

BUILDING MATERIALS AND CONSTRUCTION PRACTICE

Course Title	Building Materials and Construction Practice.	Course Code	CE-103
Year	I year	Course Group	Foundation
Teaching Scheme in Periods (L :T :P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	150
CIE	60 Marks	SEE	40 Marks

Pre-Requisites:

Basic knowledge of Science and Chemistry at 10th class Level.

Course Outcomes (COs)

CO1	Classify traditional building materials and evaluate their properties as per IS and global standards.
CO2	Explain cement, mortar, and concrete properties, tests on cement and eco-friendly alternatives.
CO3	Identify timber, aluminium, uPVC, and protective finishes including sustainable coatings.
CO4	Describe building components, foundations, and masonry practices with global construction concepts.
CO5	Differentiate types of doors, windows, lintels, scaffolding, staircases, roofs, flooring, and finishes including acoustic treatments.
CO6	Integrate advanced green building materials, energy-efficient practices, and waste management concepts.

CO PO MAPPING

CO	PO1 – Basic & Discipline Specific Knowledge	PO2 – Problem Analysis	PO3 – Design/Development of Solutions	PO4 – Engineering Tools, Experimentation & Testing	PO5 – Engineering Practices for Society, Sustainability & Environment	PO6 – Project Management	PO7 – Lifelong Learning	Linked POs
CO1	3	1	–	–	–	–	2	1,2,7
CO2	3	1	–	–	1	–	2	1,2,5,7
CO3	3	–	–	1	1	–	2	1,4,5,7
CO4	3	–	–	1	–	–	2	1,4,7
CO5	3	1	–	1	–	–	2	1,2,4,7
CO6	3	–	–	1	1	–	2	1,4,5,7

Course Content and Blueprint of Marks for SEE

UNIT NO	UNIT NAME	PERIODS	questions to be set for SEE			
			R		U	A
1	Stones, Bricks & Tiles	25	Q4	Q1	Q9(a)	Q13(a)
2	Cement, Cement mortar and Concrete	25				
3	Timber and Surface Protective Materials	25		Q2	Q10(a)	Q14(a)
4	Classification of Buildings, foundations and Masonry	25				
5	Building components &	25		Q3	Q5, Q6	Q9(b), Q13(b),

	Protective finishes				Q11(a), Q11(b)	Q15(a), Q15(b)
6	Green Building Concepts	25		Q7, Q8	Q10(b), Q12(a), Q12(b)	Q14(b), Q16(a), Q16(b)
total		150	8		8	8

UNIT - 1: Stones, Bricks & Tiles

Duration:25 periods (L:20 – T:5)

Classification of rocks, physical classification. -Characteristics of good building stone. Common varieties of stones-granite, marble, Kadapa slab, Shahabad stones. Dressing of stones and purpose.

Manufacture of bricks-Steps only ISI specification for bricks IS-1077-1971(sizes). Characteristics of good bricks. Testing of bricks as per IS-3495-1966 – tests on water absorption and compressive strength of bricks.

Tiles –Types of tiles- roofing tiles (Mangalore tiles), floor tiles, Ceramic tiles, Vitrified tiles, Mormonite. Characteristics of good tiles. Characteristics of good sand, Functions of sand. Bulking of sand.

UNIT-2: Cement, Cement mortar and Concrete

Duration:25 periods (L:20 – T:5)

Cement, Cement mortar and Concrete -Chemical composition of cement. Method of manufacture of cement – Dry process (Flow chart only). Classification of cement – ordinary Portland cement, quick setting cement, white cement –Rapid hardening cement, Low heat cement, High alumina cement, Blast furnace slag cement and Pozzolana cement – uses of different types of cement. Tests for cement as per ISI – fineness, consistency, setting time, soundness tests.

Aggregates –Define Fine aggregate and coarse aggregate and their properties. Mortar – List Classification of mortar –Cement mortar, Surkhi Mortar, Blended mortar. Different proportions of mortars for various works. Preparation of cement mortar.

Concrete– Ingredients of plain concrete and reinforced concrete. Proportioning – usual proportions for different items of work-C.C.bed, Footings, Columns, Slabs & Beams for ordinary buildings... Water cement ratio – factors effecting water cement ratio.

Define Workability. Admixtures – types – 1) Chemical admixtures – Plasticizers (water reducers), super plasticizers, air entraining agents, accelerators and retarders 2) Mineral admixtures – Pozzolanas -fly ash, blast furnace slag, silica fume and rice husk.

UNIT 3: Timber and Surface Protective Materials

Duration:25 periods (L:20 – T:5)

Characteristics of good timber. Seasoning of timber – Importance-Common varieties of timber used for different items of work – Doors and windows, form work, centring with particular references of Telangana. Classifications as per IS codes. Aluminium – properties, uses in doors, windows, curtain walls, ACP panels. WPVC doors, uPVC – properties, applications in fenestration and piping.

