AMCE12 FOUNDATION ENGINEERING

UNIT-1 INTRODUCTION
1.1 Soil as a three phase system, water content, density and unit weights, specific gravity, voids ratio, porosity and degree of saturation, Density index
1.2 CLASSIFICATION OF SOILS General, compaction, standard proctor test, equivalent for standard proctor test. [is:2720 a (part vii) : 1965 : light compaction],
1.3 Water-density relationship, modified proctor test, modified proctor test curve, jodhpur mini-compactor test, typical comparison of the standard proctor test and jodhpur mini-compactor test,
1.4 Jodhpur mini-compactor, field compaction methods, field compaction control, proctor needle, calibration curve, factors affecting compaction,
1.5 Effect of comp active effort on compaction, obtained by the jodhpur mini-compactor, shear strength

UNIT-2 STRESS DISTRIBUTION
2.1 Concentrated force: boussinesq equations, concentrated load: boussinesq, analysis, pressure distribution diagrams, variation of σz with r at constant depth,
2.2 Vertical stress distribution on a horizontal plane (influence diagram for $z\ \sigma$ at a), $z\ \sigma$ distribution on vertical lane, vertical pressure under a uniformly, uniformly distributed load over circular area,
2.3 Vertical pressure due to a line load, vertical pressure under strip load, vertical. Pressure under center of strip load, vertical pressure under a uniformly loaded rectangular area, rectangular loaded area,
2.4 Influence factor for rectangular area (after Steinbrenner), equivalent point load method, Newmark's influence chart, radii of concentric circles for influence chart, contact pressure,

UNIT-3 SURFACE TENSION CAPILLARITY & EFFECTIVE STRESS
3.1 Modes of occurrence of water in soil, adsorbed water, adsorbed water and pore water (lambe, 1953), capillary water, surface tension and formation of meniscus,
3.2 Capillary rise, values of unit weight, dynamic viscosity and surface tension for water, capillary heights of soil, stress conditions in soil
3.3 Effective and neutral pressures, capillary siphoning,

UNIT-4 PERMEABILITY & SEEPAGE ANALYSIS
4.1 Darcy's law, discharge velocity and seepage velocity, validity of Darcy's law, factors affecting permeability, constant head permeability test, falling head , permeability test, permeability of stratified soil deposits,
4.2 Head gradient and potential, seepage pressure, upward flow : quick condition Sand condition, two dimensional flow:
4.3 Laplace equation, seepage through anisotropic soil, phreatic line of an earth dam , one dimensional consolidation, consolidation of laterally confined soil, semi log plot of pressure voids ratio relationship, consolidation of undisturbed specimen,

4.4 Terzaghi's theory of one dimensional consolidation, calculation of voids ratio and coefficient of volume change, calculation of voids ration by height of solids method, calculation of voids ratio by change in voids ratio method,

4.5 Determination of coefficient of consolidation, shear strength, theoretical considerations : Mohr's stress circle, Mohr coulomb failure theory, the effective stress principle, measurement of shear strength, direct shear test, triaxle compression test, vane shear test , shear strength of cohesive soils

UNIT-5 EARTH PRESSURE

5.1 Plastic equilibrium in soils: active and passive states, active and passive states of plastic equilibrium, active earth pressure

5.2 Rankine's theory, backfill with uniform surcharge, active earth pressure of cohesive soils, passive earth pressure: Rankine's theory, coulomb's wedge theory

UNIT-6 DESIGN OF GRAVITY RELATING WALL & STABILITY OF SLOPES & SUBSOIL EXPLORATION

6.1 Design of gravity relating wall

6.2 Stability analysis of infinite slopes, stability analysis of finite slopes, the Swedish slip circle method, stability of slopes of earth dam

6.3 Site reconnaissance, site exploration, methods of site exploration, soil samples and samplers, disturbed sampling, undisturbed sampling, penetration and sounding tests, geophysical methods

UNIT-7 SHALLOW FOUNDATION & WELL FOUNDATION

7.1 Types of foundations, spread footing, safe bearing pressure, settlement of footings, combined footing and strap footing, mat or raft footing, is. Code of practice for design of raft foundations, modulus of subgrade reactions K

7.2 Caissons, shapes of wells and component parts, depth of well foundation and bearing capacity, forces acting on a well foundation, analysis of well foundation, Heavy wells

Reference Books:

1. Modern Geotechnical Engineering by A Singh
2. Principles of Foundation Engineering by B M Das
3. Theory and Practice of Foundation Design by N Som