2.11 30277 SOIL AND FOUNDATION ENGG

UNIT-1 INTRODUCTION:

1.1 Introduction and scope of soil engineering
1.2 Origin and formation of soils
1.3 Major soil deposits of India

UNIT-2 FUNDAMENTAL DEFINITIONS AND RELATIONSHIPS:

2.1 Representation of soil as a three phase system
2.2 Definition of moisture content, unit weights, density, and specific gravity, void ratio, porosity, degree of saturation and the relationship among them.

UNIT-3 CLASSIFICATION OF SOILS:

3.1 Classification of soils as per particle size and plasticity chart according to IS specifications
3.2 Particle size distribution - Sieve analysis and hydrometer analysis
3.3 Consistency of soils
3.4 Field identification of soil

UNIT-4 PERMEABILITY OF SOILS:

4.1 Definition of permeability and related terms
4.2 Darcy's law of flow through soils
4.3 Factors affecting permeability
4.4 Measurement of permeability in laboratory
4.5 Measurement of permeability in field

UNIT-5 COMPACTION:

5.1 Process of compaction
5.2 Proctor's compaction test
5.3 Moisture content and density relationships
5.4 Factors affecting compaction
5.5 Different methods of compaction
5.6 Brief description of field compaction methods, equipment’s and suitability for different type of soils.

UNIT-6 CONSOLIDATION:

6.1 Meaning and explanation of phenomena
6.2 Total stress, natural stress and effective stress
6.3 Measurement of compressibility characteristics
6.4 Consolidation test
6.5 Pressure void ratio relationship in consolidation
6.6 Practical methods of accelerating consolidation
6.7 Normally consolidated and over consolidated

UNIT-7 SOIL SHEAR STRENGTH:

7.1 Concept of shear strength

7.2 Factors contributing to shear strength of soils.

7.3 Drainage conditions of testing.

7.4 Determination of shearing strength by direct shear test, unconfined compression test, vane shear test.

UNIT-8 BEARING CAPACITY:

8.1 Concept of bearing capacity

8.2 Terzaghi's beating capacity factors and bearing capacity as per IS code

8.3 Factors affecting bearing capacity.

8.4 Determining bearing capacity of soil by plate load test and SPT. 8.5 Methods of improving bearing capacity

UNIT-9 EARTH PRESSURES:

9.1 Active and passive earth pressure

9.2 Earth pressure at rest

9.3 Determination of earth pressure by Rankine's theory for cohesion less soil (No derivation)

UNIT-10 SOIL EXPLORATION:

10.1 Functions and scope of soil exploration

10.2 Excavation and boring methods of sub-surface exploration

10.3 Types of samplers

10.4 Disturbed and undisturbed samples

10.5 Labelling, sealing and preservation of samples

UNIT-11 FOUNDATION ENGINEERING CONCEPT OF HOLLOW AND DEEP FOUNDATION:

11.1 Types of shallow foundations and their suitability;

11.2 Factors affecting the depth of shallow foundations;

11.3 Deep foundations, classification of piles according to function and material;

11.4 Installation of concrete piles (under reamed, bored, compaced) and their suitability;

11.5 load carrying capacity of piles;

11.6 Constructional features of pile foundations, well foundation

Reference Books:

1. Soil Engg by B.C. Punmmia
2. Basic Soil Engg. By Dr. Alam Singh
3. Modern Geo- Technical Engg. By Alam Singh
4. Soil and Foundation Engineering (Hindi) by B.C. Punmia
5. Soil & Foundation Engineering by A.K. Upadhyay