



# STRUCTURE, FORM AND ARCHITECTURE: THE SYNERGY

## **PROF. SHUBHAJIT SADHUKHAN**

Department of Architecture and Planning

IIT Roorkee

**INTENDED AUDIENCE :** This course would be useful for the students pursuing B.Arch, M.Arch and B.Tech/BE Civil Engineering

### **COURSE OUTLINE :**

Structure is an integral part of designing Architecture since the primitive age. Starting from the Stonehenge to the creation of the world's tallest tower in recent times, structure and its designed form presented an excellent Architecture to experience, to appreciate and also fulfill the functions for which they are created. Therefore, the present course has an extreme importance in creating an interest among the students, architects and engineers as well to learn the relationship between Structure, Form and Architecture to make a synergy between them and make the space creation structurally strong, stable, functionally optimized and aesthetically pleasant Architecture. The course will highlight the basics of structural forms, its pros and cons to make a decision to select the appropriate form for the Architectural Design. Suitable case studies along with a few demonstrations with study model experiments can help students to clear the doubts and help them in designing the assignments with a better grip.

### **ABOUT INSTRUCTOR :**

Prof. Shubhajit Sadhukhan is presently an Assistant Professor in the Department of Architecture Planning at Indian Institute of Technology Roorkee. Earlier he served National Institute of Technology Patna for four and half years as an Assistant Professor in the Department of Architecture. Dr. Sadhukhan received his PhD from Indian Institute of Technology Kharagpur in 2017. In 2010, he obtained his Master of Technology (M. Tech) Degree in Infrastructure Design and Management from Indian Institute of Technology Kharagpur and also awarded with the 'Institute Silver Medal'. He completed his Bachelor in Architecture (B. Arch) with Honours in 2008 from Jadavpur University, Kolkata.

He has exposure in both the fields of Architecture and Transport Infrastructure Planning. He has publications in several international journals of high repute and presented his research work at many international conferences. His current research includes urban mobility planning, sustainable transportation, infrastructure planning and architectural structures.

## **COURSE PLAN :**

**Week 1 :** Introduction to Structure, Form, and Architecture; Relationship of Structure to Architectural Buildings; Loads on a Structure; Synthesis of Architectural and Structural Forms

**Week 2 :** Connecting Structure and Architecture; Structural Transformation in Architectural History; Factors affecting Structural Forms; Learning from Animal Architecture

**Week 3 :** Basic Structural Properties; Structural Requirements; Structural Arrangements; Structural Forms and Shapes; Structural Materials

**Week 4 :** Structural Typology; Compressive Structures; Tensile Structures; Load Bearing Structure; Temporary Structure

**Week 5 :** Framed Structures; Arch Structures; Vault Structures; Dome Structures; Grid Structures

**Week 6 :** Shell Structures; Truss and Space Frames; Folded Plate Structures; Membrane Structures; Pneumatic Structures

**Week 7 :** Structure and Architectural Forms in Windy areas, Seismic prone areas and Flood prone areas; Cost Effective Structure and Architecture; Structure and Light in Architecture

**Week 8 :** Evaluation of Highrise Structural System; Highrise Structural Components; Mega Structures and Architecture- Case Studies; Architecture-The Past, Present and Future