

Branch Name:	Civil engineering
Program Code:	ET401
Course Name:	Construction Material
Course Code:	2ET4010304
Pre-requisite Course:	---

COURSE OBJECTIVE:

Following are the objectives of this course:

- To learn about various construction materials, and understand their relevant characteristics.
- To be able to identify quality control measures and techniques to ensure the consistency and reliability of construction materials in real-world applications.
- Examine case studies of successful and unsuccessful applications of construction materials in actual construction projects.
- Analyze the environmental impact of different construction materials and explore sustainable alternatives.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment
03	-	02	04	60	40	20	30

DETAILS OF COURSE CONTENTS:

Sr. No.	TOPIC	Total Hrs.	WEIGHTAGE
1	OVER VIEW OF CONSTRUCTION MATERIALS: 1.1 Scope of construction materials in Building Construction, Transportation Engineering, Environmental Engineering, Irrigation Engineering (applications only). 1.2 Selection of materials for different civil engineering structures on the basis of strength, durability, Eco friendly and economy. 1.3 Basic over view of modern construction material like liquid granite, hydro-ceramic, richlite.	04	10%
2	NATURAL CONSTRUCTION MATERIALS: 2.1 Requirements of good building stone; general characteristics of stone; quarrying and dressing methods and tools for stone. 2.2 Structure of timber, general properties and uses of good timber, different methods of seasoning for preservation of timber, defects in timber, use of bamboo in construction. 2.3 Asphalt, bitumen and tar used in construction, properties and uses. 2.4 Properties of lime, its types and uses. 2.5 Classification of coarse aggregate according to size	12	28%

3	ARTIFICIAL CONSTRUCTION MATERIALS: 3.1 Constituents of brick earth, Conventional / Traditional bricks, Modular and Standard bricks, Special bricks –fly ash bricks, Characteristics of good brick, Field tests on Bricks, Classification of burnt clay bricks and their suitability, Manufacturing process of burnt clay brick, fly ash bricks, Aerated concrete blocks. 3.2 Flooring tiles–Types, uses 3.3 Manufacturing process of Cement dry and wet (Only flowchart), types of cement and its uses, field tests on cement. 3.4 Pre-cast concrete blocks-hollow, solid, pavement blocks, and their uses. 3.5 Plywood, particleboard, Veneers, laminated board and their uses. 3.6 Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. 3.7 Basic knowledge of eco-friendly material (aero-gel, transparent wood)	10	24%
4	SPECIAL CONSTRUCTION MATERIALS: 4.1 Types of material and suitability in construction works of following materials: Waterproofing, Termite proofing; Thermal and sound insulating materials. 4.2 Fibbers’–Types–Jute, Glass, Plastic Asbestos Fibres (only uses). 4.3 Geo polymer cement: Geo-cement: properties, uses.	06	14%
5	PROCESSED CONSTRUCTION MATERIALS: 5.1 Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses. (Situations where used). 5.2 Industrial waste materials- Fly ash, Blast furnace slag, Granite and marble polishing waste and their uses. 5.3 Argo waste materials - Rice husk, Biogases, coir fibres’ and their uses. 5.5 Special processed construction materials; Geo-synthetic, Ferro Crete, Artificial timber, Artificial sand and their uses.	10	24%

LIST OF PRACTICAL:

Sr. No.	Experiment / Exercises
1	Conduct local market survey for different civil engineering materials with respect to applications cost and quality.
2	Perform tests on given sample of brick such as Soundness, Water absorption , Compressive strength
3	Conduct field test on given sample of brick and cement
4	Perform lab tests on given sample of cement Initial and final setting time, Compressive strength
5	Conduct field test on given sample of fine and coarse aggregate
6	Perform test on given sample of fine aggregate Sieve analysis , Silt and clay content
7	Assess the quality of different types of timber and timber products (please arrange to visit nearby saw mill or timber mart)

LIST OF REFERENCES:

Sr.no.	Title	Author
1	Engineering Materials	Dr. Janardan Jha
2	Building materials	S. K. Duggal
3	Engineering Materials	S C Rangwala
4	Civil Engineering materials	TTTI ,Chandigarh

LIST OF OPEN SOURCE SOFTWARE/LEARNING WEBSITE:

- 1) www.academia.edu
- 2) www.nptel.iitm.ac.in
- 3) "https://en.wikipedia.org/w/index.php?title=Dumbwaiter_(elevator)&oldid=621761813"
- 4) www.bis.org.in/sf/nbc.htm
- 5) cpwd.gov.in/Units/handbook.pdf
- 6) <https://www.civilengineeringnews.tk/2014/07/methods-of-demolition-of-building.html>
thecontractor.org

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To learn about various construction materials, and understand their relevant characteristics.	1 Remembering 2 Understanding
CLO2	To be able to identify suitability of various materials for different construction purposes.	2 Understanding 3 Applying,
CLO3	To know about natural, artificial, and processed materials available for various purposes of Construction activities.	2 Understanding 4 Analyzing
CLO4	Select relevant artificial construction materials.	3 Applying, 5 Evaluating
CLO5	Select relevant special type of construction materials.	3 Applying, 5 Evaluating

Course Learning Outcomes	Program Outcomes(Po's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO1	H		L									
CLO2	M		L				H					
CLO3	H					L			M			
CLO4	M		M									
CLO5	H		M	L			M					M

H: High, M: Medium, L: Low