

AA-106 - BUILDING MATERIALS

Course Title	Building Materials	Course Code	ID-106
Semester	I Year	Course Group	Core
Teaching scheme in Hrs (L:T:P)	4:1:0	Credits	3.00
Type of Course	Lecture + Assignments	Total Contact Hours	150
CIE	60 marks	SEE	40 Marks

Pre-Requisites

This course requires the knowledge of basic materials used in interiors.

Course Outcomes

CO1	Understand basic materials used in architecture
CO2	Analyze experimentation with the materials
CO3	Analyze Context based material application and workability
CO4	Explore different materials and its usage in architecture
CO5	Understand the strength and weakness/durability of the material in various aspects in its application

Time Schedule		
Unit No.	Unit Name	Hour
1	Stone	30
2	Brick	30
3	Clay	20
4	Sand	20
5	Timber	30
6	Cement	20
	Total	150

Course Contents:

UNIT 1 Stone

DURATION:30 HOURS

- 1.0 Classification of stones: igneous, sedimentary, metamorphic
- 1.1 Classification of stones: igneous, sedimentary, metamorphic
- 1.2 Common stones used in interiors: marble, granite, slate, limestone
- 1.3 Properties: strength, durability, porosity, finish
- 1.4 Stone finishes: polished, honed, flamed, leathered
- 1.5 Applications in interiors: flooring, wall cladding, countertops, staircases
- 1.6 Advantages, limitations, cost considerations, and maintenance

UNIT 2 Brick and Masonry Materials

DURATION: 30 HOURS

- 2.0 Types of bricks: burnt clay bricks, fly ash bricks, facing bricks
- 2.1 Brick bonds and patterns used in interiors
- 2.2 Brick finishes: exposed brickwork, painted brick, brick cladding
- 2.3 Use of bricks in feature walls, partitions, and loft-style interiors
- 2.4 Thermal and acoustic properties
- 2.5 Sustainability aspects and reuse of bricks

UNIT 3 Clay and Clay-Based Materials

DURATION: 20 HOURS

- 3.0 Types of clay: earthenware, stoneware, terracotta
- 3.1 Clay products: tiles, terracotta blocks, ceramic tiles
- 3.2 Manufacturing process of ceramic and clay tiles
- 3.3 Glazed vs unglazed tiles
- 3.4 Applications in flooring, wall tiles, sanitary spaces
- 3.5 Aesthetic qualities, durability, and maintenance

UNIT 4 Sand and Aggregates

DURATION: 20 HOURS

- 4.0 Types of sand: river sand, manufactured sand, pit sand
- 4.1 Role of sand in mortar, plaster, and concrete
- 4.2 Sand grading and quality requirements
- 4.3 Interior plaster finishes and textures
- 4.4 Decorative sand finishes and exposed aggregate surfaces
- 4.5 Handling, storage, and sustainability considerations

UNIT 5 Timber and Wood-Based Materials

DURATION: 30 HOURS

- 5.0 Types of timber: hardwood and softwood
- 5.1 Common interior woods: teak, oak, pine, plywood, MDF, HDF
- 5.2 Seasoning and preservation of timber
- 5.3 Wood finishes: polish, paint, veneer, laminate
- 5.4 Applications: furniture, flooring, doors, wall paneling
- 5.5 Advantages, limitations, and maintenance

UNIT 6 Cement and Cement-Based Products

DURATION: 30 HOURS

- 6.0 Types of cement: OPC, PPC, white cement
- 6.1 Cement mortar and concrete basics
- 6.2 Cement-based interior finishes: plaster, screed, terrazzo
- 6.3 Decorative cement products: concrete tiles, cement boards
- 6.4 Uses in flooring, wall finishes, countertops
- 6.5 Cracks, defects, and basic repair techniques

Reference Books:

- Building materials and construction S. C. Rangwala.

Specific learning Outcomes

CO1 Stone

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

- 1.1 Classify stones used into igneous, sedimentary, and metamorphic types.
- 1.2 Identify common stones such as marble, granite, slate, and limestone and describe their characteristics.
- 1.3 Explain the properties of stones including strength, durability, porosity, and surface finish.
- 1.4 Differentiate between various stone finishes and assess their suitability
- 1.5 Select appropriate stone materials for flooring, wall cladding, countertops, staircases,.
- 1.6 Evaluate advantages, limitations, cost factors, and maintenance requirements of stone used.

