

Subject Code: 1ET4010304	Subject Title: Construction Materials
Pre-Requisite	

RATIONALE:

The selection of materials for engineering purpose is very much crucial activity. In civil engineering any material of construction, the first and for most necessity is to know its properties, suitability, strength and durability. Based on this, one can suggest the most suitable material which may fit the exact requirement of the construction items. In this course, the technology related to some of the important and widely used construction materials has been dealt with. This course will enrich civil engineering technicians in performing their jobs with ease and confidence and will be able to select appropriate material for the given item of work on site.

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 suitability of various materials for different construction purposes.
- To know about natural, artificial, and processed materials available for various purposes of construction activities.

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
3	-	2	4	60	40	20	30

DETAILS OF COURSE CONTENTS:

S. NO.	TOPIC	Total Hrs.	WEIGHT
1	OVERVIEW 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 Broad classification of materials – Natural, Artificial, special, finishing and recycled.	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 Types of soil and its suitability in construction. 2.6 Properties of sand and uses 2.7 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, particle board, Veneers, laminated board and their uses. 3.6 Types of glass: soda lime glass, lead glass and borosilicate glass and their uses. 3.7 Ferrous and non-ferrous metals and their uses.	10	24
4	SPECIAL CONSTRUCTION MATERIALS: 4.1 Types of material and suitability in construction work of following materials: Waterproofing, Termite proofing; Thermal and sound insulating materials. 4.2 Fibers –Types –Jute, Glass, Plastic Asbestos Fibers, (only uses). 4.3 Geopolymer cement: Geo-cement: properties, uses.	06	14
5	PROCESSED CONSTRUCTION MATERIALS: 5.1 Constituents and uses of POP (Plaster of Paris), POP finishing boards, sizes and uses. 5.2 Paints- whitewash, cement paint, Distempers, Oil Paints and Varnishes with their uses. (Situations where used). 5.3 Industrial waste materials- Fly ash, Blast furnace slag, Granite and marble polishing waste and their uses. 5.4 Argo waste materials - Rice husk, Bagasse, coir fibers and their uses. 5.5 Special processed construction materials; Geosynthetic, Ferrocrete, Artificial timber, Artificial sand and their uses.	10	24

COURSE OUTCOME:

After completing this course, student will be able to:

1. Identify relevant construction materials.
2. Identify relevant natural construction materials.
3. Select relevant artificial construction materials.
4. Select relevant special type of construction materials.
5. Identify and use of processed construction materials.

LIST OF PRACTICAL:

Sr. No.	Practical / Exercise
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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 • Compressivestrength
3	Conduct field test on given sample of brick and cement
4	Perform lab tests on given sample of cement • Initial and final settingtime • Compressivestrength
5	Conduct field test on given sample of fine and coarseaggregate
6	Perform test on given sample of fine aggregate • Sieveanalysis • Silt and claycontent
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 of Books	Author	Publications
01	Engineering Materials	Dr. Janardan Jha	Khanna
03	Building materials	S. K. Duggal	New Age International
05	Engineering Materials	S C Rangwala	Charotar
06	Construction Materials	D.N. Ghose	TATA Mc Graw Hill
07	Civil Engineering materials	TTTI ,Chandigarh	TTTI