beams, slabs, and columns, Understanding the behaviour of reinforced concrete structures and the development of graphic skills in the presentation of design results. Load path, functions of various types of members,

reasons behind members becoming unserviceable. Fall theory and demonstration, loss of equilibrium.

## COURSE OBJECTIVES

The objectives of this course are to:

- introduce students to the effective calculation of sizes and depth of a reinforced concrete beams, columns and slabs with the ability to determine reinforcement bar sizes; and
- Provide students with understanding of the effect of calculated sizes and depth on the structural stability of physical building development.

## COURSE LEARNING OUTCOMES / COMPETENCIES

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

*(Knowledge based)*

- know all that is required to consider the choice of depth of beams, column and slabs

*(Skills)*

- students will be able to handle architectural design and construction considering the implications involved in the choice of effective concrete depth and the area of steel application:

## GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

Class Attendance	10%
Reports and assignments	10%
Test(s)	20%
<u>Final Examination</u>	<u>60%</u>
<b><u>TOTAL</u></b>	<b><u>100%</u></b>

## GENERAL INSTRUCTIONS

**Attendance:** It is expected that every student will be in class for lectures. 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 you 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.

All students are expected to be part of the arranged industrial visit within the semester.

**Code of Conduct in Lecture Rooms and Laboratories:** Students are prohibited from engaging in other activities (such as phoning, texting, watching videos, *etc.*) during lectures.

## READING LIST

<sup>1</sup>Durka, F. (1980). *Structural Mechanics*. A Fully Revised Edition of Structural Mechanics by W. Morgan and D. T. Williams. Pitman Educational Limited.

### **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	During this first class, the expectation of the students from the course will also be documented.
2	The simple reinforced concrete beam	
3	Elastic analysis of reinforced concrete members	
4	Analysis of Bending	
5 & 6	Critical area of Steel Examples calculation	
7 & 8	Reinforced and bar spacing Reinforcement data i. Minimum reinforcement ii. Maximum reinforcement	
9 & 10	Link reinforcement Reinforced concrete slab Beam - slab construction	
11 & 13	Reinforced concrete columns Design factors	
14 15	ASSESSMENT & REVISION(S)	This is the period preceding the semester examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met and final class assessment.