


Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: MATERIALS OF CONSTRUCTION LAB		
	Credits (L:T:P) : 0:2:4	Total Contact Hours: 78	Course Code: 15CE14P
	Type of Course: Practical, Demo& Assignments	Credit : 03	Core/ Elective: Core
CIE- 25 Marks		SEE- 50 Marks	

Pre-requisites: Basic knowledge of science in secondary education.

Course Objectives: Identification & understanding the properties & uses of various building materials.

Course Outcomes:

On successful completion of the course, the students will be able to:

Course Outcome		Experiments Linked	CL	Linked PO	Teaching Hrs
CO1	Demonstrate the important properties and uses of various solid building materials.	1	R/U	1,2,5,6,8,9,10	18
CO2	Apply knowledge of building materials to provide predictive capability to optimize building performance & to minimize building failure.	2,3,4,5	R/U	1,2,5,6,8,9,10	24
CO3	Explain the important properties and uses of various types of Timber.	6	R/U	1,2,5,6,8,9,10	06
CO4	Illustrate the various types of plastic, glass and preservative materials used in the construction.	7,8	R/U	1,2,5,6,8,9,10	12
CO5	Recognize the need & to engage in independent lifelong learning in identifying miscellaneous materials.	9	R/U	1,2,5,6,8,9,10	09
CO6	Apply the properties of materials in societal & environmental context & demonstrate knowledge for sustainable development.	10	R/U/Ap/C	1,2,5,6,8,9,10	09
Total sessions					78

Legend- R; Remember U: Understand Ap: Application Ay: Analysis C:Creation

Programme outcome Attainment Matrix

Course	Programme Outcome									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
	Basic knowledge	Discipline knowledge	Experiments and practice	Engineering Tools	Engineer and society	Environment & Sustainability	Ethics	Individual and Team work	Communication	Life long learning
Materials of construction lab	3	3	3	-	3	3	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If $\geq 40\%$ of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If $< 5\%$ of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

DETAILED COURSE CONTENT

EXPERIMENT 1 : BUILDING UNITS

i) Stones

Identification & understanding the properties & uses of the following stones: Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.

Identification	Geological Classification	Properties	Uses

ii) Bricks

Identification & understanding the properties & uses of the following bricks:

Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hollow), Fly ash bricks, Fire bricks, Light weight blocks (clay hollow blocks & autoclave aerated concrete blocks)

Specimen tabular column

Identification	Standard size	Properties	Uses

EXPERIMENT 2 : FLOORING MATERIAL

Identification & understanding the properties & uses of the following flooring materials Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring

Identification	Properties	Uses

EXPERIMENT 3 : BINDING MATERIAL

Identification & understanding the properties & uses of the following binding materials Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.

Specimen tabular column

Identification	Properties	Uses

EXPERIMENT 4 : CLADDING & ROOFING MATERIALS

Identification & understanding the properties & uses of the following Cladding material- Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding.

Roofing Material- Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.

Identification	Properties	Uses

EXPERIMENT 5: FINISHING, DECORATIVE & FALSE CEILING MATERIAL

Identification & understanding the properties & uses of the following: Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt.

Identification	Properties	Uses

EXPERIMENT 6 : TIMBER

Identification & understanding the properties & uses of the following timber Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo.

Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets

Identification	Properties	Uses

EXPERIMENT 7 : PLASTICS & GLASS

Identification & uses of the following material

Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fibre glass, Float glass, Toughened glass.

Plastics- Thermosetting plastic articles, Polycarbonate.

Identification	Uses

EXPERIMENT 8 : COATING MATERIAL

Identification & understanding the uses of the following paints, primers, varnishes & distemper

Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints

Varnish-French polish, Metallic paint (grills & all purpose)

Distemper- Water based & weather proof exterior emulsion.

Identification	Uses

EXPERIMENT 9 : MISCELLANEOUS MATERIALS

Identification & uses of the following material

Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids.

Identification	Uses

EXPERIMENT 10 : MINI PROJECT

Each Student should collect at least five different building materials & prepare the report.

NOTE

1. Students should select any one of the above or other topics relevant to the subject approved by the concerned faculty, individually or in a group of 3 to 5. Students should mandatorily submit a written report and make a presentation on the topic. The task should not be repeated among students. Report will be evaluated by the faculty as per rubrics. Weightage for 5 marks Internal Assessment shall be as follows:

Unsatisfactory **1**, Developing **2**, Satisfactory **3**, Good **4**, Exemplary **5**

2. Reports should be made available along with bluebooks to IA verification officer

Example of model of rubrics / criteria for assessing student activity

Dimension	Students score				
	(Group of five students)				
	STUDENT 1	STUDENT 2	STUDENT 3	STUDENT 4	STUDENT 5
Rubric Scale	Unsatisfactory 1 , Developing 2 , Satisfactory 3 , Good 4 , Exemplary 5				
1.Organisation	3				
2.Fulfill team's roles & duties	4				
3.Conclusion	5				
4.Convensions	5				
Total	17				
Average=(Total /4)	17/4=4.25=5				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students					

Note: Dimension should be chosen related to activity and evaluated by the course coordinator (faculty).

Course Delivery: The course will be delivered through Tutorials and Demonstration of materials.

