

# Techno India NJR Institute of Technology



## Course File

## Geotechnical Engineering Lab (5CE4-22)

For Techno India NJR Institute of Technology  
पंकज पोरवाल  
Dr. Pankaj Kumar Porwal  
(Principal)

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Department of CE



# RAJASTHAN TECHNICAL UNIVERSITY, KOTA

## Syllabus

3<sup>rd</sup> Year - V Semester: B.Tech. (Civil Engineering)

### SCE4-22 : GEOTECHNICAL ENGINEERING LAB

**Credit: 1.5**

**Max. Marks: 75(IA:45, ETE:30)**

**OL+OT+3P**

**End Term Exam: 3 Hours**

1	Grain size distribution by sieve Analysis and Hydrometer
2	Determination of specific Gravity by Pycnometer.
3	Determination of liquid limit by Casagrande's apparatus and cone penetrometer.
4	Determination of plastic limit and shrinkage limit
5	Determination of field density by core-cutter and sand replacement method
6	Determination of compaction properties by standard Proctor Test Apparatus
7	Determination of C- $\phi$ values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.
8	To determine the differential free swell index of soil and swelling pressure of soil.
9	To determine the CBR of soil.
10	To determine the compressibility parameters of soil by consolidation test.
11	To determine the permeability of soil by constant and falling head methods. Design as per syllabus of theory.

### Course Overview :

Geotechnical engineering is the branch of civil engineering concerned with the engineering behaviour of earth materials. Geotechnical engineering is important in civil engineering concerned with construction on or in the ground. Geotechnical engineering uses principles of soil mechanics and rock mechanics to investigate subsurface conditions and materials; determine the relevant physical/mechanical and chemical properties of these materials; evaluate; assess risks posed by site conditions; design earthworks and structure foundations; and monitor site conditions, earthwork and foundation construction.

### Course Outcomes:

CO.NO.	Cognitive Level	Course Outcome
1	<b>Comprehension</b>	Ability to identify the index properties of soils
2	<b>Application</b>	Students are able determine the field density by sand replacement method
3	<b>Analysis</b>	Capable to find all consistency limits for soil.
4	<b>Synthesis</b>	Able to impart knowledge on the various factors governing the Engineering behaviour of soils and the suitability of soils for various Geotechnical Engineering applications
5	<b>Evaluation</b>	Able to characterize stress-strain behaviour of soils, the failure criteria and to evaluate the shear strength and compressibility parameters of soils.

### Prerequisites:

1. Fundamentals knowledge of Soil Classification .
2. Fundamentals knowledge of Geotech lab Instruments.
3. Fundamentals knowledge of Properties of Soil.

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### Course Outcome Mapping with Program Outcome:

Geotechnical Engineering Lab															
Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO369.1	2	2	1	1	1	2	1	1	2	2	2	1	1	2	2
CO369.2	3	2	2	2	2	1	1	1	2	1	1	2	2	2	2
CO369.3	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1
CO369 (AVG)	2.3	2.0	1.7	1.3	1.7	1.7	1.3	1.3	1.7	1.3	1.7	1.3	1.3	1.7	1.7

### Course Coverage Module Wise:

Lab No.	Experiments List According to RTU Syllabus
1	Grain size distribution by sieve Analysis and Hydrometer
2	Determination of specific Gravity by Pycnometer.
3	Determination of liquid limit by Casagrande's apparatus and cone penetrometer.
4	Determination of plastic limit and shrinkage limit
5	Determination of field density by core-cutter and sand replacement method
6	Determination of compaction properties by standard Proctor Test Apparatus
7	Determination of C- $\phi$ values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.
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### **Faculty Lab Manual Link**

1. <https://drive.google.com/file/d/1btdlhAZkmemodx9S47L1vz6ZVjeUKB15/view?usp=sharing>

### **Viva QUIZ Link**

1. <https://engineeringinterviewquestions.com/soil-mechanics-lab-viva-questions-answers/>
2. <https://www.sanfoundry.com/geotechnical-engineering-basic-questions-answers/>
3. <https://www.scribd.com/doc/213801751/Soil-Lab-Viva-Question>
4. <https://www.researchgate.net/topic/Geotechnical-Engineering>

### **Assessment Methodology:**

1. Practical exam using Geotech Experiments.
2. Internal exams and Viva Conduct.
3. Final Exam (practical paper) at the end of the semester.

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