



THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

Department of Architecture

ARC 503 – Building Components and Methods IV

COURSE PARTICULARS

Course Code: ARC 503

Course Title: Building Components and Methods

No. of Units: 3

Course Duration: Two hours of theory and three hours of Studio per week for 12 weeks.

Status: Compulsory

Course Email Address:

Course Webpage:

Prerequisite: NIL

COURSE INSTRUCTORS

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COURSE DESCRIPTION

This course explores space structural systems (3- Dimensional structures) in architecture. Form-resistant structures are examined and a distinction is drawn between them and 2-Dimensional structures taught at lower levels. Preliminary discussions are made on construction in mass concrete, reinforced concrete and pre-stressed concrete. The topics examined are Interrelation of technological choices and design, structure in architecture; the challenge of space enclosure and spanning, the relation to architectural form in history; basic modes of load transfer and corresponding elements of structural forms; discussion of physical, structural and form characteristics of a wide variety of structural types. The structural systems are shell structures, space frame, folded plates, suspension structures and pneumatic structures. A non-mathematical intuitive and qualitative approach to architectural structures is used.

COURSE OBJECTIVES

The objectives of the course are to:

- Distinguish between 2-Dimensional and 3-Dimensional systems in architecture
- Highlight the importance of form-resistance in architectural structures
- Examine the use of 3-Dimensional structures in spanning large distances without intermediate supports

COURSE LEARNING OUTCOMES / COMPETENCIES

At the end of the course, students would have acquired knowledge on:

(Knowledge based)

- Basic characteristics of space structural systems
- Design of architectural forms in which structural elements can be separated over large distances without intermediate supports.

(Skills)

They would have acquired skills in

- The applications of 3-Dimensional structures in the design of large facilities

GRADING SYSTEM FOR THE COURSE

This course is graded as follows:

Semester Project	30%
Mid semester Test	10%
<u>Semenster Examination</u>	<u>60%</u>
<u>TOTAL</u>	<u>100%</u>

GENERAL INSTRUCTIONS

Attendance: A student must attend 65% of lectures to qualify for semester examination.

Academic Integrity: Plagiarism is strictly prohibited and is not acceptable.

Assignments and Group Work: A semester project is given in the middle of the semester to examine the design of a facility using the principles of space structural system.

Code of Conduct in Lecture Rooms and Laboratories: Students should turn off all electronic devices including handsets and laptops during lectures. Decorum should be observed at all times.

READING LIST

- ¹Barry, R. (1999) The Construction of Buildings; Blackwell Science, Inc., Oxford, UK
- ¹Bartony, N and Chernov (1989). Architectural Engineering, MIR Publisher, Moscow
- ¹Buchholdt, H.A (1985). Introduction to cable Roof Structures; Cambridge University Press
- ¹Buckle, I.G (1987). W Morgan's Elements of Structure. Longman Scientific and Technical, Essex
- ¹Chaudley, R (1987). Construction Technology, Vol IV. Longman Scientific and Technical.
- ³Gniadzik, J.S (1980). Structural Systems in Architecture, Ahmadu Bello University Zaria
- ²Olotuah, A.O (2002) Space Structures. Folskun Publishers, Okitipupa- Nigeria
- ¹Salvadori, M (1963) Structure in Architecture. Prentice-Hall Inc; Englewood Cliffs, New Jersey

Legend

- 1- Available on the Internet.
- 2- Available at the Department
- 3- Available with the Lecturer

COURSE OUTLINE

Week	Topic	Remarks
2	Introduction to space structural systems	
3, 4 & 5	Shell structures <ul style="list-style-type: none"> • Basic characteristics of shell structures • Cylindrical shells (Long span Barrel vault, short span barrel vault, north light, cross/ groined vault, cantilevered shell) • Rotational shells (Spherical Domes, cones) • Translational shells (Elliptical paraboloid, hyperbolic paraboloid) • Ruled surfaces (conoids) 	
6	Space Frame	
7	Folded Plates	
8	Mid Semester Test	Semester project is introduced
9 & 10	Suspension Structures <ul style="list-style-type: none"> • Membranes, • Cable Structures • Cable net Structures 	
11&12	Pneumatic Structures <ul style="list-style-type: none"> • Air Inflated and Air Supported Pneumatic Structures 	
13	Revision	