



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-3

Subject: Building Construction and Materials – BETCV13306

Type of course: Professional Core

Prerequisite: NIL

Rationale: - The development of a basic understanding about the construction of different types of Structures and application of the basic principles of Engineering to solve real-life problems in construction practices is necessary for civil engineers.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			ESE		MSE	V	P	ALA	
04	00	02	05	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No.	Course content	Hrs.	% Weightage
1.	Building Materials Introduction, Properties and Classification of Materials: bricks, blocks, building stones, lime, cement, timber, sand, aggregate, mortar, concrete, tar, bitumen and asphalt, glass, flooring materials, ferrous metals, non-ferrous metals.	9	10
2.	Foundation Subsurface Investigation: Objectives, methods of boring like wash boring, percussion etc. Shallow Foundation: Types, setting out, excavation, construction, failures of foundation, and remedial measures.	12	25



	<p>Deep Foundation: Pile Foundation: Introduction, uses, selection of pile, types of piles, pile cap and pile shoe, pile driving/ boring methods, causes of failures of piles, IS Code of piling IS2911 (Part I to IV); Caissons: Definition, uses, construction material, types of caissons, loads on caisson, design features of caissons, floating of caissons, cutting edges, sinking of caisson, tilting of caisson, shifting of caisson, caisson diseases</p>		
3.	<p>Building Construction a) Stone masonry: Technical terms, joints, Classification of Stone masonry. b) Brick masonry: Technical terms, bonds in brick work. c) Other Masonry: Composite masonry, Hollow blocks masonry, Partition Wall, Cavity walls d) Lintels & arches: Lintels – types, construction. Arches – technical terms, types, construction. e) Wall Finishes: Plastering, Pointing and Painting Plain and Reinforced Concrete Construction Pre-cast and cast-in-situ Construction, Form work for R.C.C. Wall, slab, Beam and column, Centering for arches of large spans, Slip formwork - Horizontal & Vertical.</p>	12	25
4.	<p>Building Components: Doors: Location, technical terms, size, types, construction, suitability. Windows: Factors affecting selection of size, shape, location and no. of windows, types, construction, suitability, fixtures and fastenings, Ventilators Stairs and Staircases: Definition, technical terms, requirements of good stair, fixing of going and rise of a step, types of steps, classification, example – stair design/planning, elevators, escalators. Floorings: Introduction, essential requirements of a floor, factors affecting selection of flooring material, types of ground floors and upper floor, pre cast concrete floor. 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, G.I. Sheets roofs, slates, flat roof – advantages, disadvantages, types of flat terraced roofing.</p>	15	30
5.	<p>Special Works: Timbering in trenches, Control of Ground water in excavation, types of scaffoldings, shoring, underpinning, Cofferdams, Diaphragm Walls, Demolition of structures. Special Treatments: Fire resistant, water resistant, thermal insulation, acoustical construction and anti-termite treatment. Green Building as a solution to sustainable future, rating system for green building. Principles, Concepts and Case study</p>	11	10



Continuous Assessment:

Sr. No	Active Learning Activities	Marks
01	<p>Review different types Material in market and make comparative report include properties and rate of material: Faculty will assign students to select a specific building material (e.g., concrete, steel, wood) commonly used in construction. Task them with researching the properties, manufacturing processes, sustainability factors, and cost analysis of the chosen material. Have students present their findings through reports, or multimedia formats and upload on GMIU Web Portal.</p>	10
02	<p>Model Building Exercise: Faculty will assign each group of students a specific building component (e.g., Door, Window, stair etc.). Student will choose materials such as cardboard, foam sheet, plywood, etc., to construct a scaled-down model of the assigned building. Student will upload the video of model on GMIU Web Portal.</p>	10
03	<p>Green and Sustainable building: Students will be tasked by the faculty with selecting an existing building and transforming it into a green building. They will analyze the structure, incorporating principles of sustainable design to enhance its environmental performance. Upon completion, students will submit a detailed report outlining their strategies and transformations through the GMIU Web Portal.</p>	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	30%	30%	10%	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Identify building materials and its characteristics.
CO2	Develop in- depth understanding about construction materials, building components, its construction process etc., and apply the knowledge to execute normal sized building construction project.



CO3	Recognize the associated entities involved in building construction process.
CO4	Identify the factors to be considered in planning and construction of buildings.
CO5	Understand the practices and techniques for Temporary/Special construction Works.

List of Practical:

Sr. No	Descriptions	Unit No	Hrs.
01	Material identification of Brick, Lime, Timber and Aggregate	01	02
02	Details of testing for cement, concrete and bitumen	01	04
03	Setting out of foundation for frame structures.	02	02
04	Field Sample collection methods for testing of materials.	02	02
05	Student shall visit the construction site under supervision of site super	02	04
06	Draw a sketch of a Brick, stone masonry	03	04
07	Identification of different building components like doors, windows, roofs, stairs and staircase.	04	04
08	Draw a sketch of different types of Door and Windows.	04	04
09	Draw a sketch of Different types of timbering in trenches.	05	04
	Total		30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools suchas demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performanceof students in laboratory.



Reference Books:

- [1] Building Construction by B. C. Punamia
- [2] Building Construction by S. C. Rangwala
- [3] Building Construction by Gurucharan Singh
- [4] Hand book of Heavy construction: O'Brien, Havers & Stubb
- [5] Bureau of Indian Standard

