



# COLLEGE OF TECHNOLOGY AND ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING  
3 YEAR BE I SEMESTER SESSION 2015-16

1. Course Code : **CE 313**
2. Course Title : **GEOTECHNICAL ENGINEERING-I**
3. Credit : 4(3+1)
4. Theory Lecture Outlines :

1.	<i>Fundamental Definitions &amp; Relationship:</i> Soil and soil mass constituents
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3.	Water content, specific gravity, void ratio, porosity
4.	degree of saturation, air void and air content
5.	unit weights, density index. Interrelationship of these terms.
6.	<i>Index Properties:</i> Determination of index properties of soil
7.	water content, specific gravity,
8.	particle size distribution
9.	sieve and sedimentation analysis, consistency limits
10.	void ratio and density index
11.	<i>Soil Classification:</i> Classification of soil for general engineering purposes
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13.	particle size, textural H.R.B. Unified
14.	I.S. Classification systems.
15.	<i>Flow through Soils:</i> Soil water absorbed capillary and free water
16.	Darcy's law of permeability of soil and its determination in laboratory
17.	Field pumping out tests, factors affecting permeability
18.	permeability of stratified soil masses.
19.	<i>Seepage:</i> Seepage pressure, Laplace's equation for seepage
20.	Flownet and its construction. Uplift pressure, piping, principle of drainage by Electro Osmosis,
21.	pheritic line.
22.	<i>Stresses in Soil Mass:</i> Total effective and neutral pressure
23.	calculation of stresses. Influence of water table on effective stress
24.	quicksand phenomenon

25.	<i>Shear Strength of Soils: Mohr's circle of stress</i>
26.	shearing strength of soil, parameters of shear strength
27.	Coulomb's failure envelope
28.	determination of shear parameters by Direct Shear Box
29.	Triaxial and unconfined compression test apparatuses.
30.	<i>Soil Compaction: Principles of soil compaction</i>
31.	<i>Soil Compaction: Principles of soil compaction</i>
32.	laboratory compaction tests
33.	Proctor's test
34.	Modified Proctor tests
35.	Measurement of field compaction
36.	field methods of compaction and its control
37.	dry and wet of optimum
38.	Factors affecting compaction
39.	<i>Soil Stabilization: Soil stabilization, Mechanical Stabilization</i>
40.	Stabilization with cement, Lime and bitumen.
41.	Numericals
42.	Numericals
43.	Numericals
44.	Revision
45.	Revision

### **Suggested Books & References**

1. Punmia, B.C., 'Soil Mechanics and Foundations'.
2. Ranjan G. & Rao, 'Basic and Applied Soil Mechanics'.
3. Singh Alam, 'Soil Engineering in Theory and Practice'.
4. Arora, K.R., 'Soil Mechanics & Foundation Engineering'.

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