

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 3

Environment Science & Engineering

Subject Code 131304

Subject Name BASICS OF STRUCTURAL ENGINEERING

Sr No	Course content
1.	Direct and bending stresses : Short columns subjected to eccentric load, middle third rule, kernel of section, Retaining walls, Masonary walls, Overview of long column, slenderness ratio.
2.	Deflection of beams : Moment area method, Techniques to control deflections
3.	Moment Distribution Method : Overview of fixed end moments, Analysis of statically Indeterminate beams & plane frames.
4.	Concrete Technology : • Ingredient of concrete: Cement, Aggregate, Admixtures, Water. 1. Cement: Hydration mechanisms, Types of cement & their uses, Overview of physical properties and their tests as per IS and ASTM 2. Aggregate: Function, Types, Sieve analysis, size, Overview of physical tests as per IS & ASTM 3. Admixtures: Various types, Advantages and limitations relevant IS & ASTM • Mixing & Placing of Concrete, Various techniques of Curing, Hardened Concrete • Durability and permeability of Concrete: Definitions, Causes, Carbonation, Cracking, Creep, shrinkage, Crack width, Permeability. • Concrete in Aggressive Environment: Alkali aggregate Reaction, Sulphate Attack, Chloride attack, Acid attack. Special coating for them, Water proofing. Concrete for storing hot liquids.
5.	Soil Engineering : • General characteristics of different types of soil, Soil designation. • Particle size analysis as per BIS grading curves consistency limits • Geotechnical properties of soil : Permeability, Shearing strength, • Compaction & Consolidation, Characteristics of soil and relevant test • Bearing capacity of soil mass : Shear failure and Settlement criteria. • Sub surface investigation : Planning of exploration • programme, Field testing of soil • Introduction to geosynthesis and its application.

TERM WORK:

Term Work shall consist of atleast 12 problems based on the syllabus of Basics of structural engineering.

Presentation based on Concrete Technology .& soil Engineering

REFERENCE BOOKS:

1. Timoshenko & Gere ; Mechanics of Materials
2. S. Ramamrutham ; Strength of Materials
3. S. Ramamrutham ; Theory of structures
4. A.M.Neville ; Properties of Concrete
5. M.S.Shetty ; Concrete Technology
6. K.R.Arora ; Soil Mechanics
7. B.C.Punmia ; Soil Mechanics