



23CE3551: GEOTECHNICAL ENGINEERING LAB (Syllabus)

Offering Branch	CE	Year: III	Sem: I
Course Category	Professional Course	Credits	1.5
Course Type:	Theory	L-T-P	0-0-3
Prerequisites:		Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Objectives:

By the end of this course student will be able to

- To determine the index and engineering properties of soils through laboratory tests — including grain size distribution, Atterberg's limits, degree of swelling (DFS), permeability, compaction, consolidation behavior, shear strength parameters, and CBR value.
- To impart practical knowledge on soil testing methods for classification, compaction, consolidation, permeability, and shear strength determination, enabling accurate assessment of soil behavior for engineering applications.

Course Outcomes:

Upon the successful completion of this course, the students will able to:

CO	Statement	Blooms level
CO 1	To determine basic soil properties of soil and their classification.	L3
CO 2	To assess field and laboratory compaction characteristics of soil	L3
CO 3	To evaluate permeability and consolidation behavior of soils through tests (and demonstration.)	L3
CO 4	To analyze shear strength and deformation characteristics of soil.	L4

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1	-	1	2	1	1	1	1	2	2	2
CO 2	3	3	2	-	1	2	1	1	1	1	2	2	2
CO 3	3	2	2	2	1	2	1	1	1	1	2	2	2
CO 4	3	3	3	2	1	2	1	1	1	1	2	2	2

**SYLLABUS:**

S. No.	Exp	LIST OF EXPERIMENTS	COs
1	Exp: 1	Specific gravity	CO1 CO2 CO3 CO4
2	Exp: 2	Atterberg's Limits	
3	Exp: 3	Field density-Core cutter and Sand replacement methods	
4	Exp: 4	Grain size analysis by sieving	
5	Exp: 5	Permeability of soil-Constant and Variable head tests	
6	Exp: 6	Compaction test	
7	Exp: 7	Consolidation test (to be demonstrated)	
8	Exp: 8	Direct Shear test	
9	Exp: 9	Triaxial Compression test	
10	Exp: 10	Unconfined Compression test	
11	Exp: 11	Vane Shear test	
12	Exp: 12	Differential free swell (DFS)	
13	Exp: 13	CBR test	
14	Exp: 14	Field Plate Load Test (Demo only)	
15	Exp: 15	Field CBR (Demo only)	
16	Exp: 16	Relative density of Sand	

(Atleast **Eight** experiments shall be conducted)

Learning Resource(s)**Text Book(s)/Reference Book(s)**

1. I.S. 2720 series: *Methods of Test for Soils* (Part 1 to 41) – Bureau of Indian Standards
2. K.R. Arora, "*Soil Mechanics and Foundation Engineering*", Standard Publishers
3. Braja M. Das, "*Principles of Geotechnical Engineering*", Cengage Learning.
4. Basic and Applied Soil Mechanics – Gopal Ranjan and A.S.R.Rao, New Age International Publishers

e-learn

<https://nptel.ac.in/courses/105101201>