

LESSON PLAN OF CEPC207 TH:4 Geotechnical Engineering FOR THE SESSION 2025  
26(WINTER-2025) BATCH-2024-27, GOVT. POLYTECHNIC, KANDHAMAL



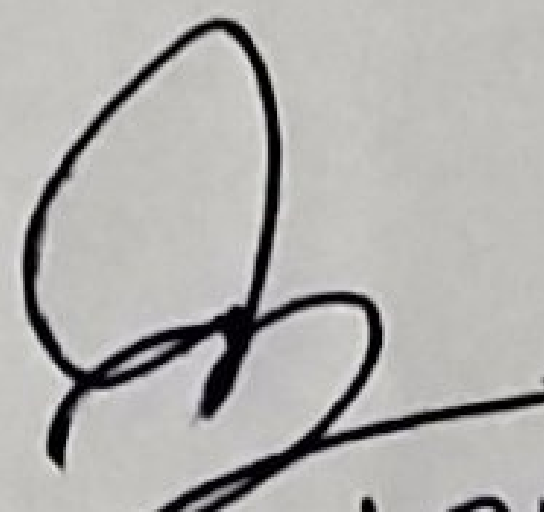
Discipline: civil engineering	Semester: 3rd	Name of the Teaching Faculty: Ashish Nayak, Lect. in Civil Eng.
Subject: CEPC207 TH:4 Geotechnical Engineering	No. of days/ per week class allotted: 3	Semester From Date : 14/07/2025 to Date: 15/11/2025 No. of Weeks: 15
Week	Class Day	Theory/ Practical Topics
	<b>UNIT-I</b>	<b>Overview of Geology and Geotechnical Engineering</b>
1st	1st	Introduction of Geology, Branches of Geology, Importance of Geology for civil engineering structure and composition of earth,
	2nd	Definition of a rock: Classification based on their genesis (mode of origin), formation. Classification and engineering uses of igneous, sedimentary and metamorphic rocks. (Concepts only)
	3rd	Importance of soil as construction material in Civil engineering structures and as foundation bed for structures. (Concepts only)
2nd	1st	Field application of geotechnical engineering for foundation design, pavement design, design of earth retaining structures, design of earthen dam. (Concepts only)
	<b>UNIT-II</b>	<b>Physical and Index Properties of Soil</b>
	2ND	Soil as a three phase system, water content, determination of water content by oven drying method as per BIS code
3rd	3RD	void ratio, porosity and degree of saturation, density index., air Content, Percentage of air voids, Relation between the parameters.
	1st	NUMERICALS
	2nd	Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight.
	3rd	<ul style="list-style-type: none"> <li>Determination of bulk unit weight and dry unit weight by core cutter and sand replacement method, Determination of specific gravity by pycnometer.</li> </ul>
4th	1st	Consistency of soil, Atterberg limits of consistency
	2nd	Liquid limit, plastic limit and shrinkage limit. Plasticity index.
	3rd	Particle size distribution test and plotting of curve
5th	1st	Determination of effective diameter of soil, well graded and uniformly graded soils, BIS classification of soil.
	2nd	<b>Monthly Test- I</b>
	<b>UNIT-III</b>	<b>Permeability and Seepage</b>