Acoustics – principles of sound absorption, insulation, acoustic plastering, materials (Mineral Wool, Gypsum boards, Cement Particle boards, Magnesium Particle boards, PET felt).

Composition of Paints, enamels, varnishes. Types and uses of surface protective materials like Paints, Enamels, Varnishes, Distempers, Emulsion, French polish and Wax Polish.

Eco-friendly finishes – low-VOC paints, bio-based coatings. Smart coatings – self-cleaning, anti-graffiti, fire-retardant.

UNIT 4: Classification of Buildings, Foundations, and Masonry:

Duration:25 periods (L:20 – T:5)

Buildings, Component parts of a building –Their functions. Classification of buildings according to National building code.

Site investigation (SI) – SI for foundation as per N.B.C, Trial pit, auger boring. Bearing capacity of soils –safe and ultimate bearing capacity.

Foundations–Spread footing for columns and walls Raft foundation. Pile foundation and uses. Different loads to be considered for the design of foundation as per IS 875 – 1987. Spread foundation – Depth of foundation by Rankine’s formula– width of foundation – Thickness of concrete bed. Construction of foundation – spread footing only.

Damp Proof course –Causes, effects and prevention of dampness at basement level.

Masonry– Types, Classification of stone masonry –Random rubble and Coursed Rubble Masonry,General principles to be observed while constructing stone masonry, Brick Masonry – Bonds in brick masonry – (English bond only) for one brick thick wall – General principles to be observed in construction of brick masonry.

UNIT 5: Building components & Protective finishes

Duration:25 periods (L:20 – T:5)

Doors, windows and Lintels – parts of door window – positioning. Common types of doors- panelled, Glazed and Flush doors. Special types of doors – Flush doors with modern construction materials, revolving doors, collapsible doors, rolling shutters, sliding doors Windows – Panelled and Glazed. Ventilators – fixed, swinging type and louvered. Lintels – Functions, Scaffolding – Purpose and types – tubular scaffolding only.

Staircases –Location of stairs. Types of stairs – straight, Quarter turn, half turn, Dog legged, open well, bifurcated, spiral, helical stair cases (only line diagrams).

Roof – functions of roofs. Classification of roofs – flat roofs – pitched roofs. Different types of trusses – classification based on material and shape -King post truss, Queen post truss. Weather-proof course on R.C.C. roof-importance.

Floor –Types of flooring -Requirements of a good floor. Methods of constructing flooring – Cement Concrete flooring, Cement Plaster flooring, Tiled flooring.

Protective Finishes –Plastering – purpose – Types of plastering – procedure for plastering, external finishing – sand faced, pebble dash, acoustic plastering and marble chips. Pointing – purpose –Types of pointing.

UNIT – 6: Green Building Concepts

Duration:25 periods (L:20 – T:5)

Sustainable construction – need and benefits.

- Rating systems – LEED, GRIHA, IGBC.
- Advanced green materials – hempcrete, bamboo composites, recycled steel, phase-change materials, aerogel insulation, photovoltaic glass.
- Smart materials – self-cleaning glass, cool roofing membranes.
- Energy-efficient practices – passive design, daylighting, insulation.
- Water management – rainwater harvesting, greywater recycling.
- Waste minimization and reuse.
- Case studies of certified green buildings worldwide.

LEARNING OUTCOMES

After completing this course, the student will be able to:

1. Identify and classify building materials such as stones, bricks, tiles, timber, cement, aggregates, mortar, and concrete used in construction.
2. Explain properties, characteristics, and uses of common building materials and components in residential and public buildings.
3. Describe standard manufacturing processes and IS specifications related to bricks, cement, mortar, and concrete.
4. Perform and interpret basic laboratory and field tests on bricks, cement, and aggregates as per relevant IS codes.
5. Select suitable materials, mortar mixes, and concrete proportions for different building works.
6. Explain construction practices related to foundations, masonry, floors, roofs, stairs, doors, windows, and scaffolding.
7. Describe causes and prevention of defects such as dampness and material deterioration in buildings.
8. Explain types and applications of surface protective finishes, including plastering, painting, pointing, and modern coatings.

9. Identify eco-friendly, smart, and sustainable materials and practices used in green buildings.
10. Explain basic concepts of green building rating systems and sustainable construction methods.

MID-I EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID-II EXAM

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Year End Examination

Sl No	Unit No.	Questions to be set for YEE				Remarks	
		R		U	A		
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b)	13(b)	
					11(a)	15(a)	
6	VI			7,8	11(b)	15(b)	
		10(b)			14(b)		
				12(a)	16(a)		
				12(b)	16(b)		
Total Questions		8		8	8		

QUESTION PAPER PATTERN FOR SEMESTER END EXAM

Sl.No	Description	Level	No of Questions	Marks for each question	Choice	Total Marks
01	Part-A	Remembering(R)	8	1	Nil	8 Marks
02	Part-B	Understanding(U)	8	3	4	12 Marks
03	Part-C	Application(A)	8	5	4	20 Marks
Total Marks						40 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATION (C-26)
MID-I EXAMINATION
CE-103 Building Materials & Construction Practice
Model Question Paper

Duration: 1 Hour

Max. Marks: 20

PART-A

Instructions: Answer ALL questions. Each question carries ONE mark.

