

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Diploma in Environmental Engineering

Semester: 3

**Subject Code**

**Subject Name** MATERIALS & CONSTRUCTION

---

Sr. No.	Course content
1.	<b>ENGG. MATERIALS :</b> 1.1 Introduction 1.2 Building stones and aggregates. 1.3 Clay product(Bricks, tiles, Terra cotta etc.) 1.4 Cement mortar 1.5 Concrete 1.6 Timber, Plywood and allied products. 1.7 Plastics and allied products. 1.8 Glass and allied products. 1.9 Ferrous and Non ferrous metals and alloys. 1.10 Adhesives, Miscellaneous materials (Asphalt, Bitumen, Bitumen felt, Flyash, Hollow concrete blocks, linoleum etc.)
2.	<b>SOILS :</b> 2.1 General discussion on soil 2.2 Characteristics of soil 2.3 Effect of – density, moisture content on performance of soil. 2.4 Effect of seasonal weather change. 2.5 Soil Investigations 2.5.1. Objectives, 2.5.2. Preliminary investigations, 2.5.3. Methods of soil exploration. 2.5.4. Choice of method. 2.5.6 Methods of improving Bearing capacity of soils.
3.	<b>CONSTRUCTION :</b> 3.1 Building components and their basic requirements. 3.2 Foundations, 3.2.1 Introduction , 3.2.2 Types of foundation (open, deep) 3.2.3 Deep foundation 3.2.3.1 Pile foundation 3.2.3.2 Well foundation. 3.3 Select Foundation in special conditions, like black cotton soil, and filled up soil or Made up soil. 3.4 Timbering of Trenching.

4.	<b>MASONRY CONSTRUCTION :</b> 4.1 General 4.2 Masonry classification 4.3 Important terms used in masonry 4.4 Stone masonry 4.4.1. Uses, 4.4.2 Selection of stone for stone masonry. 4.4.3. Classification. 4.4.4 Important terms used in stone masonry construction. 4.5. Brick masonry. 4.5.1 General principals in brick masonry construction. 4.5.2. Bonds in brick masonry. 4.5.3. Characteristics. 4.5.4 Classification 4.5.5 Defects in brick work 4.5.6 Explain Maintenance of brick masonry construction . 4.5.7 Advantages of Reinforced brick masonry.
5.	<b>BUILDING ITEMS :</b> 5.1 Necessity of Damp Prevention 5.1.1 Provision and utility of D.P.C 5.2 Explain importance of Anti- termite measures and treatments 5.3 Explain Importance of Building Finishes- plastering, pointing 5.3.1 Plastering pointing- its purpose, types, construction procedures. Advantages and disadvantages and suitability 5.4 Role and necessity of Fire protection
6.	<b>BUILDING COMPONENTS :</b> 6.1. Vertical Circulation 6.1.1 General, Role and Importance. 6.1.2 Staircase Types, purpose, suitability 6.1.3. Elevators, lift 6.1.4 Ramp 6.1.5 Escalators, comparison of all above. 6.2 Doors and Windows 6.2.1 Classification of Doors, 6.2.2 Classification of Windows, 6.2.3. Types of ventilators, 6.2.4 Purpose of all above ,their suitability, durability, Necessity, usefulness etc. 6.3 Roof and roof covering 6.3.1 Types of roof, 6.3.2 Types of roof coverings. 6.3.3 Importance and purpose of False ceilings. 6.3.4 Types of false ceiling . 6.4 Floor and Floor finishes 6.4.1 Types of floors 6.4.2 Methods of construction 6.4.3 Types of Floor finishes with their uses

7.	<b>PLUMBING SERVICES :</b> 7.1 Location, 7.2 Describe, Usefulness 7.3 List the Components 7.4 Leakage and its prevention 7.5 Maintenance of house pipe lines and drainage lines. 7.6 Drainage system of House. 7.7 Draw Drainage Plan of Bldg.
8.	<b>SAFETY MEASURES :</b> 8.1 Importance of various laws/ norms/ regulations/ Acts for safety. 8.2 Precautions and its measures 8.3 Post accidental procedures
9.	<b>BUILDING MAINTENANCE :</b> 9.1 Purpose, need, importance and methods 9.2 Causes and types of defects in building 9.3 Remedial measures and procedure of building maintenance work
10.	<b>CONSTRUCTION MACHINERIES :</b> 10.1 Purpose, Advantages and disadvantages 10.2 Machineries used for earthwork and other construction works 10.3 Special features, suitable use specifications and details
11.	<b>STRUCTURAL STEEL WORKS :</b> 11.1 General principle of steel work, various sections ( Forms) in steel work, Methods of Connecting steel work , structural steel members and their connections.
12.	<b>CEMENT CONCRETE :</b> 12.1 Introduction 12.2 Types: PCC, RCC, Vibrated concrete, Precast concrete
13.	<b>TEMPORARY SUPPORTING STRUCTURES.:</b> 13.1 Introduction. 13.2 Form work. 13.3 Scaffolding

### **LABORATORY EXPERIENCES/ TERM WORK :**

<b>Sr. No.</b>	<b>Course content</b>
1.	<b>A. Testing of materials :</b> (i) Bricks <ul style="list-style-type: none"><li>• Field tests for size and shape</li><li>• Compressive strength of bricks</li><li>• Water absorption test for bricks</li></ul> (ii) Course aggregates : <ul style="list-style-type: none"><li>• Impact test on aggregate</li></ul> (iii) Fine aggregates : <ul style="list-style-type: none"><li>• Bulking of Sand.</li><li>• Fineness modulus of sand</li></ul> (v) Cement : consistency <ul style="list-style-type: none"><li>• Initial setting time of cement</li></ul> (iv) Steel : Tensile strength of M.S. bar (vi) Market survey.
2.	<b>B. SKETCHES :</b> <ul style="list-style-type: none"><li>• Foundations-Types, Foundation plan and timbering in trenches</li><li>• Brick and stone masonry work</li><li>• Pointing</li><li>• Doors, Windows, Ventilators</li><li>• Roofs, false-ceiling</li><li>• Stairs and ramps</li><li>• D.P. C.</li><li>• Scaffolding</li></ul>
3.	<b>C. FIELD WORK :</b> <ul style="list-style-type: none"><li>• Exercise for giving layout using foundation plan of a given building on site</li></ul>
4.	<b>D FIELD VISITS : Environmental Engg. Related sites .(student should submit the visit report)</b> <ul style="list-style-type: none"><li>a. Excavation for foundations</li><li>b. Concreting</li><li>c. Masonry</li><li>d. Plastering pointing</li></ul>

### **REFERENCE BOOKS :**

- |   |                     |
|---|---------------------|
| 1. Engineering Materials                        | Dr. Janardan Jha    |
| 2. Materials of Construction                    | A.K.Roy Chaowdhary  |
| 3. Engineering Materials                        | Vazirani & Chandola |
| 4. Engineering Materials                        | S,C,Rangwala        |
| 5. Building Construction                        | Sushil Kumar        |
| 6. Building Construction                        | Arora               |
| 7. Building Construction                        | B.C.Punmia          |
| 8. Construction Planning, equipment and methods | A.M. Neville        |
| 9. All relevant Indian Standards                | B.I.S. Delhi        |
| 10. Civil Engg. Materials                       | Parbin singh        |