

**III Year – I SEMESTER**

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<b>0</b>	<b>0</b>	<b>2</b>

**CE507-GEOTECHNICAL ENGINEERING LAB**

Lecture :	--	Internal Assessment :	25 Marks
Tutorial :	--	Semester End Examination :	50 Marks
Practical :	3 hrs/Week	Credits :	2

**Course Learning Objectives:**

The objective of this course is:

1. To impart knowledge of determination of index properties required for classification of soils.
2. To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests; to determine permeability of soils.
3. To teach how to determine shear parameters of soil through different laboratory tests.

**Course Outcomes:**

Upon successful completion of this course, student will be able to

- a. Determine index properties of soil and classify them.
- b. Determine permeability of soils.
- c. Determine Compaction, Consolidation and shear strength characteristics.

**SYLLABUS:****LIST OF EXPERIMENTS**

1. Specific gravity, G
2. Atterberg's Limits.
3. Field density-Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Triaxial Compression test (UU Test)

11. Unconfined Compression test
12. Vane Shear test
13. Differential free swell (DFS)
14. CBR Test

At least **Ten** experiments shall be conducted.

#### **LIST OF EQUIPMENT:**

1. Casagrande's liquid limit apparatus.
2. Apparatus for plastic and shrinkage limits
3. Field density apparatus for
  - a) Core cutter method
  - b) Sand replacement method
4. Set of sieves: 4.75 mm, 2 mm, 1 mm, 0.6 mm, 0.42 mm, 0.3 mm, 0.15 mm, and 0.075 mm.
5. Hydrometer
6. Permeability apparatus for
  - a) Constant head test
  - b) Variable head test
7. Universal auto compactor for I.S light and heavy compaction tests.
8. Shaking table, funnel for sand raining technique.
9. Apparatus for CBR test
10. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
11. One dimensional consolidation test apparatus with all accessories.
12. Triaxial cell with provision for accommodating 38 mm dia specimens.
13. Box shear test apparatus
14. Laboratory vane shear apparatus.
15. Hot air ovens (range of temperature  $50^{\circ}$  -  $150^{\circ}$ C)

#### **Reference:**

1. 'Determination of Soil Properties' by J. E. Bowles.
2. IS Code 2720 – relevant parts.

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