(4 × 1 = 4 Marks)

1. Define bulking of sand.
2. Write IS specification for bricks.
3. State one use of quick setting cement.
4. State types of mineral admixtures.

PART-B

Instructions: 1. Answer any ALL questions.

2. Each question carries TWO marks.

(3 × 2 = 6 Marks)

5. a) Explain the purpose of dressing of stones.

OR

- b) Write characteristics of good bricks.

6. a) Write proportions of mortars for different works.

OR

- b) Define fineness test and state its significance.

PART–C

Instructions: 1. Answer ALL questions.

2. Each question carries TWO marks.

(5 × 2 = 10 Marks)

- 7 a) Describe the manufacturing process of bricks (steps only).

OR

- b) Explain test procedure of compressive strength on bricks as per IS-3495:1966.

- 8 a) Discuss different types of cement and their applications.

OR

- b) Define water cement ratio and State factors effecting water cement ratio.

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING,
TELANGANA
DIPLOMA EXAMINATION (C-26)
MID-II EXAMINATION
CE-103 Building Materials & Construction Practice
Model Question Paper**

Duration: 1 Hour

Max. Marks: 20

PART-A

Instructions: 1. Answer ALL questions.

2. Each question carries ONE mark.

(4 × 1 = 4 Marks)

1. Define seasoning of timber.
2. List common varieties of timber used in Telangana.
3. What is ACP panel?
4. State the functions of lintels.

PART-B

Instructions: 1. Answer any THREE questions.

2 Each question carries TWO marks.

(3 × 2 = 6 Marks)

5. a) Explain composition of paints.

OR

- b) Describe eco-friendly finishes.

6. a) Discuss site investigation methods for foundations.

OR

- b) Explain Rankine's formula for depth of foundation.

PART-C

Instructions: 1. Answer any FIVE questions.

2. Each question carries TWO marks.

(5 × 2 = 10 Marks)

7. a) Differentiate random rubble and coursed rubble masonry.

OR

b) Explain English bond in brick masonry.

8. a) Describe causes and prevention of dampness in buildings.

OR

b) Explain pile foundations with neat sketches.

STATE BOARD OF TECHNICAL EDUCATION & TRAINING, TELANGANA
DIPLOMA EXAMINATION (C-26)
SEMESTER END EXAMINATION
CE-103 Building Materials & Construction Practice
Model Question Paper

Duration: 2 Hours

Max. Marks: 40

PART–A (Compulsory)

Instructions: 1. Answer ALL questions. 2. Each question carries ONE mark.

(8 × 1 = 8 Marks)

1. List any two characteristics of good building stones.
2. Define bulking of sand.
3. Write IS specification for bricks.
4. State one use of quick setting cement.
5. Define slump test.
6. State importance of seasoning timber.
7. What are causes of dampness in buildings?
8. Name any two advanced green building materials.

PART–B (Answer any FOUR, with choice A or B)

Instructions: 1. Answer any FOUR questions. 2. Each question carries THREE marks.

(4 × 3 = 12 Marks)

9. a) Explain dressing of stones. (*Unit I*)

OR

- b) List types of doors and windows. (*Unit V*)

10. a) Explain composition of paints. (*Unit III*)

OR

- b) Write short notes on rating systems for sustainable construction (LEED, GRIHA, IGBC). (*Unit VI*)

11. a) Explain different types of staircases with neat line diagrams.

OR

- b) Discuss types of roofs and trusses used in buildings.

12. a) Write notes on advanced green building materials (hempcrete, bamboo composites, aerogel insulation, photovoltaic glass).

OR

- b) Explain energy-efficient practices in green buildings.

PART–C (Answer any FOUR, with choice A or B)

Instructions:1. Answer any FOUR questions. 2. Each question carries FIVE marks.

(4 × 5 = 20 Marks)

13. a) Describe the manufacturing process of bricks with neat sketches. (*Unit I*)

OR

- b) Explain types of lintels and scaffolding. (*Unit V*)

14. a) Discuss site investigation methods for foundations as per NBC. (*Unit IV*)

OR

- b) Explain advanced smart materials used in construction (self-cleaning glass, cool roofing membranes). (*Unit VI*)

15. a) Explain methods of constructing different types of flooring.

OR

- b) Describe plastering and pointing methods with neat sketches.

16. a) Discuss water management practices in sustainable construction (rainwater harvesting, greywater recycling).

OR

- b) Write notes on waste minimization and reuse in green buildings.