

# **BUILDING MATERIALS**

**Total marks: 100 (80 + 20)**

**Subject Code CIV 304**

**Theory: 42**

**Rational:**

The subject of building material is very important for the diploma holder in civil engineering. The course material has been designed for the student to know the properties of the building material as well as the strength of the material as per IS code of practices. Further, practices input have been given for augmenting the learning by the student.

**Aim:**

To know the properties of different material for use and quality control in construction works.

<b>1.0 Bricks:</b>	<b>05 hrs</b>
1.1 Bricks earth – its composition & selection	
1.2 Brick making – preparation of brick moulding, drying, burning in kiln	
1.3 Classification of bricks, size of traditional and modular bricks, qualities of good building bricks	
1.4 Uses of brick bats and surkhi, uses of hollow bricks.	
<b>2.0 Lime:</b>	<b>01 hrs</b>
2.1 Type of lime	
2.2 Uses of lime	
<b>3.0 Cement:</b>	<b>02 hrs</b>
3.1 Type of cements	
3.2 Properties of cements	
3.3 Testing of quality of cement	
3.4	
<b>4.0 Sand:</b>	<b>02 hrs</b>
4.1 Sources and classification of sand	
4.2 Bulking factor and finesses of sand	
4.3 Qualities and grading of sand for plaster and for masonry Work as per BIS specification (IS:1542,2116,383)	
<b>5.0 Stone:</b>	<b>03 hrs</b>
5.1 Classification of rock, uses of stone, natural bed of stone, Qualities of good building stone.	
5.2 Stone quarrying- tools for blasting, process of blasting, Precautions in blasting, machines for quarrying, dressing of stone.	
5.3 Characteristics of different type of stone and their uses	

<b>6.0 Refractory material and clay products:</b>	<b>03 hrs</b>
6.1 Definition, classification of refractory	
6.2 Properties and uses of refractory like terracotta, porcelain glazing.	
6.3 Different types of Tile and similar products.	
<b>7.0 Mortar and concrete:</b>	<b>10 Hrs</b>
7.1 Composition and properties of ingredients in both cement & lime mortar and concrete	
7.2 Properties and uses of cement & lime mortar and concrete	
7.3 Grading of aggregates in concrete	
7.4 Water- cement ratio	
7.5 Concreting- mechanical properties of aggregate, mixing of ingredients, placing, compacting and curing of concrete.	
7.6 Introduction to Ready Mixed Concrete	
7.7 Factors responsible for deterioration of concrete	
<b>8.0 Timber:</b>	<b>04 Hrs</b>
8.1 Classification and structure of timber	
8.2 Defects in timber	
8.3 Disease and decay of timber	
8.4 Seasoning and preservation of timber	
8.5 Manufacturing and uses of plywood	
8.6 Special characteristics of Assam type timber	
8.7 Substitute building materials of timber	
<b>9.0 Paint, Varnish and Distemper:</b>	<b>04 Hrs</b>
9.1 Purpose of painting a surface	
9.2 Characteristics of ideal paint and varnish	
9.3 Ingredients of paint and varnish	
9.4 Process of painting and varnishing	
9.5 Repainting of old surface	
9.6 Purpose of applying distemper, properties, ingredients, process of distempering	
9.7 Application of white washing and colour washing	
<b>10.0 Iron and steel:</b>	<b>03 Hrs</b>
10.1 Uses of cast iron, wrought iron, mild steel and tor steel	
10.2 Classification and uses of steel	
<b>11.0 Bituminous material:</b>	<b>03 hrs</b>
11.1 Distinction among tar, bitumen and asphalt	
11.2 Different types of asphalt and tor and their uses	
12. Introduction to Nano Materials	<b>02 Hrs</b>

**List of Experiments (Minimum 10 Experiments are to be performed)**

1. Identification of various construction materials
2. Determination of compressive strength of brick.
3. Water absorption test on Bricks, Stones and Tiles.
4. Hardness test of floor marbles and tiles.
5. Construction of bonds in brick work
6. Compressive strength test of Cement mortar
7. Tensile strength of cement mortar
8. Compressive strength of concrete cube
9. Slump test of concrete.
10. Demonstration of log of a timber cross section.
11. Checking spreading quality of paints.
12. Determination of Hardness of glass.

**REFERENCE OF BOOKS :**

1. Materials of construction- by D.N Ghosh, :Tata Mc-Grew hills
2. Text book of materials- by Rangawala.
3. Building Materials – by Shri S.K. Basu and Shri A.K. Ray;; S.K. Lahiri & Co. (P) ltd
4. Civil engineering materials- T.T.T.I, Chandigarh, Tata McGrew Hills
5. Building Materials – Duggal
6. Building Materials - J Jha & S K Sinha
7. Building Materials – Sushil Kumar