INSTITUTE OF ENGINEERING AND MANAGEMENT GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005

LESSON PLAN

Name of the Subject: Geotechnical Engineering Name of the Faculty: Bhupendra Pratap Dongri Semester: Third Semester Semester From: July to December

Branch: Civil Engineering **No. of Weeks:** 15 Weeks

$1^{st} = \begin{bmatrix} 1^{st} & 1.0 \text{ INTRODUCTION} \\ 1.1-Soil and Soil Engineering. \\ 1.2-Scope of Soil Mechanics \\ 2^{nd} & 2.0 PRELIMINARY DEFINITIONS AND RELATIONSHIP. \\ 2.1-Soil as a three Phase system. \\ \hline 2^{nd} & Weight volume relationships: Water Content ,Density \\ \hline 4^{th} & Specific gravity, Voids ratio, Porosity, \\ \hline 4^{th} & Specific gravity, Voids ratio, Porosity, \\ \hline 4^{th} & Specific gravity, Voids ratio, Porosity, \\ \hline 4^{th} & Degree of saturation , Percentage of air voids, air content, \\ \hline 2^{nd} & 2^{nd} & Density Index, Bulk/Saturated/dry/submerged density. \\ \hline 3^{rd} & 3.0DETERMINATION OF INDEX PROPERTIES. \\ \hline 3.1- Water Content (Pycnometer method, Oven drying method) \\ \hline 4^{th} & 3.2-Specific Gravity \\ \hline 4^{th} & 3.3- Particle size distribution, Sieve analysis, Wet mechanical analysis. Pipette method, Basic concept of Hydrometer Analysis \\ \hline 1^{st} & 3.3- Particle size distribution, Sieve analysis, Plasticity Index, Consistency Index, Liquidity Index \\ \hline 4^{th} & 4.2- Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index \\ \hline 4^{th} & 4.2- Particle size Distribution. \\ \hline 4^{th} & 4.2- Particle size Distribution. \\ \hline 4^{th} & 4.2- Particle Size Distribution. \\ \hline 4^{th} & 4.2- Constant Constitution \\ \hline 4^{th} & 4.5- General. \\ \hline 4^{th} & 1.5. Concept of Permeability, Darcy's Law \\ \hline 5^{th} & 5.0 FERMEABILITY AND SEEPAGE \\ \hline 5.1- Concept of Permeability, Darcy's Law \\ \hline 2^{nd} & 5.2-Factors affecting Permeability and \\ \hline 6^{th} & 1^{st} falling head permeability and \\ \hline 6^{th} & 1^{st} falling head permeability Test \\ \hline 2^{nd} & 5.4-Seepage pressure, the phenomenon of quick sand \\ \hline 3^{rd} & 5.4-Seepage pressure, the phenomenon of quick sand \\ \hline 7^{th} & 1^{st} & Optimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 7^{th} & 1^{st} & Optimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 7^{th} & 1^{st} & Optimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 7^{th} & 1^{st} & Optimum Moisture$	Week	Class Day	Theory/ Practical Topics
$\begin{array}{ c c c c c c } \hline 1^{3^{d}} & 1.2\text{- Scope of Soil Mechanics} \\ \hline 2^{3^{d}} & 2.0 \text{ PRELIMINARY DEFINITIONS AND RELATIONSHIP.} \\ \hline 2.1\text{- Soil as a three Phase system.} \\ \hline 3^{3^{d}} & Weight volume relationships: Water Content ,Density \\ \hline 4^{1^{h}} & Specific gravity, Voids ratio, Porosity, \\ \hline 4^{1^{h}} & Degree of saturation ,Percentage of air voids, air content, \\ \hline 2^{3^{d}} & 2^{3^{d}} & 3.0\text{DETERMINATION OF INDEX PROPERTIES.} \\ \hline 3^{3^{d}} & 3.0\text{DETERMINATION OF INDEX PROPERTIES.} \\ \hline 3^{3^{d}} & 3.0\text{DETERMINATION OF INDEX PROPERTIES.} \\ \hline 3^{3^{d}} & 3.2\text{- Particle size distribution, Sieve analysis, Wet mechanical analysis.} \\ \hline 1^{3^{d}} & 3.3\text{- Particle size distribution, Sieve analysis, Wet mechanical analysis.} \\ \hline 1^{3^{d}} & 3.4\text{- Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index \\ \hline 3^{3^{d}} & 3.4\text{- Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index \\ \hline 4^{4^{lh}} & 4.2\text{- Particle size Distribution.} \\ \hline 1^{3^{d}} & 4.0\text{CLASSIFICATION OF SOIL.} \\ \hline 4^{4^{lh}} & 4.2\text{- Particle size Distribution.} \\ \hline 1^{3^{d}} & 1\text{Unified Soil Classification.} \\ \hline 1^{3^{d}} & 1\text{Unified Soil Classification.} \\ \hline 1^{3^{d}} & 5.0\text{PERMEABILITY AND SEEPAGE \\ \hline 5^{1^{h}} & 1^{3^{d}} & 5.2\text{ Factors affecting Permeability, Darcy's Law \\ \hline 2^{3^{d}} & 5.2\text{ Concept of Permeability, Data \\ \hline 3^{d} & 5.3\text{- Concept of Permeability and} \\ \hline 6^{6^{h}} & 1^{3^{d}} & falling head permeability Test \\ \hline 2^{3^{d}} & 5.5\text{- Concept of flow-net, Properties and application of flow-net.} \\ \hline 4^{4^{h}} & 6.0\text{- COMPACTION AND CONSOLIDATION \\ \hline 6.1\text{- Compaction, Light and heavy compaction Test \\ \hline 7^{th} & 1^{3^{d}} & Optimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 0^{th} & 1^{3^{d}} & 0ptimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 0^{th} & 1^{3^{d}} & 0ptimum Moisture Content of Soil, Maximum dry density, Zero air void line \\ \hline 0^{th} & 1^{3^{d}} & 0ptimum Moisture Con$		1 st	1.0 INTRODUCTION
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2 nd Factors affecting Compaction		2^{nd}	Factors affecting Compaction

