



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor in Architecture

Branch: UG

Subject Code: BA01050031

Subject Name: Building Construction-I

W.e.f. Academic Year:	2026-27
Semester:	1st
Category of the Course:	Building Sciences and Applied Engineering (BS&AE)

Prerequisite:	Zeal to learn the subject.
Rationale:	<p>This course introduces the learners to the basic building materials used in the construction industry: historically and currently. 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.</p> <p>The proper choice of building material and technique is very important as it glorifies the endurance and visual aspects of design. This course gives a brief description about different types of materials used in building construction projects.</p> <p>Properties of various building construction methodologies with different materials and their uses are discussed in this subject.</p>

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Understand the properties and uses of various materials used for building construction.
02	Compare the different alternative materials suitable for the given requirement.
03	Select suitable materials for building construction for the given requirement.
04	Learn building construction methodologies with different materials.

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)	PA/ CA(M)	PA/CA(I)	ESE (V)	
2	0	4	6	50	50	0	0	100



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Course Content: Theory

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction: 1.1 Definition and Classifications of building components and parts: structural and non structural 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	4	15
2.	Building Construction materials: 2.1 Introduction to various building construction materials: mud, brick, stone, timber, bamboo, cement and concrete 2.2 Aim is to explore above mentioned materials in terms of their application and variation in the uses via presentations and case studies.	6	25
3.	Building Construction methodologies: 3.1Mud construction: 3.1.1Understanding soil types, constituents, and criteria for soil suitable for construction 3.1.2Learning various techniques of soil construction, including but not limited to: Wattle and daub, Cob, Adobe, Rammed earth, earth bag and compressed earth blocks (CEB). 3.1.3These can be taught via scaled models made from mud and drawings of construction process. 3.2Stone construction: 3.2.1Formation of rock, its types and rock extraction, understanding suitability of major classification of rocks for construction purpose. 3.2.2Learning various stone construction techniques including but not limited to <u>Rubble Masonry</u> : Un-coursed Random Rubble, Coursed Rubble Masonry, Polygonal Rubble Masonry, Flint Rubble Masonry, & Dry Rubble Masonry. And <u>Ashlar masonry</u> : Ashlar Fine Masonry, Ashlar Rough Tooled Masonry, Rock or Quarry Faced Masonry, Ashlar Chamfered Masonry, Ashlar Block in Course.	20	60



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	<p>3.3Bamboo Construction:</p> <p>3.3.1Types, parts, growth, harvesting, identifying defects and seasoning for bamboo in order to be used for construction.</p> <p>3.3.2Understanding various bamboo joineries used in bamboo construction including but not limited to: Lashing, Fish mouth (Radial) Joint, Saddle (Butt) Joint, Pinned/Doweled Joints, Internal Splice, and Keyhole/Bolt Joint.</p> <p>3.4Timber constructing:</p> <p>3.4.1Types of timber-plywood, laminates, veneers, Block board, particle boards, Fiber boards growth, harvesting, understanding defects and various methods seasoning of timber in order to be used for construction.</p> <p>3.4.2Timber joinery: understanding grains and knots and ideal cuts for the mentioned joineries including but not limited to: Butt joint, Dado, Lap, Rabbet, Scarf, Mortise and Tenon, Dovetail, Finger, Half-Lap, Tongue and Groove, Miter Joint. Also include joinery reinforcements such as key/biscuit, dowel and spline joint.</p> <p>3.5Brick constructing:</p> <p>3.5.1Process of manufacturing bricks, its parts, grades of brick and identification of defects of brick.</p> <p>3.5.2Brick masonry: masonry and its components like courses, mortar, vertical joints & its staggering, plumb line and wall thicknesses.</p>		
	Total:	30	100

Suggested Specification Table with Marks :

Unit No.	Unit Title	Distribution of Theory Marks						Total
		R Level	U Level	A Level	N Level	E Level	C Level	
I	Introduction	5	3	2	0	0	0	10
II	Building construction materials	5	7	3	0	0	0	15
III	Building construction methodologies	5	5	15	0	0	0	25
	Total	15	15	20	0	0	0	50



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	Total percentage	30	30	40	0	0	0	100
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Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

Books:

S. 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 Materials	S. K. Duggal	New Age International (P) Limited, Publishers ISBN(13):978-81-224-2975-6
3	Building Construction	S.C. Rangwala	Charotar Publishing House Pvt. Ltd., Anand, ISBN:9788185594873
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	The text book of Building Construction	S. P. Arora, S. P. Bindra	Dhanpat Rai Publications, ISBN13: 9788189928803 ISBN:978-1-84569-956-7(online)
6	Material Architecture Paperback-Illustrated	John Fernandez	Routledge ISBN-10: 0750664975 ISBN-13:978-0750664974

Open-source software and website:

- <https://nptel.ac.in/courses/124106455>: includes mud, stone, & bamboo as chapters in as part of the course
- <https://nptel.ac.in/courses/105106206>: part 2, part 3 and part 4: for stone, brick and mortar.
- https://onlinecourses.nptel.ac.in/noc23_ar10/preview : for building materials and composites.

Suggested Course Practical List:

Unit No.	Content	No. of Hours	% of Weightage
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1	Introduction: 1.1 Photographic documentation of various building components, in any accessible site, ensuring to cover all components.	8	15
2	Building Construction materials: 2.1 Case studies and presentation of buildings constructed with these materials, their scale, detailing and structural systems in digital or report form.	12	25
3	Building Construction methodologies: 3.1Mud construction: 3.1.1 Drawings of construction process and scaled model of wall prototypes made from mud. 3.2Stone construction: 3.2.1 Drawings and case studies of local buildings which have walls in stone masonry. 3.3Bamboo Construction: 3.3.1 Drawing and using bamboo or cpvc pipes for making models. 3.4Timber constructing: 3.4.1 Drawing sheets and utilizing wooden joint prototypes in any model making material. 3.5Brick constructing: 3.5.1 Scaled sheet drafting and creating appropriately scaled wall prototypes with modular bricks in Styrofoam, MDF or any other suitable material.	40	60
	Total:	60	100

List of Laboratory/Learning Resources Required: NA

Suggested Project List:

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

Suggested Activities for Students:

- Study of on-going constructions works and documentation of the same in the form of a report with photographs and sketches.
- Sample collection for various construction materials.