



STRUCTURAL SYSTEM IN ARCHITECTURE

PROF. SHANKHA PRATIM BHATTACHARYA

Department of Architecture And Planning
IIT Kharagpur

TYPE OF COURSE : New | Core | UG/PG

COURSE DURATION : 8 weeks (17 Aug' 20 - 9 Oct' 20)

EXAM DATE : 18 Oct 2020

PRE-REQUISITES : Interested Learners

INTENDED AUDIENCE : Architecture

COURSE OUTLINE :

The structural engineering is an essential component of Architecture. The creativity and imagination of an architect come to reality by adopting a suitable structural system. Architects should understand the basic principles and concepts of structure in order to apply the structural system suitably. It is also needed for an Architect to communicate effectively with consultants and contractors about the conceived structural system. The course is designed to explain structural concepts clearly, using analogies and examples.

ABOUT INSTRUCTOR :

Dr. Shankha Pratim Bhattacharya is presently an Assistant Professor in the Department of Architecture and Regional Planning, Indian Institute of Technology Kharagpur. He is an Architectural Engineer by profession and has more than fifteen years of teaching experience. He did his PhD on Modeling on Building Structure under Seismic Excitation in 2011. He was Worked as Principal Developer for "Developing Suitable Pedagogical Methods for various classes, intellectual calibres and learning" [Course developed: Structural System], a national project anchored by National Mission on Education through Information and Communication Technology (NMEICT) of MHRD, Govt. of India. His area of academic and research interest includes earthquake resistant building, building physics and structural systems. Recently, he had delivered an NPTEL course on Architectural Acoustics (Jointly with Prof. Sumana Gupta)

COURSE PLAN :

- Week 1:** Basics of Statics and Structural Systems: Force system, Structure and its classification, Supports, reaction, Structural framing and loading.
- Week 2:** Mechanics of Material-I : Theory of Elasticity, Material properties, Shear and Bending moments,
- Week 3:** Mechanics of Material-II : Stress due to bending and shear, Deflection. Theory of Column
- Week 4:** Frame Structure Analysis and Design: Analysis of Structural elements and frame. Ordinary and special Moment resisting frames, The application different types of structural frame in Architecture. Design for flexure and shear in RCC, Design principle of steel beam and column
- Week 5:** Truss and Space Frame: Concept and application of Truss and Space Frame, Advantages and application in Architecture
- Week 6:** Arch, Shell and Dome: Structural concept, Types, Application and advantages, Case study
- Week 7:** Tensile and Plate Structures: Structural concept, Types, Materials for tensile structures, Application and advantages, Case study
- Week 8:** Special Structures: Pneumatic structures, Tensegrity, Temporary structures and structures for cost effective technology, High-rise Structural Systems