Detailed Teaching Plan

Lecture No.	Unit No	Topics to be covered	Planned Date	Execution Date	Remark
1	1	1.1 Weight and Volume Relationships : 1.1.1 Definition of soil and soil mechanics or Geotechnical Engineering, field application of Geotechnical Engineering , 1.1.2 Soil as a three-phase system, types of soil water, water content, Void ratio			
2		porosity and degree of saturation, water content,			
3		density and unit weights, specific gravity			
4		density index and relative compaction and functional relationship among them.			
5		1.1.3 Determination of water content, specific gravity and bulk density			
6		1.2 Index Properties and Soil Classification : 1.2.1 Particle size analysis, mechanical sieve analysis, sedimentation analysis,			
7		Stoke's law, pipette method and hydrometer method			
8		Particle size distribution curve and its interpretation			
9		, 1.2.2 Consistency of soil, stages of consistency, Atterberg's limits of consistency, relationship between consistency limits.			
10		Determination of liquid limit, plastic limit and shrinkage limit , 1.2.3 Particle size classification of soils & IS classification of soil.			
11		2.1 Permeability : 2.1.1Definition of permeability, Darcy's law of permeability, coefficient of permeability, Factors affecting permeability.			
12		2.1.2Determination of coefficient of permeability by constant head and falling head permeability tests.			

13		2.2 Well Hydraulics : 2.2.1Aquifer, aquiclude, aquifuge, coefficient of transmissibility			
14		2.2 Well Hydraulics : 2.2.1Aquifer, aquiclude, aquifuge, coefficient of transmissibility ….Numerical Cont.			
15	2	2.2.2Formulae for discharge through unconfined and confined aquifer for steady radial flow by Dupuit's Theory (no derivation).			
16		field determination of coefficient of permeability and coefficient of transmissibility			
17		2.3 Seepage : 2.3.1 Seepage through earthen structures, head, gradient and potential, seepage velocity, seepage pressure, quicksand condition.			
18		seepage velocity, seepage pressure, quicksand condition.			
19		2.3.2 Flow net, characteristics of flow net, application of flow net (no numerical problems), phreatic line.			
20		3.1 Shear failure of soil, concept of shear strength of soil, components of shearing resistance of soil – cohesion, internal friction			
21		3.2 Mohr-Coulomb failure theory, Strength envelope, strength equation.			
22		3.3Effective stress principle-total pressure, effective pressure, neutral pressure.			
23		3.3Effective stress principle-total pressure, effective pressure, neutral pressure….Numerical Continue			
24	3	3.3Effective stress principle-total pressure, effective pressure, neutral pressure….Numerical Continue			
25		, shear strength equation in terms of effective pressure, Mohr's stress circle.			

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26		3.4 Determination of shear strength- types of shear test depending upon drainage condition, Direct shear test, Tri-axial test.			
27		3.4 Determination of shear strength- types of shear test depending upon drainage condition, Direct shear test, Tri-axial test….Numerical Continue…			
28		Unconfined compression test, Vane shear test			
29		Unconfined compression test, Vane shear test…Numerical			
30		4.1Compaction of Soil : 4.1.2 Concept of compaction, purpose of compaction field situations where compaction is required.			
31		4.2 Standard proctor test – test procedure as per IS code, compaction curve, optimum moisture content, maximum dry density, zero air voids line.			
32		4.3 Modified proctor test , 4.4 Factors affecting compaction			
33		4.5 Field methods of compaction – rolling, ramming & vibration and suitability of various compaction equipment's, placement water content, field compaction control.			
34	4	4.6 Difference between compaction and consolidation			
		4.7 Earth Pressure - 4.7.1 Definition of active earth pressure, Neutral pressure and passive earth pressure,			
35		4.7.1 Definition of active earth pressure, Neutral pressure and passive earth pressure,			
36		4.7.2 Structures subjected to earth pressure in the field.			
37		4.7.3 Rankine's theory , 4.7.4 Calculation of active and passive earth pressure (simple cases).			

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38		4.7.4 Calculation of active and passive earth pressure (simple cases)…Numerical Cont..			
39		5.1 Bearing Capacity of Soils : 5.1.1 Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure			
40		5.1.2 Terzaghi's analysis and assumptions made.			
41		5.1.3 Effect of water table on bearing capacity			
42		5.1.4 IS code method for computing bearing capacity.			
43		5.1.5 Field methods for determination of bearing capacity – Plate load test and standard penetration test. Test procedures as Per IS:1888 & IS:2131			
44	5	5.1.6 Typical values of bearing capacity from building code IS:1904			
45		5.1.6 Liquefaction (in brief) ; 5.2 Stabilization of soil , 5.2.1Concept of stabilization, necessity of soil stabilization,			
46		5.2.2 Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization.			
47		5.3 Site Investigation and Sub Soil Exploration , 5.3.1 Necessity investigation & exploration, 5.3.2 Method exploration open excavation & boring			
48		5.3.3 Criteria for deciding the location and number of test pits and bores , 5.3.4 Methods of exploration, disturbed & undisturbed soil samples for lab testing.			