

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - CIVIL ENGINEERING

Semester: IV

Subject Name: **Soil Engineering**

Sr. No.	Course content
1.	Stress distribution in soil : Boussinesq's theory for distribution of pressure on a vertical plane and a horizontal plane below ground surface due to vertical point load on the ground surface, isobar, assumptions, comparison and limitations of Boussinesq theory & Westergaard theory. Stress caused by loaded areas of different shapes, equivalent point load method, stresses due to trapezoidal loads. Newmark's influence chart.
2.	Shear strength Of Soil : Mohr's strength theory, Mohr- coulomb's strength theory, Modified Mohr-coulomb's theory, direct shear test, unconfined compression test, lab. vane shear test, introduction to triaxial compression test, shear tests based on drainage conditions.
3.	Compaction : Definition, theory of compaction, factors affecting compaction, laboratory compaction tests, effect of compaction on soil properties, placement water content, placement layer thickness, field control of compaction, Proctor's needle, methods of compaction used in field.
4.	Consolidation of soils : Compressibility of soils, definitions and mechanism of consolidation, spring analogy, void ratio and effective stress relation, related indices, assumptions of Terzaghi's one dimensional consolidation theory, time factor, one dimensional consolidation tests, laboratory and theoretical time curves, determination of pre-consolidation pressure, estimation of consolidation settlement and rate of settlement for uniform pressure increment in a clay layer
5.	Earth pressure: Active and passive earth pressures due to level and uniform surcharged backfill for cohesionless and cohesive soils using Rankine's theory, earth pressure at rest, introduction to Coulomb's theory, limitations and differences of Rankine's and Coulomb's theory
6.	Stability of slopes: Idealized condition used in the analysis, types of slope failures, infinite and finite slopes, factor of safety, stability of infinite slopes, Fundamentals of conventional methods, swedish circle method , friction circle method, Taylor stability numbers, stability charts,

	effects of seepage and non-homogeneity on the stability of slopes, factor of safety and soil parameters for special cases such as end of construction, rapid (instantaneous) draw down, steady seepage, Tension cracks.
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TERM WORK :

work and tutorials(mini. 30 problems) based on above course. The assessment of term work shall include a practical/oral Term work shall consist of laboratory test also.

Reference Books:

1. Arora K.R.; *Soil Mechanics & Foundation Engineering*
2. Murthy V.N.S.; *Soil Mechanics & Foundation Engg Vol.I*
3. Taylor D.W.; *Fundamentals of Soil Mechanics*
4. Lambe & Whitman.; *Soil Mechanics*