CIVIL ENGINEERING

SEMESTER : 3rd

FROM :01/07/2026 TO :05/11/2026

NAME OF THE FACULTY : Er. POONAM BEHERA

SUBJECT : GEOTECHNICAL ENGINEERING

TOTAL CLASS AVAILABLE IN SEMESTER: 45 nos

NO. OF PERIODS : 03/ WEEK

Class No.	Unit	Topic / Sub-topic	Teaching Method	Learning Outcome
1	I	Introduction to Geology, Branches of Geology	Lecture	Understand the scope of geology
2	I	Importance of Geology in Civil Engineering, Composition of Earth	Lecture + Discussion	Explain geological significance in construction
3	I	Rocks – Definition, Classification Based on Origin	Lecture	Classify rocks
4	I	Engineering Uses of Igneous, Sedimentary & Metamorphic Rocks	Lecture + Specimens	Identify engineering applications of rocks
5	I	Soil as Construction Material, Applications of Geotechnical Engineering	Lecture	Understand role of soil in civil engineering
6	II	Soil as a Three-Phase System	Lecture	Explain soil composition
7	II	Water Content, Oven Drying Method (BIS), Void Ratio, Porosity	Lecture + Numerical	Calculate index properties
8	II	Degree of Saturation, Air Content, Percentage Air Voids & Relationships	Numerical	Solve phase relationship problems
9	II	Unit Weights of Soil	Lecture	Differentiate unit weights
10	II	Determination of Bulk & Dry Unit Weight (Core Cutter & Sand Replacement)	Demonstration	Explain field density methods
11	II	Specific Gravity by Pycnometer Method	Demonstration	Determine specific gravity
12	II	Atterberg Limits – Liquid, Plastic & Shrinkage Limits	Lecture + Lab Demonstration	Explain soil consistency

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13	II	Plasticity Index, Particle Size Distribution & Grading Curve	Lecture + Numerical	Classify soil using grading
14	II	Effective Size, Well-Graded & Uniformly Graded Soil, BIS Classification	Lecture	Classify soils as per BIS
15	II	Revision & Unit Test	Practice/Test	Assess Unit-II
16	III	Permeability – Definition, Darcy's Law & Coefficient of Permeability	Lecture	Explain permeability concepts
17	III	Factors Affecting Permeability	Lecture	Identify influencing factors
18	III	Constant Head & Falling Head Permeability Tests	Demonstration	Describe permeability tests
19	III	Numerical Problems on Coefficient of Permeability	Numerical Practice	Solve permeability problems
20	III	Seepage Through Earthen Structures, Flow Lines & Phreatic Line	Lecture	Explain seepage concepts
21	III	Flow Net Applications, Effective Stress & Quick Sand	Lecture	Understand seepage effects
22	III	Revision & Numerical Practice	Practice	Reinforce Unit-III
23	III	Unit Test	Test	Assess Unit-III
24	IV	Soil Compaction – Concept & Standard/Modified Proctor Test	Lecture + Demonstration	Explain compaction
25	IV	Compaction Curve, OMC, MDD & Zero Air Voids Line	Lecture + Numerical	Interpret compaction curve
26	IV	Factors Affecting Compaction & Field Methods	Lecture	Explain field compaction
27	IV	Consolidation – Concept & Difference from Compaction	Lecture	Differentiate consolidation and compaction
28	IV	Terzaghi's Spring Analogy & Field Implications	Lecture	Understand consolidation process
29	IV	Soil Stabilization – Methods & Necessity	Lecture	Explain stabilization techniques
30	IV	California Bearing Ratio (CBR) Test & Pavement Applications	Lecture + Demonstration	Understand CBR significance
31	IV	Site Investigation & Soil Exploration	Lecture	Explain exploration methods

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32	IV	Field Identification Tests (Dry Strength, Dilatancy & Toughness)	Demonstration	Identify soil in field
33	IV	Revision & Unit Test	Practice/Test	Assess Unit-IV
34	V	Shear Strength of Soil & Types of Shear Failure	Lecture	Explain shear failure mechanisms
35	V	Cohesion, Internal Friction & Mohr-Coulomb Theory	Lecture	Understand shear strength parameters
36	V	Strength Envelope & Shear Strength Equations	Lecture + Numerical	Apply shear strength concepts
37	V	Direct Shear, Triaxial & Vane Shear Tests	Demonstration	Describe laboratory shear tests
38	V	Revision & Numerical Practice	Practice	Reinforce Unit-V
39	VI	Bearing Capacity – Concepts & Terminology	Lecture	Explain bearing capacity
40	VI	Terzaghi's Bearing Capacity Theory & Water Table Effect	Lecture	Understand bearing capacity theory
41	VI	Plate Load Test & Standard Penetration Test (SPT)	Lecture + Demonstration	Explain field bearing capacity tests
42	VI	Earth Pressure – Active, Passive & Rankine's Theory	Lecture	Explain earth pressure concepts
43	VI	Coefficient of Earth Pressure & Types of Foundations	Lecture	Relate earth pressure to foundation design
44	VI	Comprehensive Revision & Numerical Practice	Practice	Strengthen overall concepts
45	VI	Final Revision, Doubt Clearing & Internal Assessment	Discussion/Test	Complete course assessment

27.06.26
Sign of Faculty

27.06.26
Sign of HOD

Principal
R.K. INSTITUTE OF ENGG & TECH.
KANTAPADA,NIALI CUTTACK