

Subject: Basics of Civil Engineering (For Students of Other Branches)								
Program: B. Tech. Offered by Civil Dept.				Subject Code:			Semester: I	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
2	0	2	3	16/40	16/40	24/60	24/60	80/200

Being a Non-Civil Engineer, Why Should I Study this Subject?

Amongst the three Basic Necessities of life namely Food, Clothing and Shelter, this subject addresses the third one i.e. Shelter. **It is a clear fact that every individual in his/her life, will make at least one house for his/her family to reside.** This Subject makes you familiar with Basic Surveying to be carried out before preparing the house. It makes you familiar with Materials related to construction of Buildings. It also teaches you the Understanding of Building Drawings so that you can apply the same in your day to day life.

This Subject is 50% Theory and 50% Hands-On (Practical) Learning. There are three Field/Industrial visits mandatory, as a part of this Open Elective Subject. Come and explore this Journey of Understanding Basics of Civil Engineering.

Course Objectives:

1. To Understand the Civil Engineering as a universal branch applicable to all.
2. To Perform Basic Surveying.
3. To Understand Materials used during Construction.
4. To Draw and Understand Construction Drawings.

Course Outcomes:

1. Student must be able to understand various disciplines of Civil Engineering.
2. Student must be able to carry out simple land surveys by taking linear and angular measurements.
3. After the completion of the course, student should be able to use materials adopted in Civil Engineering and analyze their properties.
4. Student should get acquainted with Basic Building Drawings such as Plan, Elevation and Section for a simple Residential Building.

COURSE CONTENTS

UNIT-I

[6]

Introduction

Branches of civil engineering, Scope of civil Engineering, Role of Civil engineer in society, Basic introduction to engineering structures (Bridges, Dams, railways, pavement etc.) Impact of infrastructural development on economy of country.

Basics of Water Resources and Transportation Engineering

Hydrologic cycle, water use and its conservation, Introduction to dams, weirs, barrages and check dams, Role of transportation in national development, Modes of transportation, Introduction to road traffic and traffic control, Introduction to mass transportation system.

UNIT-II

[8]

Surveying

Basics of Surveying: definition of Surveying, Aims and applications, Fundamental principles of surveying, Classification of surveying, Plans and maps, Scales, Units of measurement.

Linear Measurements: Methods, Instruments used in chain surveying, terms related with chain surveying, Selection of stations, Chaining, Ranging, Offsetting, Errors in chaining and correction, Conventional symbols.

Angular Measurements: Instruments used, Types of compass & its overview, Types of meridians (magnetic, true, arbitrary) and bearings (true, magnetic, grid, arbitrary), Measurement of bearings (Whole circle bearing and quadrantal bearing).

UNIT-III

[6]

Building Construction & Materials, Construction:

Building Materials: Introduction to building materials like bricks, stone, lime, timber, mortar, cement, concrete, sand, aggregate, Paints and varnishes, glass, metals, plastic and many more.

Stone and Brick Masonry: Definition of Masonry, basic terms related masonry (Course, Header, Stretcher, Bed, Lap, Bond, Quoins, Joint, Closer, Queen closer, king closer, beveled closer, mitred closer, bat), brief classification of stone masonry (Random rubble and Ashlar masonry), dressing of stones, types and classes of bricks, Bonds in brick work (stretcher bond, header bond, English bond, Flemish bond), comparison of brick and stone masonry.

Building Planning and Drawing

Classification of buildings, types of load acting on building, building component and their function & nominal dimension of residential building, Introduction to planning, Principles of planning (Aspect, Prospect, privacy, Grouping, roominess, flexibility, circulation, elegance, sanitation, economy), basic requirements of a building and orientation, types of residential building, Different type of areas (Built up area, plinth area, floor area, carpet area) FSI, line plan of residential building and detailed plan (includes window and doors opening).

Definition and concept of plan of a simple residential building, Elementary principles and basic requirements for building planning, elevation and section of a residential building.

Self-study:

The self-study components will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

LIST AND DETAILS OF PRACTICAL**1. Basic Surveying:**

Details: This includes Chain and Tape Surveying, Chain and Compass surveying and understanding measurements in Surveying Process and its applications in your day to day life.

- a. Practical Set – 1 Understanding Basic Surveying:
Chain Surveying (On Field).
Chain and Compass Surveying (On Field).

***Note:** Preparing A0 Size Drawing Sheet, based on the Practical will be Mandatory here.*

2. Building Materials:

Details: This consists of understanding various building construction materials and their applications. Get to know these materials practically by testing them in the laboratory.

- b. Practical Set – 2 Understanding Bricks: Red Clay Bricks, Fly-Ash Bricks, AAC Blocks
(Size, Weight, Water Absorption and Strength)
- c. Practical Set – 3 Understanding Bonds in Brick Construction
(Making actual Brick Bonds (Half Brick Wall, English Bond, Flemish Bond etc.) in Laboratory)
- d. Practical Set – 4 Understanding Cement by Some Basic Field and Laboratory Tests
(Standard Consistency, Initial and Final Setting Time and its Compressive Strength)

- e. Practical Set – 5 Understanding Concrete
(Making a Basic Concrete Mix by using Thumb Rules, For Example: M-15 = 1:2:4; M-20 = 1:1.5:3 etc.)
- f. Practical Set – 6 Tests on Fresh Concrete (Prepared in Practical Set – 5 above)
(Tests for Fresh Concrete: Slump & Compaction Factor)
- g. Practical Set – 7 Tests on Hardened Concrete (Tested in Practical Set – 6 above)
[Tests on Hardened Concrete: Compressive Strength (Cubes), Tensile Strength (Cylinders), Flexural Strength (Beams)]

3. Building Planning and Drawings:

- h. Practical Set – 8 Understanding Building Drawings
(Visit to an already constructed Building, carrying out its on-field Measurements, preparing drawings (Plan, Elevation and Section) based on the measurements taken, and thereafter comparing the same with actual drawings).

Note: *Safety Shoes, Hand Gloves and Helmets will be Mandatory for all students during the Laboratory Hours. These are to be Brought by Students on their own.*

Text Books:

1. Rangwala, S. C. (2016). *Building Construction*. India: Charotar Publishing House.
2. Birdie, G. S. and Ahuja, T. D. (2012). *Building Construction and Construction Material*. India: Dhanpat Rai Publication.
3. Shah, M. G., Kale C. M. and Patki, S. Y. (2001). *Building drawing*. India: Tata McGraw Hill.
4. Basak, N. N. (2017). *Surveying and Leveling*. India: Tata McGraw Hill.
5. Subramanian, R. (2012). *Surveying and Leveling*. India: Oxford University Press.
6. Jain, R. K., and Lodha, P. P. (2014). *Elements of Civil Engineering*. India: McGraw Hill.