CO2 Brick and Masonry Materials

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

- 2.1 Identify different types of bricks used and explain their properties.
- 2.2 Recognize brick bonds and patterns commonly employed
- 2.3 Compare brick finishes such as exposed, painted, and cladded brickwork.
- 2.4 Apply bricks effectively in feature walls, partitions, and loft-style
- 2.5 Explain the thermal and acoustic performance of brick masonry in
- 2.6 Assess sustainability aspects, including reuse and recycling of bricks

CO3 : Clay and Clay-Based Materials

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

- 3.1 Differentiate between types of clay such as earthenware, stoneware, and terracotta.
- 3.2 Identify clay-based products, including tiles, terracotta blocks, and ceramic tiles.
- 3.3 Explain the manufacturing process of ceramic and clay tiles.
- 3.4 Distinguish between glazed and unglazed tiles based on performance and application.
- 3.5 Select suitable clay products for flooring, wall finishes, and sanitary spaces.
- 3.6 Evaluate aesthetic qualities, durability, and maintenance needs of clay-based materials.

CO4 : Sand and Aggregates

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

- 4.1 Identify different types of sand used in construction

- 4.2 Explain the role of sand and aggregates in mortar, plaster, and concrete.
- 4.3 Describe sand grading and quality requirements.
- 4.4 Recognize various interior plaster finishes and textures achieved using sand.
- 4.5 Apply decorative sand finishes and exposed aggregate surfaces.
- 4.6 Adopt proper handling, storage, and sustainable use practices for sand and aggregates.

CO5 : Timber and Wood-Based Materials

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

- 5.1 Classify timber into hardwood and softwood and identify their uses.
- 5.2 Identify common wood materials such as teak, oak, pine, plywood, MDF, and HDF.
- 5.3 Explain seasoning and preservation methods for timber
- 5.4 Differentiate wood finishes including polish, paint, veneer, and laminate.
- 5.5 Select suitable timber and wood-based materials for furniture, flooring, doors, and wall paneling.
- 5.6 Evaluate advantages, limitations, and maintenance requirements of timber

CO6 : Cement and Cement-Based Products

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

- 6.1 Identify different types of cement and explain their properties and uses.
- 6.2 Explain the basics of cement mortar and concrete relevant
- 6.3 Recognize cement-based interior finishes such as plaster, screed, and terrazzo.
- 6.4 Identify decorative cement products.
- 6.5 Apply cement-based materials in flooring, wall finishes, and countertops.
- 6.6 Identify common cracks and defects in cement-based finishes and suggest basic repair techniques.

Cocurricular activities:

- 1. Material surveys
- 2. Visit to building material exhibitions
- 3. Material Museum

CO-PO MATRIX

	Basic knowledge	Discipline	Experiments and practice	Engineering tools	Engineer and society	Environment and	Ethics	Individual and team work	Communication	Lifelong learning	
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	Mapped POs
CO1	x				x						1,5
CO2	x	x						x	x		1,2,8,9
CO3					x		x				5,7
CO4					x		x	x	x		5,7,8,9
CO5	x	x		x	x	x					1,2,4,5,6

EXAMINATION PATTERN							
MID SEM - I EXAM (Duration of Exam: 1 Hour)							
		PART A		PART B	PART C	Total Marks	
Marks/Question		1 Mark each		3 Marks each	5 Marks each	20 Marks	
No. of Questions		4 Questions		2/4 Questions	2/4 Questions		
S.No.	Unit No.	R		U	A	Remarks	
1	UNIT I	1,2		5(a) or 5 (b)	7(a) or 7(b)		
2	UNIT II	3,4		6(a) or 6(b)	8(a) or 8(b)		
Total Questions		4		4	4		
Total Marks		4		6	10	20 Marks	
MID SEM - II EXAM (Duration of Exam :1 Hour)							
1	UNIT III	1,2		5(a) or 5 (b)	7(a) or 7(b)		
2	UNIT IV	3,4		6(a) or 6(b)	8(a) or 8(b)		
Total Questions		4		4	4		
Total Marks		4		6	10	20 Marks	
SEMESTER END EXAMINATION (Duration of Exam: 2 Hours)							
		PART A		PART B	PART C	Total Marks	
Marks/Question		1 Mark each		3 Marks each	5 Marks each	40 Marks	
No. of Questions		8 Questions		4/8 Questions	4/8 Questions		
S.No.	Unit No.	R		U	A	Remarks	
1	UNIT I	4	1		9(a)	13(a)	
2	UNIT II						
3	UNIT III		2		10(a)	14(a)	
4	UNIT IV						
5	UNIT V		3	5,6	9(b)	13(b)	
					11(a)	15(a)	
					11(b)	15(b)	
6	UNIT VI			7,8	10(b)	14(b)	
		12(a)			16(a)		
				12(b)	16(b)		
Total Questions		8		8	8		
Total Marks		8		12	20	40 Marks	

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING BOARD DIPLOMA MID SEM – I EXAMINATION (C-26)

AA-106– BUILDING MATERIALS

MID–SEM I EXAMINATION

Duration: 1 Hour

Maximum Marks: 20

Units Covered: Unit I – Stone, Unit II – Brick

Instructions

1. Answer all questions in Part A.
 2. Answer any TWO questions from Part B.
 3. Answer any TWO questions from Part C.
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PART – A

(4 × 1 = 4 Marks)

1. Define metamorphic stone.
2. Name one stone finish used in interiors.
3. What is a fly ash brick?
4. Name any one brick bond.

