Geotechnical Engineering (Code no: A50120)

UNIT - I:

Introduction: Soil formation - clay mineralogy and soil structure and clay mineralogy - moisture content - weight - volume relationship - Relative density.

Index Properties of Soils: Grain size analysis - Sieve analysis, principle of Hydrometer method - consistency limits and indices - I. S. Classification of soils.

UNIT - II:

Permeability: Soil water - capillary rise - flow of water through soils - Darcy's law - permeability - Factors affecting permeability - laboratory determination of coefficient of permeability - permeability of layered soils - In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress - principle of effective stress - quick sand condition - Seepage through soils - Flownets: Characteristics and Uses.

UNIT - III:

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction - factors affecting compaction - effects of compaction on soil properties - Field compaction Equipment - compaction quality control.

UNIT - IV:

Consolidation: Types of compressibility - Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves - normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory - coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V:

Shear Strength of Soils: Importance of shear strength - Mohr's - Coulomb Failure theories - Types of laboratory tests for strength parameters - strength tests based on drainage conditions - strength envelops - Shear strength of sands - dilatancy - critical void ratio - Liquefaction - shear strength of clays.