

## LESSON PLAN

**PROGRAMME:** DIPLOMA IN CIVIL ENGINEERING  
**COURSE NAME:** GEOTECHNICAL ENGINEERING  
**COURSE CODE:** Th2  
**SEMESTER:** 3<sup>rd</sup>  
**PERIODS/WEEK:** 04  
**TOTAL PERIODS:** 60

**NAME OF THE FACULTY:** UTKALIKA PRADHAN  
**SESSION:** WINTER

CLASS	TOPIC
1	Introduction: Soil and Soil Engineering Scope of Soil Mechanics
2	Origin and formation of soil
3	Soil as a three Phase system: Phase diagram
4	Weight volume relationship of soil
5	Preliminary Definitions: Water Content, Density, Specific gravity, density Index, Bulk/Saturated/dry/submerged density
6	Voids ratio, Porosity, Percentage of air voids, air content, degree of saturation
7	Interrelationship of various soil parameters: Derivations
8	Interrelationship of various soil parameters: Derivations
9	Numerical problems on interrelationship of soil parameters
10	Numerical problems on interrelationship of soil parameters
11	Determination of Water content: Oven drying method & Pycnometer method
12	Determination of specific gravity by pycnometer method
13	Particle size distribution: Sieve analysis,
14	Wet mechanical analysis of soil
15	Particle size distribution curve and its uses
16	Consistency of Soils, Atterberg's Limits,
17	Plasticity Index, Consistency Index, Liquidity Index
18	I.S. Classification of soil: Coarse grained soil
19	Plasticity chart: Explanation & numerical problems
20	Permeability: Concept, Darcy's Law, Co-efficient of Permeability
21	Factors affecting Permeability
22	Constant head permeability test: Explanation & numerical problems
23	Falling head permeability test: Explanation & numerical problems
24	Seepage pressure, effective stress, phenomenon of quick sand
25	Compaction: Definition & Concept,
26	Light and heavy compaction Test: Proctor test
27	Optimum Moisture Content of Soil, Maximum dry density, Zero air void line
28	Factors affecting Compaction
29	Field compaction methods and their suitability
30	Consolidation: Definition & concept, distinction between compaction and consolidation.
31	Terzaghi's model analogy of compression/ springs showing the process of consolidation
32	Field application of Spring analogy

33	Concept of shear strength
34	Mohr- Coulomb failure theory
35	Cohesion, Angle of internal friction, strength envelope for different type of soil
36	Direct shear test: description
37	Tri-axial shear test: description
38	Unconfined compression test and vane-shear test
39	Earth Pressure on Retaining Structures: concept
40	Plastic Equilibrium of soil
41	Active earth pressure: details
42	Passive earth pressure, Earth pressure at rest.
43	Use of Rankine's formula: Backfill with no surcharge
44	Use of Rankine's formula: Backfill with uniform surcharge
45	Foundation Engineering: Definition, Function of foundations
46	Types of foundation: Shallow & Deep foundations
47	Different type of shallow foundations with sketches.
48	Different type of deep foundations with sketches.
49	Types of failure (General shear, Local shear & punching shear)
50	Bearing capacity of soil: Definition & concept
51	Bearing capacity of soils using Terzaghi's formulae for strip, Circular and square footings,
52	Numerical problems on Terzaghi's formulae
53	Numerical problems on Terzaghi's formulae
54	Bearing capacity of soils using IS Code formulae for strip, Circular and square footings.
55	Numerical problems on IS Code formulae
56	Numerical problems on IS Code formulae
57	Effect of water table on bearing capacity of soil
58	Plate load test and standard penetration test
59	Numerical problem practice: Interrelationship of soil
60	Numerical problem practice: Interrelationship of soil

*Chiradhar*  
Signature of Faculty

*SAB*  
Signature of HOD