GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF CIVIL ENGINEERING

Discipline: **CIVIL ENGG.**	Semester: 3RD	Name of the Teaching Faculty: - **Mr. SURYAKANT DASH**
Subject: **GEOTECHNICAL ENGINEERING (Th2)**	No. of days/per week class allotted: 04	Semester From date: 01.10.2021 To Date: 08.01.2022 No. of Weeks:15
PRE-REQUISITE	Basic knowledge about material properties.	
COURSE OUTCOMES	1. Comprehend the scope of soil mechanics and define the associated terminology and inter-relation among various soil properties	
	2. Classify and indentify soil types under different standards	
	3. Comprehend significance of permeability and seepage and compute those.	
	4. Describe requirement and methodology of compaction and consolidation.	
	5. Realize the methods towards shear strength estimation and obtain strength envelop for different types of soils.	
	6. Define terms of foundation engineering and estimate bearing capacity	

Week	Class day	Practical topics	Delivery Method
1ST	1ST	**Introduction** 1.1 Soil and Soil Engineering, 1.2 Scope of Soil Mechanics,	Whiteboard
	2ND	1.2 Review of CG and MI of different sections, 1.3 Origin and formation of soil	Whiteboard
	3RD	**2.0 PRELIMINARY DEFINITIONS AND RELATIONSHIP.** 2.1- Soil as a three Phase system	Whiteboard
	4TH	2.2-Weight volume relationships:	Whiteboard
2ND	1ST	Water Content ,Density	Whiteboard
	2ND	Specific gravity,Voids ratio, Porosity,	Whiteboard
	3RD	degree of saturation ,Percentage of air voids, air content, density Index, Bulk/Saturated/dry/submerged density.	Whiteboard
	4TH	**Problem solving and assignment**	Whiteboard
3RD	1ST	**3.0 INDEX PROPERTIES OF SOIL.** 3.1- Water Content , 3.2- Specific Gravity, 3.3- Particle size distribution,	Whiteboard
	2ND	Sieve analysis, Wet mechanical analysis,	Whiteboard
	3RD	Particle size distribution curve and its uses	Whiteboard
	4TH	3.4 – Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index	Whiteboard
4TH	1ST	**4.0 CLASSIFICATION OF SOIL.** 4.1- General.	Whiteboard
	2ND	4.2 I.S. Classification,	Whiteboard
	3RD	4.2 I.S. Classification,	Whiteboard
	4TH	plasticity chart	Whiteboard
5TH	1ST	plasticity chart	Whiteboard
	2ND	**Quiz and assignment**	Whiteboard
	3RD	**5.0 PERMEABILITY AND SEEPAGE** 5.1- Concept of Permeability, Darcy's Law	Whiteboard
	4TH	Co-efficient of Permeability, ,	Whiteboard
6TH	1ST	5.2 Factors affecting Permeability	Whiteboard
	2ND	5.3- Constant head permeability and	Whiteboard

	3RD	falling head permeability Test	Whiteboa
	4TH	5.4- Seepage pressure, the phenomenon of quick sand	Whiteboa
7TH	1ST	the phenomenon of quick sand	Whiteboa
	2ND	**6.0- COMPACTION AND CONSOLIDATION.** 6.1- Compaction	Whiteboa
	3RD	Light and heavy compaction Test	Whiteboa
	4TH	Optimum Moisture Content of Soil, Maximum dry density, Zero air void line	Whiteboa
8TH	1ST	Factors affecting Compaction	Whiteboa
	2ND	Field compaction methods and their suitability	Whiteboa
	3RD	6.2 Consolidation: Consolidation	Whiteboa
	4TH	distinction between compaction and consolidation	Whiteboa
9TH	1ST	Terzaghi's model analogy of compression/ springs showing the process of consolidation , field implications	Whiteboa
	2ND	**Quiz and assignment**	Whiteboa
	3RD	**7.0 SHEAR STRENGTH.** 7.1- Concept of shear strength	Whiteboa
	4TH	Mohr- Coulomb failure theory,	Whiteboa
10TH	1ST	Cohesion, Angle of internal friction, strength envelope for different type of soil,	Whiteboa
	2ND	Measurement of shear strength;- Direct shear test,	Whiteboa
	3RD	triaxial shear test	Whiteboa
	4TH	unconfined compression test and vane-shear test	Whiteboa
11TH	1ST	**8.0 EARTH PRESSURE ON RETAINING STRUCTURES** 8.1Active earth pressure	Whiteboa
	2ND	Passive earth pressure,	Whiteboa
	3RD	8.2- Use of Rankine's formula for the following cases (cohesion-less soil only)	Whiteboa
	4TH	(i) Backfill with no surcharge,	Whiteboa
12TH	1ST	(ii) backfill with uniform surcharge.	Whiteboa
	2ND	**9.0 FOUNDATION ENGINEERING.** 9.1- Functions of foundations,	Whiteboa
	3RD	shallow and deep foundation,	Whiteboa
	4TH	different type of shallow and deep foundations with sketches.	Whiteboa
13TH	1ST	Types of failure (General shear Local shear & punching shear)	Whiteboa
	2ND	9.2 Bearing capacity of soil, bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip	Whiteboa
	3RD	**Numerical**	Whiteboa
	4TH	Circular and square footings	Whiteboa
14TH	1ST	9.3 Plate load test and standard penetration test	Whiteboa
	2ND	**Quiz and assignment**	Whiteboa
	3RD	REVISION	Whiteboa
	4TH	REVISION	Whiteboa

	1ST	REVISION	Whiteboard
	2ND	REVISION	Whiteboard
	3RD	REVISION	Whiteboard
	4TH	REVISION	Whiteboard

LEARNING RESOUCES:

01. . Soil Mechanics & Foundation Engineering-B.C. PUNMIA
02. Soil Mechanics& Foundation Engineering –K.R. ARORA
03. Textbook of geotechnical engineering –T.N RAMAMURTY &T.G. SITARAM

WEBSITE RESOUCES:

01. https://youtu.be/V1m3cB-Aqv8 NPTEL)

Sunyayant Dash
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