

25UMCET301	BUILDING MATERIALS	Category	L	T	P	R	Credit	Year of Introduction
		VAC	4	0	0	0	4	2025

Preamble: This course introduces the properties, behavior, and applications of conventional and modern building materials used in construction. It emphasizes material selection, durability, and quality aspects for safe and economical structures. The course also highlights sustainable and innovative materials for environmentally responsible construction.

Prerequisite: Nil

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO1	Explain manufacturing, properties, and applications of conventional building materials.	K2 Understand
CO2	Describe properties, behavior, and applications of concrete, steel, and special concretes.	K2 Understand
CO3	Explain finishing materials and their performance in building applications.	K2 Understand
CO4	Describe modern, smart, and sustainable building materials and their applications.	K2 Understand

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	2	1	–	–	–	–	–	–	–
CO2	3	2	2	1	–	–	–	–	–	–	–
CO3	2	1	1	–	–	1	–	–	–	–	–
CO4	2	1	2	–	–	2	–	–	–	–	1
Avg	2.5	1.25	1.75	1	-	1.5	-	-	-	-	1

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*	*			*	
CO2	*	*	*	*	*			*	
CO3	*	*	*	*	*		*		
CO4	*	*	*	*	*		*	*	

Wks Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*		*	*	

Mark Distribution:

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	40	60	2.5 hrs

Continuous Internal Evaluation Pattern:

Attendance : 5 marks
Continuous Assessment Test : 20 marks
Continuous Assessment Assignment/Activity : 15 marks

SYLLABUS**Module 1 (14 hrs)**

Stone: Classification, quarrying, dressing, and properties, Uses and selection criteria - Brick: Brick manufacturing, types, properties, and defects - Lime: types, properties, and applications - Cement: Manufacturing process, types of cement, and properties. Setting and hardening of cement - Aggregates and Mortar: Classification, grading, and properties of aggregates. Types and properties of mortar - Timber: Structure of timber, seasoning methods, defects, preservation, and engineered wood.

Module 2 (14 hrs)

Concrete: Ingredients, water-cement ratio, workability, and strength - Mix design basics and durability of concrete - Special Concretes: High-strength concrete, Fibre reinforced concrete, Self-compacting concrete, Geopolymer concrete - Steel: Types of reinforcing steel and manufacturing process, Mechanical properties and corrosion of steel - Admixtures and durability improvement techniques.

Module 3 (14 hrs)

Glass and Plastics: Types, properties, and applications in buildings - Flooring and Tiles: Ceramic tiles,

vitrified tiles, stone flooring, and wooden flooring- Paints and Surface Finishes:Constituents, types, defects, and application methods,Varnishes, distempers, and coatings-Insulating and Waterproofing Materials:Thermal and acoustic insulation materials -Waterproofing compounds and sealants

Module 4 (14 hrs)

Composite Materials: Fibre reinforced polymers and sandwich panels- Applications in strengthening and retrofitting- Geosynthetics:Types, functions, and applications in civil engineering-Smart and Advanced Materials:Shape memory alloys, self-healing concrete, and nano materials- Sustainable Materials:Recycled aggregates and green concrete,Fly ash, GGBS, and alternative eco-friendly materials

Recommended Activity(Suggested topics)

1. Visit to a construction site,observe material storage, batching, mixing, and quality control practices.Document different materials used and sustainability measures adopted.
2. Study green building materials (fly ash bricks, geopolymers concrete, recycled aggregates, bamboo). Evaluate environmental benefits and propose applications in local construction.

Text Books:

1. Duggal, S. K. (2020). *Building materials* (5th ed.). McGraw Hill Education.
2. Mishra, A. K. (2018). *Building materials and construction* (1st ed.). S. Chand Publishers.
3. Punmia, B. C. (2020). *Building materials and construction* (10th ed.). Laxmi Publications.
4. Shetty, M. S. (2019). *Concrete technology* (8th ed.). S. Chand Publishers.

Reference Books:

1. Neville, A. M. (2012). *Properties of concrete* (5th ed.). Pearson Education.
2. Gambhir, M. L. (2017). *Concrete technology: Theory and practice* (5th ed.). Tata McGraw-Hill Education.

END SEMESTER EXAMINATION – MODEL QUESTION PAPER

Course Code	25UMCET301
Course Name	BUILDING MATERIALS
Max. Marks: 60	Duration: 2.5 Hours

Part A <i>(Answer all questions. Each question carries 3 marks)</i>				
Qn No.	Question	Marks	CO	BL
1	Outline the desirable properties of a good building stone.	3	1	L2
2	Explain the common defects found in bricks.	3	1	L2
3	Outline the advantages of fibre reinforced concrete.	3	2	L2
4	Explain the causes of corrosion in steel.	3	2	L2
5	Differentiate between ceramic tiles and vitrified tiles.	3	3	L2
6	Explain the purpose of thermal insulation materials.	3	3	L2
7	Outline the functions of geosynthetics.	3	4	L2
8	Explain the role of nanomaterials in construction.	3	4	L2
Part B <i>(Answer any one full question from each Module. Each carry 9 marks)</i>				
Module I				
Qn No.	Question	Marks	CO	BL
9.a	Explain the manufacturing process of cement and discuss its important properties.	6	1	L2
9.b	Summarize the common defects found in bricks.	3	1	L2
OR				
10.a	Explain the types and properties of mortar used in construction.	6	1	L2
10.b	Describe the methods of seasoning of timber.	3	1	L2
Module II				
Qn No.	Question	Marks	CO	BL
11	Explain the types of admixtures and their role in improving concrete durability.	9	2	L2
OR				
12	Describe the basics of concrete mix design and durability requirements.	9	2	L2
Module III				
Qn No.	Question	Marks	CO	BL
13. a	Explain the properties and uses of plastics in construction.	5	3	L2

13. b	Summarize the constituents of paint.	4	3	L2
OR				
14. a	Compare ceramic tiles, vitrified tiles, stone flooring, and wooden flooring.	5	3	L2
14. b	Differentiate between varnish and distemper.	4	3	L2
Module IV				
Qn No.	Question	Marks	CO	BL
15	Explain the role of composite materials in strengthening and retrofitting structures.	9	4	L2
OR				
16	Describe the concept of sustainable materials and their importance in construction.	9	4	L2