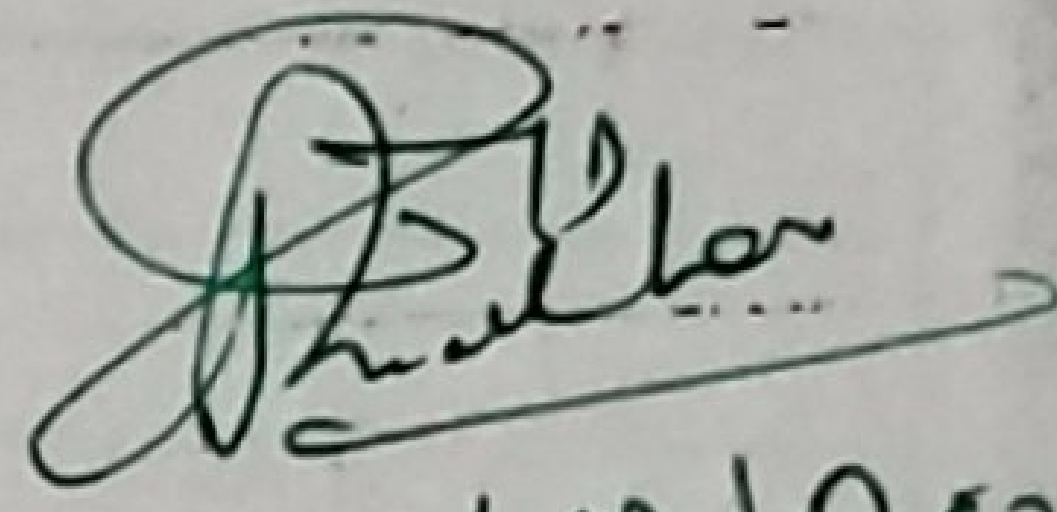


	3rd	Definition of permeability, Darcy's law of permeability, coefficient of permeability, factors affecting permeability
6th	1st	determination of coefficient of permeability by constant head and falling head tests
	2nd	simple problems to determine coefficient of permeability
	3rd	Seepage through earthen structures, seepage velocity, seepage pressure
7th	1st	phreatic line, flow lines, application of flow net, (Concepts only No numerical problems). Effective stress, quick Sand
	<b>UNIT-IV</b>	<b>Compaction, Consolidation and stabilization of soil</b>
	2nd	Concept of compaction, Standard and Modified proctor test as per IS code, Plotting of Compaction curve for determining: Optimum moisture content (OMC), maximum dry density (MDD), Zero air voids line.
	3rd	Factors affecting compaction, field methods of compaction – rolling, ramming and vibration.
8th	1st	<ul style="list-style-type: none"> <li>● Consolidation, Difference between compaction and consolidation. Terzaghi's Model analogy of compression/springs showing the process of consolidation, Field implications</li> </ul>
	2nd	Concept of soil stabilization, necessity of soil stabilization, different methods of soil stabilization.
	3rd	<ul style="list-style-type: none"> <li>● California bearing ratio (CBR) test - Meaning and Utilization in Pavement Construction</li> </ul>
9th	1st	Necessity of site investigation and soil exploration: Types of exploration, criteria for deciding the location and number of test pits and bores.
	2nd	<ul style="list-style-type: none"> <li>● Field identification of soil – dry, strength test, dilatancy test and toughness test.</li> </ul>
	3rd	<b>Monthly Test- II</b>
	<b>UNIT-V</b>	<b>Shear Strength of Soil</b>
10th	1st	<ul style="list-style-type: none"> <li>● Shear failure of soil-General, local and punching shear, concept of shear strength of soil.</li> </ul>
	2nd	Components of shearing resistance of soil – cohesion, internal friction
	3rd	Mohr-Coulomb failure theory, Strength envelope, strength equation for purely cohesive and cohesion less soils.
11th	1st	Direct shear, triaxial and vane shear test laboratory methods.
	<b>UNIT-VI</b>	<b>Bearing Capacity of Soil and Foundation</b>
	2nd	Bearing capacity and theory of earth pressure. Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure.
	3rd	Introduction to Terzaghi's analysis and assumptions
12th	1st	<ul style="list-style-type: none"> <li>● effect of water table on bearing capacity.</li> </ul>
	2nd	Numericals



	3rd	Field methods for determination of bearing capacity – Plate load
13th	1st	• Standard Penetration Test. Test procedures as per IS:1888 & IS:2131.
	2nd	Definition of earth pressure
	3rd	Active and Passive earth pressure for no surcharge condition
14th	1st	coefficient of earth pressure
	2nd	Numericals
	3rd	Rankine's theory and assumptions made for non- cohesive Soils.
15th	1st	Type of foundations-shallow,deep foundation
	2nd	PYQ Discussion
	3rd	<b>Monthly Test- II</b>

  
 8/7/2025  
 Lect stage -11  
 CIVIL,

  
 14/7/2025  
 H.O.D  
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