	3 rd	Field compaction methods and their suitability
	4 th	Consolidation, distinction between compaction and consolidation
8 th	1^{st}	Spring Analogy method, Pressure-void ratio curve, normally consolidated
	2^{nd}	Under consolidated and over consolidated soil, Assumption of Terzaghi's
		theory of one-dimensional consolidation, Laboratory Consolidation Test
	3 rd	Co-efficient of Consolidation, Time Factor, Estimation of consolidation
		settlement, Difference between primary and secondary consolidation
	4^{th}	7.0SHEAR STRENGTH.
		7.1- Concept of shear strength
9 th	1^{st}	Mohr- Coulomb failure theory,
	2^{nd}	Cohesion, Angle of internal friction
	3 rd	Strength envelope for different type of soil,
	4^{th}	Measurement of shear strength;- Direct shear test,
10^{th}	1^{st}	Triaxial shear test, unconfined compression test and vane-shear test
	2^{nd}	8.0EARTH PRESSURE ON RETAINING STRUCTURES
	3 rd	8.1Active earth pressure
	4^{th}	Passive earth pressure,
11^{th}	1^{st}	Earth pressure at rest.
	2^{nd}	8.2- Use of Rankine's formula for the following cases (cohesion-less soil
		only)
	3 rd	(i) Backfill with no surcharge,
	4^{th}	(ii) Backfill with uniform surcharge.
12 th	1^{st}	iii) Submergedbackfill
	2^{nd}	9.0 FOUNDATION ENGINEERING. 9.1- Functions of foundations,
	$3^{\rm rd}$	Shallow and deep foundation,
	4^{th}	Different type of shallow and deep foundations with sketches.
13 th	1^{st}	Types of failure (General shear, Local shear & punching shear)
	2^{nd}	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's
	_	formulae & IS Code formulae for strip, Circular and square footings
	3 rd	9.3 Machine Foundation: Introduction to Soil dynamics, Terms associated
		with soil dynamics
	4^{th}	Free vibration and Forced vibration, Natural frequency, Types of
14^{th}	1^{st}	Machines and machine foundation, General requirements, Design of machine
	2^{nd}	Foundations: Reciprocating type, Centrifugal type, Impact type,
	3^{rd}	Isolation of foundations.
-	4 th	PREVIOUS YEAR QUESTION DISCUSSION
15 th	4 1 st	-
15	1	REVISION