

**GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**

**COURSE CURRICULUM**

**Course Title: BUILDING MATERIALS**

**(Code: 3330601)**

<b>Diploma Programme in which this course is offered</b>	<b>Semester in which offered</b>
CIVIL ENGINEERING	THIRD

**1. RATIONALE :**

To select 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.

**2. COMPETENCY**

The course content should be taught and implemented with the aim to develop with different types of skills so that students are able to acquire following competency

1. To select appropriate Building material in given field situation.

**3. TEACHING AND EXAMINATION SCHEME**

<b>Teaching Scheme (In Hours)</b>			<b>Total Credits (L+T+P)</b>	<b>Examination Scheme</b>				<b>Total Marks</b>
<b>L</b>	<b>T</b>	<b>P</b>		<b>Theory Marks</b>		<b>Practical Marks</b>		
<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>ESE</b>	<b>PA</b>	<b>ESE</b>	<b>PA</b>	<b>150</b>
03	00	02	05	70	30	20	30	

**Legends:** **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** - Credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment

**Note:** It is the responsibility of the institute heads that marks for **PA of theory & ESE and PA of practical** for each student are entered online into the GTU Portal at the end of each semester within the dates specified by GTU.

## 4. COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
<b>Unit – I INTRODUCTIO N</b>	1a. Study of Various Materials Used in Civil engg. Construction	1.1 Physical and Chemical properties of different Building Materials. 1.2 Appropriate Various building materials for its suitability. 1.3 Different alternative materials suitable for the given item.
<b>Unit – II CLAY PRODUCTS</b>	2a. Study of Clay Products	2.1 Classification of Clay products 2.2 Standard requirements of Quality bricks and Fly ash Bricks as per BIS 2.3 Manufacturing Process of Bricks 2.4 Test on Bricks 2.5 Grade of Bricks as per BIS
<b>Unit – III ROCKS AND STONES</b>	3a. Study of Rocks and stones	3.1 Classification Of Rocks 3.2 Uses Of Stones 3.3 Requirement of Good Building Stone 3.4 List some important stones used in construction 3.5 Describe the characteristics of stones with respect to - Structure , texture , strength and gravity , Porosity and absorption , Hardness , durability , weight 3.6 Artificial Stone
<b>Unit – IV LIME AND POZZOLANAS</b>	4a. Study of Lime and Pozzolanas	4.1 Sources of Lime 4.2 Classification of lime 4.3 Types of lime according to setting and slaking * fat , hydraulic and poor lime 4.4 Uses of lime 4.5 Types of Pozzolanic materials like Surkhi , fly ash , slag , rice husk ash 4.6 Advantages of addition of pozzolonas
<b>Unit – V MATERIALS FOR CEMENT CONCRETE</b>	5a. Study of Materials for cement concrete	5.1 Different types of cement and their specific use 5.2 Grade of cement as per BIS 5.3 Field and laboratory Test of cement as per BIS 5.4 Methods of storing the cement 5.5 Types of aggregate as per BIS - 2720 5.6 Size of aggregate requirements as per BIS – 456 5.7 Test on aggregate

Unit	Major Learning Outcomes	Topics and Sub-topics
<b>Unit – VI TIMBER</b>	6a. Study of Timber and timber products	6.1 Types of timber 6.2 Uses of timber 6.3 Defects in timber 6.4 Methods of seasoning 6.5 Merits and demerits 6.6 Timber products like veneers , plywood , laminated boards
<b>Unit – VII MISCELLANEOUS MATERIALS</b>	7a. Classification , Properties and engineering uses of different materials	7.1 Plastics and PVC 7.2 Ceramic Products 7.3 Paints and Varnish 7.4 Materials for Damp proofing , Water proofing and Anti termite treatment 7.5 Glass and Fiber 7.6 Steel

### 5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	INTRODUCTION	04	03	04	00	07
II	CLAY PRODUCTS	10	03	04	07	14
III	ROCKS AND STONES	04	03	04	00	07
IV	LIME AND POZZOLANAS	04	03	04	00	07
V	MATERIALS FOR CEMENT CONCRETE	12	03	04	14	21
VI	TIMBER	04	00	03	04	07
VII	MISCELLANEOUS MATERIALS	04	00	03	04	07
<b>Total</b>		<b>42</b>	<b>15</b>	<b>26</b>	<b>29</b>	<b>70</b>

### 6. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills so that students are able to acquire the competency.

Following is the list of experiments for guidance.

S. No.	Unit No.	Practical/Exercise	Apprx. Hrs. Required
1	I	Conduct local market survey for different materials regarding cost , quality and suitability	04
2	II	Test on Bricks <ul style="list-style-type: none"> <li>• Field test for size , shape and soundness</li> <li>• Water absorption test</li> <li>• Compressive strength</li> <li>• Visit nearby where the bricks are manufacturing.</li> </ul>	04

S. No.	Unit No.	Practical/Exercise	Apprx. Hrs. Required
3	III	Identification of different types of stones	02
4	IV	Field test of cement	02
5	IV	Test on Cement <ul style="list-style-type: none"> <li>• Normal Consistency of Cement</li> <li>• Initial &amp; Final setting time</li> <li>• Compressive strength</li> </ul>	04
6	IV	Field test of coarse aggregate	02
7	IV	Test on fine aggregate <ul style="list-style-type: none"> <li>• Sieve analysis</li> <li>• Silt and clay content</li> </ul>	04
8	V	Identification of different types of timber and timber products ( please arrange to visit nearby saw mill or timber mart )	02
9	VII	Preparation of report regarding miscellaneous civil engineering materials used	04
<b>Total</b>			<b>28</b>

## 7. SUGGESTED LIST OF STUDENT ACTIVITIES

Observing and writing report of selection of use of appropriate building material at given construction site.

## 8. SUGGESTED LEARNING RESOURCES

### A. List of Books:

SR. No.	Title of Books	Author
01	Engineering Materials	Dr. Janardan Jha
02	Materials of Construction	A K Roy Chaudhary
03	Engineering Materials	Agrawal and Arora
04	Engineering Materials	Vazirani and Chandola
05	Engineering Materials	S C Rangwala
06	Construction Materials	D.N. Ghose
07	Building materials	Amarjit Agrawal
08	Building materials	S. K. Duggal
09	Engineering materials	Sharma
10	Civil Engineering materials	TTTI ,Chandigarh

### Handbooks

SR. No.	Title	Author
01	PWD Handbooks for -Materials - Masonry -Building -Plastering and Pointing - Foundation	All India Council for Technical Education
02	Practical Civil Engineering Handbook	Khanna

### *BIS/ International Codes of Practice:*

SR. No.	Title
01	National Building Code

### **B. List of Major Equipment/Materials**

1. Compression testing machine capacity – 40 tonne
2. Vicat apparatus
3. Sets of sieve and sieve shaker
4. Abrasion testing machine with Balls
5. Impact machine

### **C List of Software/Learning Websites**

### **9. INSTRUCTIONAL STRATEGICS:**

**Put emphasis on identification of suitable material for given construction site**

### **10. COURSE CURRICULUM DEVELOPMENT COMMITTEE**

#### **Faculty Members from Polytechnics**

1. Prof. Bhavesh Modi , Principal B V P I T (DS) , UMRAKH
2. Mr. Anil K. Popat , LCE , G. P. Dahod

#### **Coordinator and Faculty Members from NITTTR Bhopal**