

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CIVIL & INFRASTRUCTURE ENGINEERING BUILDING TECHNOLOGY AND MATERIALS

**SUBJECT CODE: 2134002**

**B.E. 3<sup>th</sup> Semester**

**Type of course:** Core Subject in Civil & Infrastructure Engineering

**Prerequisite:** No Prerequisite

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE	PA(M)		PA(V)		PA (I)		
PA	ALA	ESE		OEP						
3	0	2	5	70	20	10	20	10	20	150

**Contents:**

Module	Description	Hours	% Weightage
<b>1</b>	<p>a) <b>Introduction to building construction-</b> definition, types of building as per national building code. Substructure - shallow and deep foundation and their suitability. Failure of foundation and its causes and setting out, Layout of foundation in black cotton soil, sloping ground. Damp proof course, plinth filling and soling.</p> <p>b) <b>Masonry-</b> Stone masonry- Principal terms, types of stone masonry. Brick masonry- characteristics of good building bricks, IS specification and tests, classification of bricks-silica, refractory, fire and fly ash bricks.</p> <p>c) <b>Brick work, types of bonds-</b> English, Flemish, Header, Stretcher, construction procedure, supervision, underpinning, Scaffolding- Purpose, types, suitability.</p>	<b>8</b>	<b>19</b>
<b>2</b>	<p>a) <b>Block masonry:</b> Cellular Lightweight Concrete blocks, Hollow blocks, solid blocks, cavity wall construction. Reinforced brick masonry: applications, advantages, materials required and construction procedure. Composite masonry- types, advantages, applications, materials required and construction procedure. Plasters-different types of plasters, plastering methods, modern materials for plaster.</p> <p>b) <b>Form work and casting procedure</b> for reinforced concrete columns, R.C.C. beams and girders, R.C.C. slabs, curing methods, precast concrete construction and joints in concrete work. Slip Form work- Component parts- Design Criteria</p>	<b>6</b>	<b>15</b>
<b>3</b>	<p><b>Flooring and Roofing Materials:</b></p> <p>a) <b>Flooring and flooring materials</b> --Functional requirement of flooring, varieties of floor finishes and their suitability, construction details for concrete, tiles and stone flooring. Types of flooring: timber flooring, cement concrete flooring, mosaic flooring ceramic flooring, terrazzo flooring or cast in situ terrazzo flooring, tiled flooring, rubber flooring, cork flooring, epoxy</p>	<b>8</b>	<b>19</b>

	<p>asphalt flooring or mosaic asphalt flooring, filler materials, tests and IS Specifications.</p> <p>b) Roofing materials: galvanized iron pre-coated aluminum sheets, fiber sheets, and Mangalore tiles. Roof construction: types and their suitability, method of construction, types of trusses, types of shell structure, space and frame structure, fixing details of roof covering.</p>		
4	<p><b>Doors, Windows, Arches and Lintels.</b></p> <p>a) Doors and windows: definition of technical terms, installation of doors and window frames and their size specifications, fixtures and fastenings. Types of doors: glazed or sash doors, plastic doors, flush doors, louvered doors, collapsible doors, revolving doors, rolling steel doors, sliding doors, swing doors, folding doors. Types of windows: casement window, double hung window, pivoted window, sliding windows, louvered or Venetian window, metal window, sash or glazed window, bay window, corner window, dormer window, gable window, skylight window, circular window, mosquito proof window, curtain wall window. Ventilators: purpose and types.</p> <p>b) Arches and lintels: principle of arch action, types of arches, method of arch construction, cantering and removal of centring. Lintels: necessity and types, chajja or weather shade necessity and types.</p>	8	19
5	<p><b>Vertical Circulation and Protective Coatings</b></p> <p>a) Vertical circulation: Consideration in planning, design considerations, Staircase: types, and details of ramps. Ladders, lifts, and escalator.</p> <p>Types of staircase: straight stairs open well stairs, quarter turn stairs, half turn stairs, turning stairs, dog-legged stairs, circular stairs, geometrical stairs, and bifurcated stairs, and spiral stairs, Materials, fire resisting materials.</p> <p>b) Protective coatings: plastering types (lime plaster, cement plaster, gypsum plaster used in spray fire proofing, plaster of Paris) and application, pointing- purpose &amp; types, mortar- Preparation and types, painting and varnishing, types and application, white washing, distempering, oil paints. Wall cladding: materials, method, wall papering and glazing work</p>	6	6
6	<p><b>Miscellaneous Materials and Safety in Construction</b></p> <p>a) Miscellaneous materials: Properties, types and uses of following materials, lime, polymers, plastic types, mastic, gypsum, clay tiles and glazed wares, Timber: types and properties, seasoning, testing, aluminum, Stainless Steel.</p> <p>b) Safety in construction: safety on site, storage of materials, construction safety, prevention of accidents, fire proof construction.</p> <p>Repairs and maintenance: addition, and alteration, strutting and shoring.</p> <p>c) Glass: uses, types and properties, application and ingredients, market forms, Glass claddings, Aluminum composite panel cladding. Ceramic products: ceramic sanitary application, water closet, urinals, tabs, washes basins, their common sizes, pipes and</p>	6	14

	fitting. Eco-friendly materials: eco-friendly decorating materials, eco-friendly flooring, thatch, bamboo, linoleum, cork etc.		
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**Term Work:** Term Work will be based on above mentioned topics

**Texts/References:**

- Building Construction - B.C. Punmia
- Building Materials - S.V.Deodhar, Khanna Publication
- Building Construction - Bindra and Arora
- Civil Engineering Materials - Neil Jackson & Ravindra K. Dhir - Palgrave Macmillan