II Year-II Semester
(20CE4761) Basics of Geo Technical Engineering

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of Engineering Mechanics

Course Objectives:
The objective of this course is:

- To enable the student to determine the index properties of the soil and classify it.
- To impart the concept of seepage of water through soils and determine the discharge of water through soils.
- To impart the principles of compaction and consolidation of soils and determine the magnitude and the rate of consolidation settlement.
- To enable the student to understand the concept of shear strength of soils, determine the shear parameters of sands and clays and the areas of their application.

UNIT-I:
Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density – Mechanism of compaction – factors affecting – effects of compaction on soil properties – compaction control.

UNIT-II:
Index Properties of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT-III:
Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law-permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition - Seepage through soils –Flow nets: Characteristics and Uses.

UNIT–IV:
Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation – Spring Analogy – Terzaghi's theory of one-dimensional Consolidation – Degree of consolidation – Determination of coefficient of consolidation (Cv) – Over consolidated and normally consolidated clays.

UNIT-V:
Shear Strength of Soils: Basic mechanism of shear strength – Mohr – Coulomb Failure theories – Critical Void Ratio – Shear Strength determination- various drainage conditions.

Course Outcomes:

S.No	Course Outcomes	BTL
1	Know the definition of the various quantities related to soil mechanics and establish their inter-relationships.	L2
2	Know the methods of determination of the various index properties of the soils and classify the soils.	L2
3	Know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation	L2
4	Know the importance of shear strength and determine them in the laboratory.	L2
5	Apply the above concepts in day-to-day civil engineering practice.	L3

Text Books:

1. 'Basic and Applied Soil Mechanics' by Gopal Ranjan and A.S.R. Rao, New Age International Publishers.
2. 'Soil Mechanics and Foundation Engineering' by V.N.S. Murthy, CBS publishers.
3. 'Soil Mechanics' by M. Palani Kumar, PHI Learning.

Reference Books:

1. 'Fundamentals of Soil Mechanics' by D.W. Taylor., Wiley.
2. 'An introduction to Geotechnical Engineering' by Holtz and Kovacs; Prentice Hall.