Program : **Diploma in Architecture / Civil Engineering**	
Course Code : **3013**	Course Title: **Building Construction and Construction Materials**
Semester : **3**	Credits: **4**
Course Category: **Program Core**	
Periods per week: **4 (L:3, T: 1, P: 0)**	Periods per semester: **60**

Course Objectives:

- To impart knowledge about availability, suitability and characteristics of natural and artificial materials for various applications of constructions.
- To familiarize the various components of buildings and their constructional procedures

Course Prerequisites:

Topic	Course code	Course name	Semester
Mechanical and chemical properties of materials		Engineering Science	1 and 2

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Identify relevant natural construction materials	12	Applying
CO2	Select relevant types of construction materials for site conditions in tune with sustainability.	17	Applying
CO3	Identify components of building structures and suggest suitable type of foundation	12	Applying
CO4	Illustrate types of masonry and elements of building superstructure	17	Applying
	Series Test	2	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	-				3		3
CO2	-				3		
CO3	3				-		
CO4	3				-		

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Identify relevant natural construction materials and eco friendly masonry blocks**		
M1.01	Identify the Scope of construction materials in civil works	1	Understanding
M1.02	Classify natural materials for construction	1	Understanding
M1.03	Explain requirements of stone and timber	5	Understanding
M1.04	Explain manufacturing process of bricks and select ecofriendly masonry blocks	5	Applying
Contents: Broad classification of materials - Natural, Artificial, special, finished and recycled. - Requirements of good building stone - general characteristics of stone - Laterite stones- quarrying and dressing of stone - Structure of timber, general properties and uses of good timber - different methods of seasoning for preservation of timber - defects in timber - use of bamboo in construction. Lime - Properties - types and uses - Types of soil and its suitability in construction. Constituents of brick earth- Manufacturing process of burntclay brick, fly ash bricks, Autoclave Aerated Concrete (AAC) blocks - Conventional / Traditional bricks - Modular and Standardbricks, Special bricks - fly ash bricks, Characteristics of good brick, Field tests on Bricks -Classification of burnt clay bricks and their suitability.			
CO2	**Select relevant type of construction materials for site conditions**		
M2.01	Identify types flooring materials and suggest the suitability	4	Understanding
M2.02	Identify uses of wood products for various applications	4	Understanding
M2.03	Suggest the specially processed products for various applications of construction	5	Applying
M2.04	Illustrate structural steel sections for buildings.	4	Understanding
	Series Test – I	1	

Contents:

Flooring materials: Types, uses (Natural and Artificial) - Granite, Marble, Clay tiles, Ceramic tiles etc. Pavement blocks and their uses. - Wood products: Plywood, particle board, Veneers, laminated board and their uses. - Types of glass: soda lime glass, lead glass, Toughened glass and borosilicate glass and their uses. - Ferrous and non-ferrous metals and their uses - Types of material and suitability in construction works of following materials - Waterproofing, Termite proofing; Thermal and sound insulating materials - Constituents and uses of POP (Plaster of Paris), POP finishing boards, sizes and uses - Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses. (Situations where used) - Industrial waste materials- Fly ash, Blast furnace slag - Agro waste materials - Rice husk, Bagasse, coir fibers and their uses - Special processed construction materials- Ferro Crete, Artificial timber, MDF, HDF, PVC foam board, WPC, ACP, Artificial sand (M sand) and their uses.

Structural Steel sections for buildings.

CO3	**Identify components of buildings and Suggest suitable type of foundation**		
M3.01	Classify buildings as per NBC/ KMBR / KPBR and type of constructions	2	Understanding
M3.02	Identify building components and their functions	3	Understanding
M3.03	Explain construction methods for substructure and superstructure	3	Understanding
M3.04	Identify types of foundations and suggest suitable foundation for site conditions	4	Applying

Contents:

Classification of Buildings as per National Building Code/KMBR/KPBR.

Types of Constructions - Load Bearing wallStructure, Framed Structure, Composite Structure, Prefabricated structures, Special framed structure for earthquake resistance (IS 13920) - Construction methods for Structural Steel buildings.

Building Components - Functions of Building Components - Substructure - Foundation - Plinth. - DPC - Superstructure - Parts of building - Walls, Partition wall, and Cavity wall, Sill, Lintel, Doors and Windows, Floor etc.

Construction of Substructure - Job Layout - Site Clearance, Layout for Load Bearing Structure and Framed Structure by Center Line and Face Line Method.

Earthwork: Excavation for Foundation - Timbering and Strutting - Materialsused for plinth Filling - Foundation - Functions of foundation - Types of foundation - Shallow Foundation and Deep Foundation - Stepped Footing, Wall Footing, Column Footing, Isolated and Combined Column Footing, Raft Foundation, Grillage Foundation, Strap footing, Pile Foundation, Well foundation and Caissons.

CO4:	**Illustrate types of masonry and elements of building superstructure.**		
M4.01	Identify and propose types of masonry for super structure	4	Applying
M4.02	Explain scaffolding and formwork for masonry and concreting.	4	Understanding

M4.03	Illustrate vertical communication for buildings	4	Understanding
M4.04	Identify and suggest roofing materials and methods suited for site conditions.	5	Applying
	Series Test – II	1	

Contents:

Types of stone masonry - Rubble masonry, Ashlar Masonry. - Pointing of stone masonry and their purpose - Precautions.

Brick masonry - Terms used in brick masonry-Bonds in brick masonry- header bond, stretcher bond, English bond, Flemish bond etc.Requirements of Brick Masonry - Precautions to be observed - Hollow and Solid concrete block masonry - composite masonry - interlock bricks.

Scaffolding and Shoring - Purpose and Types - Underpinning - Formwork.

Doors - Fully Paneled Doors, Partly Paneled and Glazed Doors, Flush Doors, Collapsible Doors, Rolling Shutters, Revolving Doors, Glazed Doors.

Windows: FullyPaneled, Partly Paneled and Glazed, wooden, Steel, Aluminium windows, Sliding Windows, Louvered Window, Bay window, Corner window, Gable and Dormer window, Skylight - Sizes of Windows recommended by BIS.

Ventilators - Fixtures and fastenings for doors and windows.

Vertical Communication methods-stair, lifts and escalators.

Roofs - Roofing Materials - RCC, MP Tiles, Ceramic roofing tiles, Thatched, G.I. sheets, Corrugated G.I. Sheets, Plastic and Fiber Sheets, Innovative roofing materials (Fiber reinforced cement board, Shinglesetc.), Types of Roof - Flat roof, Pitched Roof - terms used in roofs - King Post truss, Queen Post Truss-terms used.

Text / Reference:

T/R	Book Title/Author
T1	Ghose, D. N., Construction Materials, Tata McGraw Hill, New Delhi
R1	Rangawala, S. C., Building Construction, Charotar Publication, Anand
R2	Sushil Kumar., Building Construction, Standard Publication.
R3	Rangwala, S.C., Engineering Materials, Charaotar publisher, Ahmedabad.
R4	Sood H., Laboratory Manual on Testing of Engineering Materials, New Age Publishers, NewDelhi

Online Resources:

Sl.No	Website Link
1	https://www.aboutcivil.org/engineering-materials.html