# **Techno India NJR Institute of Technology**



# Course File Geotechnical Engineering Lab (5CE4-22)

For Techno India NJR Institute of Technology

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Or. Pankaj Kumar Porwa'

(Principal)

Bharat Kr. Suthar (Assistant Professor) **Department of CE** 



# RAJASTHAN TECHNICAL UNIVERSITY, KOTA Syllabus 3rd Year - V Semester: B.Tech. (Civil Engineering)

#### 5CE4-22: GEOTECHNICAL ENGINEERDING 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.						
ľ	4	Determination of plastic limit and shrinkage limit						
	5	Determination of field density by core-cutter and sand replacement method						
Ī	6	Determination of compaction properties by standard Proctor Test Apparatus						
	7	Determination of C-Ø 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.						
ľ	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.						

Office of Dean Academic Affairs
Rajasthan Technical University, Kota

#### **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	Comprehension	Ability to identify the index properties of soils
2	Application	Students are able determine the field density by sand replacement method
3	Analysis	Capable to find all consistency limits for soil.
4	Synthesis	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	Evaluation	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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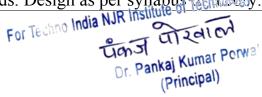
(Principal)

## **Course Outcome Mapping with Program Outcome:**

	Geotechnical Engineering Lab														
Course Outcom e	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	<b>Experiments List According to RTU Syllabus</b>
No.	
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-Ø 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 the constant and falling head



#### Faculty Lab Manual Link

1. <a href="https://drive.google.com/file/d/1btdlhAZkmemodx9S47L1vz6ZVjeUKB15/view?us">https://drive.google.com/file/d/1btdlhAZkmemodx9S47L1vz6ZVjeUKB15/view?us</a> p=sharing

### Viva QUIZ Link

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

#### **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.

