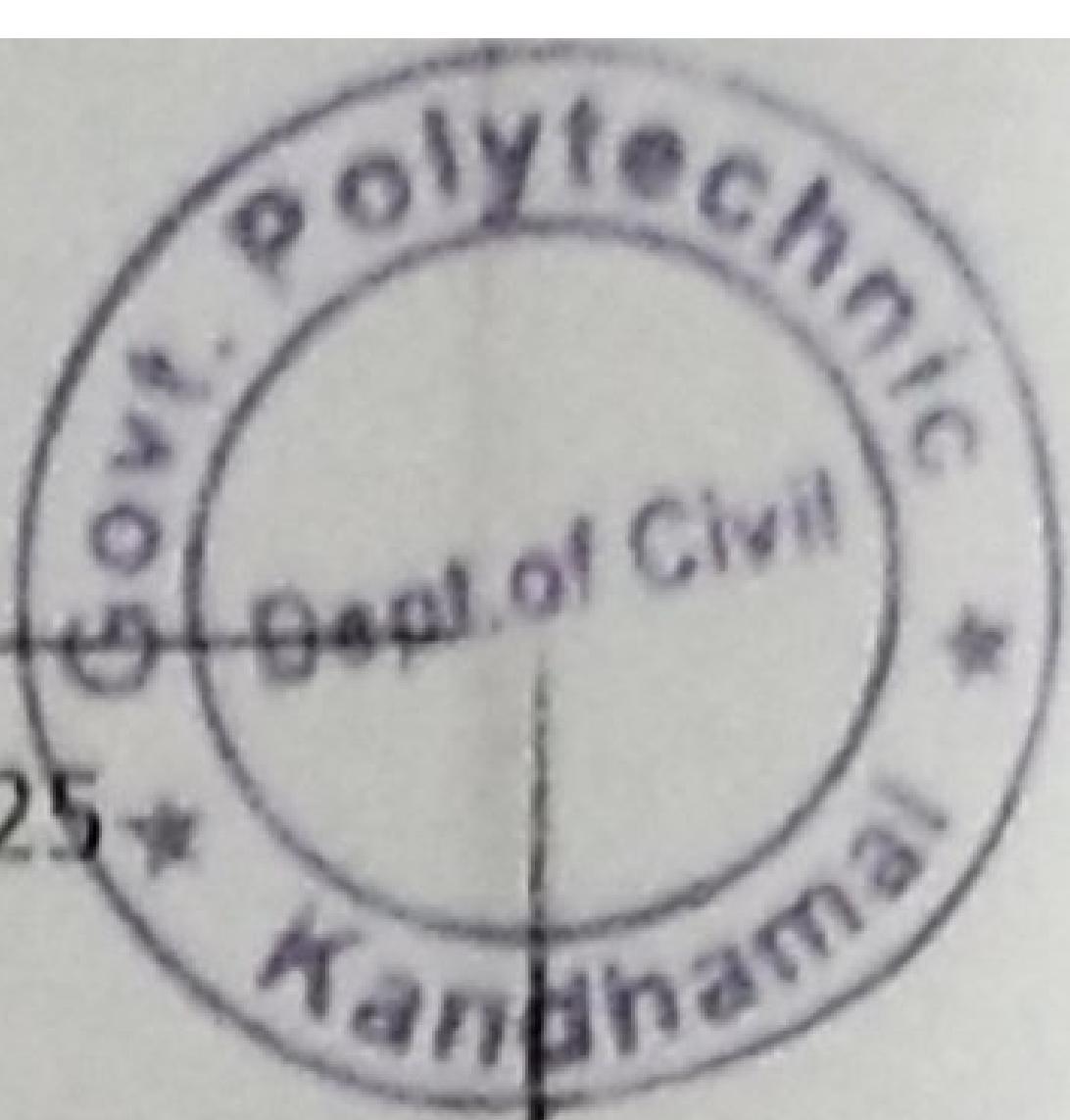


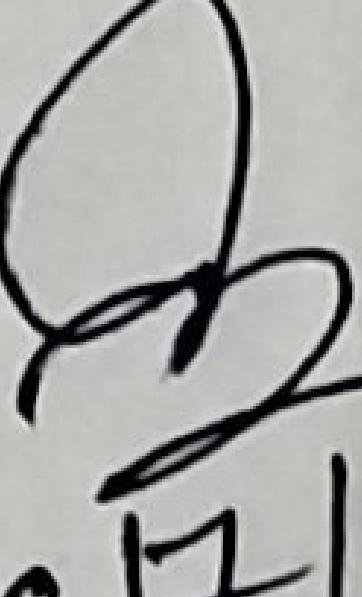
LESSON PLAN OF CEPC207 TH:4 Geotechnical Engineering FOR THE SESSION 2025-26(WINTER-2025) BATCH-2024-27, GOVT. POLYTECHNIC,KANDHAMAL

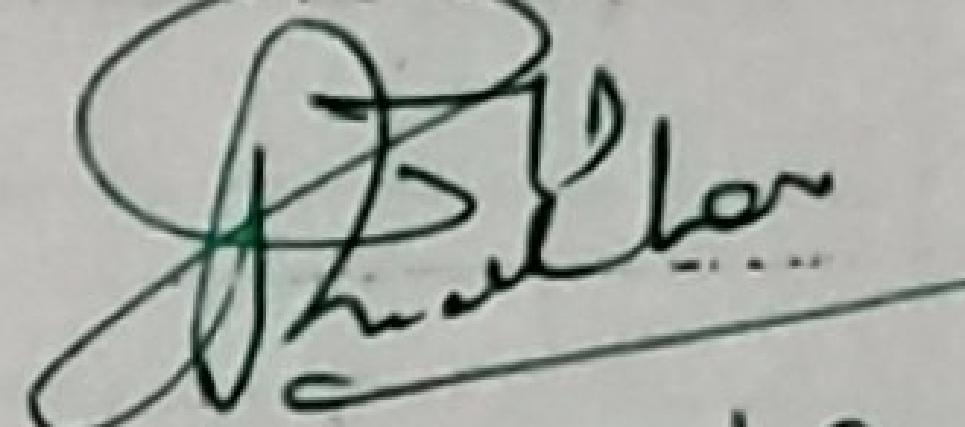


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| Discipline: civil engineering | Semester: 3rd | Name of the Teaching Faculty: Ashish Nayak, Lect. in Civil Eng. |
| Subject: CEPC207 TH:4 Geotechnical Engineering | No. of days/ per week class allotted: 3 | Semester From Date : 14/07/2025 to Date: 15/11/2025 No. of Weeks: 15 |
| Week | Class Day | Theory/ Practical Topics |
| | UNIT-I | Overview of Geology and Geotechnical Engineering |
| 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 (mod. 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) |
| | UNIT-II | Physical and Index Properties of Soil |
| | 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"> Determination of bulk unit weight and dry unit weight by core cutter and sand replacement method, Determination of specific gravity by pycnometer. |
| 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 | Monthly Test- I |
| | UNIT-III | Permeability and Seepage |

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| | 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 |
| | UNIT-IV | Compaction, Consolidation and stabilization of soil |
| | 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 | • Consolidation, Difference between compaction and consolidation. Terzaghi's Model analogy of compression/springs showing the process of consolidation, Field implications |
| | 2nd | Concept of soil stabilization, necessity of soil stabilization, different methods of soil stabilization. |
| | 3rd | • California bearing ratio (CBR) test - Meaning and Utilization in Pavement Construction |
| 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 | • Field identification of soil – dry, strength test, dilatancy test and toughness test. |
| | 3rd | Monthly Test- II |
| | UNIT-V | Shear Strength of Soil |
| 10th | 1st | • Shear failure of soil-General, local and punching shear, concept of shear strength of soil. |
| | 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. |
| | UNIT-VI | Bearing Capacity of Soil and Foundation |
| | 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 | • effect of water table on bearing capacity. |
| | 2nd | Numericals |

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| | 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 | Monthly Test- II |


 8/7/2025
 Lect Stage - II
 CIVIL,


 14/7/2025

H.O.D
 Dept. of Civil Engg.
 Govt. Polytechnic
 Kandhamal