

Subject Code: 1ET1060302	Subject Title: BUILDING CONSTRUCTION AND MATERIALS
Pre-requisite Subject	Basic Knowledge of elements of civil engineering

Course Objective: To develop capability to understand building components and advanced material.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total (T+P)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	1	0	4	70	30	-	-	100

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
Module 1				
1	Introduction: Overview of construction practices, theory and methods	06	15	
	Subsurface Investigation: Objectives, methods of boring like wash boring, percussion etc.,			
	Shallow Foundations: Necessity, types, setting out, excavation, construction, failures of foundation and remedial measures.			
Module 2				
2	Masonry Construction : a) Stone Masonry: Technical terms, lifting appliances, joints, types – random (un-coursed) rubble, coursed rubble, dry rubble Masonry, Ashlar Masonry - Ashlar fine, chamfered fine. b) Brick Masonry : Technical terms, bonds in brick work- English bond, single & double Flemish bond, garden wall bond, raking bond, Dutch bond. c) Composite Masonry: Stone facing with brick backing, brick facing with concrete backing. d) Hollow concrete blocks and construction e) Cavity walls: Brick cavity walls, position of cavity at foundation, roof and at opening levels. f) Lintels & arches: Lintels – types, construction. Arches – technical terms, types – brick arches, rough, axed, stone arches, flat – semi circular.	08	20	
	Plain and Reinforced Concrete Construction: Pre -cast and cast -in -situ Construction			
Module 3				
3	Doors and Windows : a) Doors: Location, technical terms, size, types, construction, suitability. b) Windows: Factors affecting selection of size, shape, location and no. of windows, types, construction, suitability, fixtures and fastenings. c) Ventilators: Ventilators combined with window, fan light.	06	15	
	Stairs and Staircases: Definition, technical terms, requirements of good stair, fixing of going and rise of a step, types of steps, classification, example – stair planning, elevators, escalators.			
Module 4				
4	Floorings : Introduction, essential requirements of a floor, factors affecting selection of flooring material, types of ground floors, brick, flag stone, tiled cement, concrete, granolithic, terrazzo, marble, timber flooring, upper floor - timber, timber floor supported on RSJ flag stone floor resting on RSJ, jack arch floor, reinforced concrete floor, ribbed floor, pre cast concrete floor.	08	20	
	Roofs and Roof Coverings: Introduction, requirements of good roof technical terms, classification, types of roof coverings for pitched roof. A.C. sheet roofs – fixing of A.C. sheets, laying of big six sheets, G.I. Sheets roofs, slates, flat roof – advantages			
	Wall Finishes: Plastering, pointing and painting			
	Temporary Works : Timbering in trenches , types of scaffoldings, shoring,			

Module 5

5	Principal Properties of Building Materials: Introduction ,Physical Properties ,Mechanical Properties ,Characteristic Behaviors under Stress	14	30
	Puzzolanas: Introduction, Classification, The Activity of Puzzolanas, Effects of Natural Puzzolanas, Applications Fly Ash, Calcined Clay Puzzolanas (Surkhi),Ground Blast Furnace Slag, Silica Fume, Rice Husk Ash		
	Ferrous Metals: Introduction, Structures of Ferrous Metal, Iron, Pig Iron, Cast Iron, Wrought Iron, Steel, Rolled Steel Sections, Reinforcing Steel Bars, Rusting and Corrosion, Alloy Steel		
	Non-Ferrous Metals: Introduction, Aluminum, Building Materials, Copper , Zinc, Lead, Tin, Nickel		
	Ceramic Materials: Introduction, Classification of Ceramic, Refractories., Glass, Glass Wool, Polymorphism in Ceramic Materials, Mechanical Properties of Ceramic Phases , Thermal Properties of Ceramic Phases,Electrical Properties of Ceramic Phases		
	Paints, Enamels and Varnishes: Introduction, Composition of Oil Paint, Characteristics of an Ideal Paint, Preparation of Paint, Covering Power of Paints, Pigment Volume Concentration (P.V.C.), Painting Plastered Surfaces, Painting Wood Surfaces, Painting Metal Surfaces		
	Miscellaneous Materials: Adhesives , Asbestos, Linoleum, Thermocol , Heat Insulating Materials, Sound Insulating Materials, Water Proofing Materials, Fiber, Geosynthetics, Sand Lime Brick (IS:4139), Smart Materials, Composite Materials		

Course Outcome:

After successful completion of course the students shall be able to:

- Discuss sub surface soil strata investigation.
- Construct various types of shallow foundation.
- Execute various types of masonry.
- Construct various structural and non-structural building components.
- Erect various temporary works for new and existing buildings.
- Apply special treatments like water resistance, thermal insulation acoustical construction.
- Select appropriate method of construction.
- Explain causes of failure and remedial measures for foundations
- Explain the green buildings and suggest how to convert existing building in to green building.

List of References:

1. Building Construction by Dr. B. C. Punamia
2. Building Construction by Sushil Kumar
3. Building Construction by Gurcharan Singh
4. Building Construction by S. C. Rangwala
5. Building Construction by P.C Varghese, Prentice-Hall of India, New Delhi
6. Indian Standard Institution, National Building Code of India, ISI, 1984, New Delhi
7. Building materials by S.K. Duggal

Design based Problems/Open Ended Problems:

- 1) Setting out of foundation from lay out plan
- 2) Site Visit of Manufacturing of brick and reports detail, analysis of bricks N B C.
- 3) Preparing model of following roof works: North Light truss, Lean to Roofs, King post Truss, and Queen Post Truss
- 4) Preparing Model of Various types of Stairs