GOVT. POLYTECHNIIC KORAPUT

ACADEMIC SESSION 2020-2021

SEMESTER- 3rd

BRANCH - CIVIL ENGINEERING

SUBJECT – GEOTECHNICAL ENGINEERING

FACULTY NAME – MADHUSMITA DEHURI

Week No	Topic to be covered
1	**Introduction** 1.1 Soil and Soil Engineering 1.2 Scope of Soil Mechanics 1.3 Origin and formation of soil
2	**Preliminary Definitions and Relationship** 2.1 Soil as a three Phase system. 2.2 Water Content, Density, Specific gravity, Voids ratio, Porosity, Percentage of air voids, air content, degree of saturation, density Index, Bulk/Saturated/dry/submerged density, Interrelationship of various soil parameters **3**
3	**Index Properties of Soil** 3.1 Water Content 3.2 Specific Gravity 3.3 Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses
4	3.4 Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index
5	**Classification of Soil** 4.1 General 4.2 I.S. Classification, Plasticity chart
6	**Permeability and Seepage** 5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability, 5.2 Factors affecting Permeability.
7	5.3 Constant head permeability and falling head permeability Test. 5.4 Seepage pressure, effective stress, phenomenon of quick sand
8	**Compaction and Consolidation** **6.1 Compaction:** Compaction, Light and heavy compaction Test, Optimum Moisture
9	Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability **6.2 Consolidation:** Consolidation, distinction between compaction and consolidation.
10	Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
11	**Shear Strength** 7.1 Concept of shear strength, Mohr- Coulomb failure theory, Cohesion, Angle of internal friction, strength envelope for different type of soil, Measurement of shear strength;- Direct shear test, triaxial shear test, unconfined compression test and vane-shear test **Earth Pressure on Retaining Structures** 8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.

	8.2 Use of Rankine's formula for the following cases (cohesion-less soil only) (i) Backfill with no surcharge, (ii) backfill with uniform surcharge
12	Foundation Engineering 9.1 Functions of foundations, shallow and deep foundation, different type of shallow and deep foundations with sketches. Types of failure (General shear, Local shear & punching shear)
13	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip, Circular and square footings, Effect water table on bearing capacity of soil
14	9.3 Plate load test and standard penetration test
15	Revion of concepts