PART – B

(2 × 3 = 6 Marks)

5. (a) Classify stones based on their origin.
OR
(b) List any three properties of stones used in interior design.
6. (a) List different types of bricks used in interiors.
OR
(b) Explain exposed brickwork as an interior finish.

PART – C

(2 × 5 = 10 Marks)

7. (a) Explain various stone finishes and their applications in interior design.
OR
(b) Discuss advantages, limitations, and maintenance of stone used in interiors.
8. (a) Explain brick bonds and patterns used in interior spaces with examples.
OR
(b) Discuss the thermal and acoustic properties of brick masonry in interiors.

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING BOARD DIPLOMA MID SEM – I EXAMINATION (C-26)

AA-106– BUILDING MATERIALS

MID–SEM II EXAMINATION

Duration: 1 Hour

Maximum Marks: 20

Units Covered: Unit III – Clay, Unit IV – Sand

Instructions

1. Answer all questions in Part A.
2. Answer any TWO questions from Part B.
3. Answer any TWO questions from Part C.

PART – A

(4 × 1 = 4 Marks)

1. What is stoneware?
2. Name one clay-based tile used in interiors.
3. Define manufactured sand.
4. What is meant by sand grading?

PART – B

(2 × 3 = 6 Marks)

5. (a) Differentiate between earthenware and stoneware.
OR
(b) List applications of clay-based materials in interiors.
6. (a) Explain the role of sand in mortar and plaster.
OR
(b) List any three interior plaster finishes.

PART – C

(2 × 5 = 10 Marks)

7. (a) Explain the manufacturing process of ceramic tiles and their interior applications.
OR
(b) Differentiate between glazed and unglazed tiles with suitable uses.
8. (a) Explain types of sand and quality requirements for interior works.
OR
(b) Discuss decorative sand finishes and exposed aggregate surfaces used in interiors.

MODEL QUESTION PAPER

STATE BOARD OF TECHNICAL EDUCATION AND TRAINING BOARD DIPLOMA SEMESTER EXAMINATION (C-26)

AA-106– BUILDING MATERIALS

Semester End Examination (SEE)

Duration: 2 Hours

Maximum Marks: 40

Instructions to Candidates

1. Answer all questions in Part A.
2. Answer any FOUR questions from Part B.
3. Answer any FOUR questions from Part C.
4. Draw neat sketches wherever necessary.

PART – A

(8 × 1 = 8 Marks)

(Answer all questions)

1. Define igneous rock.
2. Name any one brick bond used in interiors.
3. What is terracotta?
4. Define sand grading.
5. Give one example of hardwood.
6. What is seasoning of timber?
7. Expand OPC.
8. Name one cement-based interior finish.

PART – B

(4 × 3 = 12 Marks)

(Answer any FOUR questions)

9. (a) Classify stones based on their origin.
OR
(b) List any three properties of stones used in interior design.
10. (a) Explain any three types of bricks used in interiors.
OR
(b) Explain exposed brickwork as an interior finish.
11. (a) Differentiate between glazed and unglazed tiles.
OR
(b) List applications of clay-based materials in interiors.
12. (a) Explain the role of sand in mortar and plaster.
OR
(b) List any three decorative sand finishes used in interiors.
13. (a) Differentiate between hardwood and softwood.
OR
(b) List any three wood finishes used in interior design.
14. (a) List different types of cement used for interior works.
OR
(b) Mention any three common defects in cement-based finishes.

PART – C

(4 × 5 = 20 Marks)

(Answer any FOUR questions)

15. (a) Explain the properties, finishes, and interior applications of natural stone.
OR
(b) Discuss advantages, limitations, and maintenance of stone used in interiors.

16. (a) Explain types of bricks and their use in interior spaces with suitable examples.
OR
(b) Discuss thermal, acoustic, and sustainability aspects of brick masonry.
17. (a) Describe the manufacturing process of ceramic tiles and their interior applications.
OR
(b) Explain different types of clay and clay-based products used in interiors.
18. (a) Explain types of sand, grading requirements, and their importance in interior finishes.
OR
(b) Discuss interior plaster finishes and exposed aggregate surfaces.
19. (a) Explain seasoning and preservation methods of timber used in interior design.
OR
(b) Discuss applications, advantages, and maintenance of timber in interiors.
20. (a) Explain cement-based interior finishes such as plaster, screed, and terrazzo.
OR
(b) Discuss cracks and defects in cement finishes and suggest basic repair techniques.