

CE/BOS/CE 302/0210

**K L UNIVERSITY**  
**FOUNDATION ENGINEERING (09 - CE 302)**

L	T	P	Cr
3	1	2	5

**SYLLABUS**

**UNIT – 1** Site Investigation: Introduction, Different Investigation Methodologies, Drilling Techniques, Stabilization of Bore Hole, Samplers and Sampling Techniques, Consequences of Sample Disturbance, In Situ Field Testing – Penetration Tests (SPT, SCPT), Vane Shear test, Soil Report.

**UNIT – 2 Stress Distribution:** Stress Distribution using Boussinesq Equation, Stress Distribution using FADUM Chart and 1:2 method

**Settlement Analysis:** Consolidation Settlement, Immediate Settlement, Corrections to settlements, Settlement in different soil types, Settlement from Field tests, Settlement of Deep foundations

**UNIT – 3 Bearing Capacity of Shallow Foundations:** Failure mechanism, Failure along over simplified failure surface, Failure along a circular failure surface, Bearing Capacity Equation – Observations, More Realistic Failure Surface – Terzaghi's Theory, Generalized Bearing Capacity Equation, Selecting appropriate strength parameters, Bearing Capacity from Field Tests.

**Bearing Capacity of Deep Foundations:** Estimating Axial Pile Capacity – Theoretical Approach, Estimating Axial Pile Capacity – Pile Load Test Approach and Driving Resistance Approach (*only theory will be covered briefly*), Negative Skin Friction, Pile Group and Group Capacity.

**UNIT – 4 Slope Stability Analysis:** Stability of Infinite Slopes, Stability of Finite slopes, Stability Numbers, Method of Slices, Critical Failure Surface, Non-Circular Failure surfaces, Two Wedge Method.

**Sub Structures Foundations:** Loads on Foundations, Foundation Types, Design Criteria, Design Process, Design Water Table Level, Design Soil Parameters, Geotechnical Design of Shallow foundations, Geotechnical Design of Deep foundations.

**UNIT – 5 Earth Pressure Analysis:** Lateral Earth Pressure, States of Failure, Rankine's theory, Coulomb's Theory, Culmann's Method, Factors affecting lateral earth pressure, Tension crack and Height of Unsupported Cut.

**Earth Retaining Structures:** Types of Earth retaining structures, Design of Retaining Walls, Earth pressure behind different retaining structures.

**TEXT BOOKS:**

1. Geotechnical Engineering by Shashi K Gulhati and Manoj Datta, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008

**REFERENCE BOOKS:**

1. Basic and Applied Soil Mechanics by Gopal Ranjan and ASR Rao, New Age International Publishers, second Edition, 2007

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**LIST OF EXPERMENTS**

1. Determination of water content by oven drying method
2. Determination of specific gravity
  - a. Density bottel method (b) pycnometer method
3. Sieve analysis (a) dry sieve (b) wet sieve
4. Hydrometer analysis
5. Determination of liquid limit & plastic limit
6. Determination of field unit weight by core cutter method
7. Determination of field unit weight by sand replacement method
8. Determination of permiability
  - a. constant head
  - b. variable head
9. Determination of shear strength parameters of the soils by direct shear
10. Determination of c & f by vane shear test
11. Un confined compression test
12. Standard proctor compaction test
13. Modified proctor compaction test
14. Laboratory vane shear
15. Swell pressure test.