



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Architecture

Level: Diploma

Branch: Architecture

Course / Subject Code: DA01063031

Course / Subject Name: Building Materials -I

w. e. f. Academic Year:	2025-26
Semester:	First
Category of the Course:	Building Sciences and Applied Engineering(BS&AE)

Prerequisite:	Zeal to learn the subject.
Rationale:	This course introduces the learners to the basic building materials used in the construction industry. Building material is an integral part of the architectural field. The site condition, as well as the nature of its surroundings, determines the building type, and choice of building materials to be used. The type and form of structure is determined by the type of material used. The proper choice of building material is very important as it glorifies the endurance and visual aspects of design. It also helps in enhancing the aesthetic quality of a building— venustas (beauty) and firmitas (structure). This course gives a brief description about different types of materials used in building construction projects. Properties of various construction materials and their uses are discussed in this subject. This course will not only help diploma students in identifying suitable building material as per the type of building but also maintain its aesthetic aspects.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Classify the various building materials
02	Select the relevant man-made materials like bricks, cement, concrete, artificial stone, etc. as per architectural project requirements
03	Select the relevant natural materials like stone/rock, timber, lime, etc. as per architectural project requirements
04	Differentiate between various types of binding materials in a given situation

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+P	Assessment Pattern and Marks				Total Marks
L	T	P	C	Theory		Tutorial / Practical		
				ESE (E)	CA (M)	CA (I)	ESE (V)	
3	0	0	3	70	30	20	0	120



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Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, CA - Continuous Assessment; ESE -End Semester Examination.

Important note: The 20 marks under the theory CA (I) are for assessment of the suggested projects / market survey / reports / assignments to facilitate integration of all COs.

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction: 1.1 Definition and Classifications of building materials 1.2 Characteristics of Building Materials and their application in architecture 1.3 Properties of the given building materials 1.4 Factors affecting the selection of material	03	7
2.	Bricks: 2.1. Composition of Bricks: Constituents of good brick earth 2.2. Manufacture of Bricks: Preparation of Clay, Moulding, Drying, Burning 2.3. Classification of Bricks 2.4. Qualities of Good Brick 2.5. Special Types of Bricks 2.6. Tests for Bricks 2.7. Grading of Bricks 2.8. Size and weight of bricks	09	20
3.	Stones: 3.1 Classification of Rocks: Geological, Physical, Chemical 3.2 Qualities of a good building stone 3.3 Characteristics of different stones: e.g., Granite, Ballast, Sand Stone, Lime Stone, Marble, Slate, etc. 3.4 Artificial Stones: Cement Concrete, Mosaic tiles, Terrazzo, etc. 3.5 Advantages of artificial stones 3.6 Aggregates: Fine Aggregates, Coarse Aggregates 3.7 Grading of Aggregates	09	20
4.	Timber: 4.1 Uses of Timber 4.2 Classification of trees: Endogenous trees, Exogenous trees 4.3 Comparison of Soft wood and Hard wood 4.4 Structure of tree: Macro structure, Micro structure 4.5 Defects in Timber: Defects due to conversion, Defects due to fungi, Defects due to insects, Defects due to natural forces, etc. 4.6 Wood based products: Veneers, Plywood, Fibre boards, etc. 4.7 Characteristics of good timbers	09	20



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	4.8	Seasoning of Timber and its Importance		
5.		Lime, Cement and Sand: 5.1 Lime: Types, Properties & Uses 5.2 Comparison among properties of different types of lime 5.3 Lime mortar, different proportions, Properties of good mortar 5.4 Storing & slaking of lime 5.5 Cement: Ingredients and Functions 5.6 Types of cement 5.7 Uses of cement 5.8 Cement Mortar: Proportion and Use 5.9 Admixtures – Uses 5.10 Sand: Sources, Characteristics, Grading of sand, Bulking of sand	09	20
6.		Concrete: 6.1 Concrete – Constituents, Requirements 6.2 Function of water 6.3 Uses of Concrete 6.4 Types of Concrete 6.5 Preparation of concrete mix: Hand mixing, Machine mixing 6.6 Compaction – Methods: Hand compaction, Mechanical compaction 6.7 Curing of concrete	06	13
Total			45	100

Suggested Specification Table with Marks (Theory):

Unit No.	Unit Title	Distribution of Theory Marks						Total
		R Level	U Level	A Level	N Level	E Level	C Level	
I	Introduction	03	02	02	0	0	0	07
II	Bricks	04	06	04	0	0	0	14
III	Stones	04	06	04	0	0	0	14
IV	Timber	04	06	04	0	0	0	14
V	Lime, Cement and Sand	04	06	04	0	0	0	14
VI	Concrete	02	02	03	0	0	0	07
Total		21	28	21	0	0	0	70
%		30	40	30	0	0	0	100

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:



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(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Engineering Materials (Material Science)	Rangwala	Charotar Publishing House Pvt. Ltd., Anand, ISBN: 9789385039171
2	Building Construction	Sushil Kumar	Standard Publishers Distributors, ISBN 13: 9788180141683
3	The text book of Building Construction	S. P. Arora, S. P. Bindra	Dhanpat Rai Publications, ISBN 13: 9788189928803
4	A text book of Building Construction	Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publications (P) Ltd., ISBN: 81-7008-053-3
5	Building Materials	S. K. Duggal	New Age International (P) Limited, Publishers ISBN (13):978-81-224-2975-6
6	Building Construction	Dr. Janardan Jha, Prof. S. K. Sinha	Kanna Publisher, ISBN-10: 978817409263 2
7	Building Materials in Civil Engineering	H. Zhang	(Woodhead Publishing, 2011) ISBN: 978-1-84569-955-0 (print) ISBN: 978-1-84569-956-7 (online)
8	Building Construction and Material (SI Units)	Gurcharan Singh	Standard Book House ISBN: 978-81-89401-21-4

(b) Open-source software and website:

1. <http://www.nptelvideos.in/2012/11/building-materials-and-construction.html>
2. https://www.vssut.ac.in/lecture_notes/lecture1424085991.pdf
3. <https://nptel.ac.in/courses/105/106/105106206/>
4. <https://nptel.ac.in/courses/124/105/124105013/>
5. <https://nptel.ac.in/courses/105/102/105102088/>

Suggested Project List:

- a) Conduct Market survey for the building materials.
- b) Prepare a report on the market survey supported with the photographs.

Suggested Activities for Students:

- a) Visit of construction sites to study the uses of building materials and prepare a report.
- b) Visit to historical structures to study uses of stone and other materials.
