

Department: Civil Engineering	Semester : 3rd Sem SEC B	Name of the Teaching faculty: MANAS RANJAN
Subject :- Th2. GEOTECHNICAL ENGINEERING	No.of Days/ week class allotted : 04/week	Semester from date: 15/09/2022 to 22/12/2022 of Weeks :15 covered:-
<b>Week</b>	<b>Class Day</b>	<b>Topics</b>
		<b>1. INTRODUCTION</b>
1 st Week:	1st	1.1 Soil and soil engineering
	2nd	1.2 Scope of soil mechanics, 1.3 Origin and formation of soil
		<b>2.PRELIMINARY DEFINATIONS AND RELATIONSHIP</b>
	3rd	2.1 Soil as a three phase system
2nd Week:	1st	2.2 Water content,Density, Specific gravity, void ratio, porosity, percentage of air void, air content, Degree of saturation, Density index, Bulk/Saturated/Dry/Submerged Density, Interrelationship of various soil parameter.
	2nd	2.2 Water content,Density, Specific gravity, void ratio, porosity, percentage of air void, air content, Degree of saturation, Density index, Bulk/Saturated/Dry/Submerged Density, Interrelationship of various soil parameter.
	3rd	2.2 Water content,Density, Specific gravity, void ratio, porosity, percentage of air void, air content, Degree of saturation, Density index, Bulk/Saturated/Dry/Submerged Density, Interrelationship of various soil parameter.
	4th	2.2 Water content,Density, Specific gravity, void ratio, porosity, percentage of air void, air content, Degree of saturation, Density index, Bulk/Saturated/Dry/Submerged Density, Interrelationship of various soil parameter.
3 rd Week: (26 th Sept-1st Oct)	1st	2.2 Water content,Density, Specific gravity, void ratio, porosity, percentage of air void, air content, Degree of saturation, Density index, Bulk/Saturated/Dry/Submerged Density, Interrelationship of various soil parameter.
		<b>3.Index Properties of Soil</b>
	2nd	3.1 Water Content
	3rd	3.2 Specific Gravity

	4th	3.3 Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses
<b>4th week</b>	<b>vacation</b>	
5 th Week:	1st	3.4 Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index
		<b>4.Classification of Soil</b>
	2nd	4.1 General
	3rd	4.1 General
	4th	4.2 I.S. Classification, Plasticity chart
6 th Week:	1st	4.2 I.S. Classification, Plasticity chart
	2nd	4.2 I.S. Classification, Plasticity chart
	3rd	4.2 I.S. Classification, Plasticity chart
		<b>5.Permeability and Seepage</b>
	4th	5.1 Concept of Permeability, Darcy's Law, Co-efficient of Permeability,
7 th Week:	1st	5.2 Factors affecting Permeability.
	2nd	5.3 Constant head permeability and falling head permeability Test.
	3rd	5.3 Constant head permeability and falling head permeability Test.
	4th	5.4 Seepage pressure, effective stress, phenomenon of quick sand
8 th Week:	1st	5.4 Seepage pressure, effective stress, phenomenon of quick sand
	2nd	5.4 Seepage pressure, effective stress, phenomenon of quick sand
		<b>5.Compaction and Consolidation</b>
	3rd	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum MoistureContent of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability
	4th	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum MoistureContent of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability
	2nd	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum MoistureContent of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability

9 th Week: (7 th Nov -12 th Nov)	3rd	6.1 Compaction: Compaction, Light and heavy compaction Test, Optimum Moisture Content of Soil, Maximum dry density, Zero air void line, Factors affecting Compaction, Field compaction methods and their suitability
	4th	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi's model analogy of compression/ springs showing the process of consolidation – field
10 th Week:	1st	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
	2nd	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
	3rd	6.2 Consolidation: Consolidation, distinction between compaction and consolidation. Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
		<b>7. Shear Strength</b>
	4th	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
11 th Week:	1st	7.1 Concept of shear strength, Mohr- Coulomb failure theory, Cohesion, Angle of internal friction, strength envelope for different type of soil, <u>Measurement of shear strength:- Direct shear test.</u>
	2nd	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
	3rd	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

	4th	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
12 th Week: (28 th Nov -3 rd) Dec	1st	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
		<b>8.Earth Pressure on Retaining Structures</b>
	2nd	8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.
	3rd	8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.
	4th	8.1 Active earth pressure, Passive earth pressure, Earth pressure at rest.
13 th Week:	1st	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
	2nd	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
	3rd	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
	4th	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
14 th Week:		<b>9.Foundation Engineering</b>
	1st	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)
	2nd	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)

	3rd	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)
	4th	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)
15 th Week:	1st	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
	2nd	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
<b>EXTRA CLASSES</b>		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
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		9.3 Plate load test and standard penetration test
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