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes	
Direct Assessment	CIE*	IA	Students	Two IA Tests (average of two tests will be computed)	Test 1	10	Blue books (Test Papers)	1,2,3
					Test2			4,5,6
				Record writing (average of marks allotted for each experiment)	10	Lab Record	1,2,3,4,5,6	
				Mini project	05	Report	1,2,3,4,5,6	
	Total	25						
	SEE*	End Exam		End of the course	50	Answer scripts at BTE	CO1 to CO6	
Indirect Assessment	Student Feedback on course		Students	Middle of the course	---	Feedback forms	CO1,CO2, CO3 Delivery of course	
	End of Course Survey			End of the course	---	Questionnaires	CO1 to CO6 Effectiveness of Delivery of instructions & Assessment Methods	

*CIE – Continuous Internal Evaluation

*SEE – Semester End Examination

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. (Any decimals shall be rounded off to next higher digit).

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

Sl. No	Bloom's taxonomy	% in Weightage
1	Remembering and Understanding	60
2	Applying the knowledge acquired from the course	25
3	Analysis	10
4	Synthesis (Creating new knowledge)	3
5	Evaluation	2



TEXT BOOKS&REFERENCEBOOKS

1. Materials by SC Rangwala
2. Engineering Building materials by S SBhavikatti
3. Engineering Materials by GJ Kulkarni
4. Engineering Materials by Sushil Kumar
5. Market brochures

E-Links

1. www.constructionmaterials.com/
2. [en.wikipedia.org/wiki/Building material](http://en.wikipedia.org/wiki/Building_material)
3. en.wikipedia.org/wiki/List_of_building_materials
4. www.exponent.com
5. <http://www.tce.co.in/>
6. www.prakruthibuilding.com
7. <http://www.aboutcivil.org>

SCHEME OF VALUATION

Course: **MATERIALS OF CONSTRUCTION LAB** Course Code: **15CE14P**

Sl. no.	Performance	Max. Marks
1	Identify & list the properties & uses of given 7 material Identification-1 mark Properties-2 marks Uses-2 marks	35
2	Viva-Voce	10
3	Mini-project report and graded exercise	5
	TOTAL	50

List of equipment and materials

Sl No	Description	Nos
Furniture		
1	Display table 4'X8'	8
2	Stools/ Chairs	40
3	Display Racks	10
4	Metal Trays	10
Specimens		
6	<u>STONES</u> Granite, Trap, Basalt, Sandstone, Limestone, Gneiss, Laterite, Marble, Quartzite, Slate.	Each 5Nos
7	<u>BRICKS</u> Ground moulded, Table moulded, Machine moulded (Wire cut), Soil stabilized blocks, Concrete blocks (solid-hallow), Fly ash bricks, Fire bricks, Light weight blocks (clay hallow blocks & autoclave aerated concrete blocks)	Each 5Nos
8	<u>FLOORING MATERIAL</u> Granolithic, CC with red oxide finish, Shahabad, Vitrified, Marble, Granite, Pressed Clay tiles, Interlocking pavers, Cobble stone, Wooden flooring	Each 5Nos
9	<u>BINDING MATERIAL</u> Cement, White cement, Lime, Clay, Fly ash, Plaster of Paris, Lime putty, Water proofing compound, and White cement based putty.	Each 5Nos
10	<u>CLADDING MATERIAL</u> Exterior surface wall cladding material, Bath & kitchen wall cladding, Sloped roof cladding. <u>ROOFING MATERIAL</u> - Mangalore tiles, Country tiles, A C sheet, Plastic sheets, Non-asbestos Hi tech roofing sheet, Meta colour sheets, Alpha sheet, corrugated aluminium sheets, Puff-sandwiched roofing sheets.	Each 5Nos
11	<u>FINISHING, DECORATIVE & FALSE CEILING MATERIAL</u> Mortar plaster, Stucco plaster, Designer tiles, Acoustic ceiling board, Gypsum ceiling board, Fibre board, Pulp board, Straw board, Polystyrene, Thermocol, Hair felt	Each 5Nos
12	<u>TIMBER</u> Teak, Honne, Sal, Casuarina, Deodar, Jackfruit, Mahogany, Mango, Neem, Silver oak, Bamboo. Industrial timber- Veneers, Plywood, Fibre board, Hardboard, Block board, Laminated sheets	Each 5Nos
13	<u>PLASTICS & GLASS</u> Glass panels- Plain, Dark cool, Brown cool, printed; Mesh glass, Wired glass, Glass bricks, Structural glass, Ribbed glass, Perforated glass, Foam glass, Fiber glass, Float glass, Toughened glass. Plastics- Thermosetting plastic articles, Polycarbonate.	Each 5Nos

Sl No	Description	Nos
14	<p><u>COATING MATERIAL</u> (Paint samples to be displayed on panels of size 30cm X 30cm) Paints- Exterior primer water based, Metal-wood & wall primer, emulsion paint, enamel paint, cement paint (Snowcem), Texture paints, Interior paints Varnish-French polish, Metallic paint (grills & all purpose) Distemper- Water based & weather proof exterior emulsion.</p>	15X2=30 panel
15	<p><u>MISCELLANEOUS MATERIALS</u> Metal paste, Epoxy resin, Epoxy water proofing, Silicon paste, Glass fibre reinforced polyesters, Synthetic rubber adhesives, Tile joint filler material, Sealants, PVC products, Asphalt, Expanded metal strips for joints, FRP, Geo fabrics & Geogrids</p>	Each 5Nos

Note: Minimum Floor area required for establishing Material-testing Lab is 60 Sqm.

