SOIL MECHANICS LAB

Courses Covered:

1. CET-212-L-Soil Mechanics
2. CET-324-L-Geotechnical Site Investigation and Foundations
3. CET-321-L-Geology & Earthquake Engineering

DEPARTMENT OF CIVIL ENGINEERING TECHNOLOGY

PUNJAB TIANJIN UNIVERSITY OF TECHNOLOGY, LAHORE

Course Title: CET-212-L-Soil Mechanics

List of Experiments:

1. Introduction to the Soil Mechanics Laboratory and HSE (Health, Safety and Environment) measures.
2. Collection of soil samples from field and to prepare the representative soil sample for laboratory testing:
   a). Quartering Method **b).** Riffle Box Method
3. To determine the water content of soil sample by:
   a). Oven Drying Method **b).** Hot Plate Method
   c). Sand Bath Method **d).** Speedy Moisture Tester **e).** Infrared Moisture Tester
4. To determine the particle size distribution of coarse-grained soil by Sieve Analysis.
5. To determine the particle size distribution of fine-grained soil by Hydrometer Analysis and pipette analysis.
6. To determine the liquid limit of fine-grained soil by Casagrande Apparatus and or Fall Cone (Penetrometer) Method.
7. To determine the liquid limit of fine-grained soil.
8. To determine the shrinkage limit of fine-grained soil.
9. To determine the specific gravity of fine-grained soil by Density Bottle Method.
10. To determine the coefficient of permeability of coarse-grained soil by Constant Head Method.
11. To determine the coefficient of permeability of fine-grained soil by Falling Head Method.
12. To determine consolidation parameters of saturated fine-grained soil by One Dimensional Consolidation Test.
13. To determine free swell of clayey soils.
14. To determine the minimum and maximum dry density of cohesion less soil sample by Vibrating Table.
15. To determine the shear strength parameters of sandy/clayey soil by Direct Shear Box Test.
16. To determine the shear strength of clayey soil by Un-Confined Compression Test and Pocket Penetrometer Test.
17. To determine the shear strength of a clayey soil by Laboratory Vane Shear Test.
18. To determine shear strength of fine grained and coarse-grained soils by CU/CD/UU-Tri-Axial Test.
19. To determine sand equivalent value of sand.
20. To perform the open-ended lab.

Course Title: CET-324-L-Geotechnical Site Investigation and Foundations

List of Experiments:

1. To determine the moisture-density relationship by Standard Proctor Test.
2. To determine the moisture-density relationship by Modified Proctor Test.
3. To determine the CBR value for un-soaked soil sample.
4. To determine the CBR value for soaked soil sample.
5. To determine the field density by Core Cutter Method.
6. To determine the field density by Sand Replacement (Sand Cone) Method and or by Water Replacement/Oil Replacement Method.

7. To determine load settlement behavior by Plate Load Test.
8. To perform Standard Penetration Test (SPT).
9. To collect UDS from clayey Strata.
10. To obtain shear strength parameters of the collected UDS sample.
11. To obtain consolidation parameters of the collected UDS sample.
12. To observer Percussion drilling Procedures in the field.
13. To observe rotary drilling in field.
14. To observe Pile load test and analysis the result.
15. To Perform the Open-Ended Lab.

Course Title: CET-321-L-Geology & Earthquake Engineering

List of Experiments:

1. Introduction to the Engineering Geology Laboratory and HSE (Health, Safety and Environment) measures.
2. To determine the hardness of minerals using Moh's scale.
3. To determine the streak of minerals.
4. Estimation of RQD, TCR, SCR and Fracture Index using given rock core samples
5. To determine the compressive strength of rocks using Schmitt hammer.
6. To determine the different properties of rock core by ultrasonic pulse wave.
7. To determine the tensile strength of rocks in UTM machine.
8. To determine the slake durability index (Weathering) of rocks.
9. To determine the presence of carbonates in rocks using acid test.
10. To observe the folds using sand box.
11. To observe the different types of faults using sand box.
12. To distinguish the folds and faults in rocks at site.
13. To prepare drawing of Cross Sections from Geological maps.
14. To perform open ended lab project.

List of Equipment's:

1. Electronic Balance (Quantity = 04).
2. Standard Sieve (Quantity = 06).
3. Sieve Shaker (Quantity = 02).
4. Electric Thermostatic Drying Oven (Quantity = 02).
5. Motorized CBR Testing Machine (Quantity = 01).
6. Standard Proctor Mould and Rammer (Quantity = 03).
7. Modified Proctor Mould and Rammer (Quantity = 03).
8. Surface Soil Sampler (Quantity = 02).
9. Sand Density Cone Apparatus – Diameter 6.5" (Quantity = 03).
10. Standard Penetration Test (Quantity = 01).


Motorized CBR Testing Machine



Sieve Shaker **Electronic Balance** **Drying Oven**

Standard and Modified Proctor Mould and Rammer

Surface Soil Sampler & Sand Density Cone Apparatus – Diameter 6.5”

Standard Penetration Test