

# **AMEV08 SOIL MECHANICS AND FOUNDATION ENGINEERING**

## **UNIT-1 SOIL PROPERTIES AND COMPACTION OF SOIL**

- 1.1 Nature of Soil- Problems with soil- phase relation- particle size distribution
- 1.2 Atterberg limits- classification for engineering purposes
- 1.3 BIS Classification system- Soil compaction- factors affecting compaction
- 1.4 Laboratory and field compaction methods and monitoring- Clay Mineralogy.

## **UNIT-2 SOIL MOISTURE- PERMEABILITY, STRESSES IN SOILS**

- 2.1 Soil water- Various forms- Capillary rise- Suction
- 2.2 Effective stress concepts in soil- Total, neutral and effective stress distribution in soil
- 2.3 Permeability- Darcy's Law- Permeability measurement in the laboratory- quick sand condition- Stress distribution in soil media
- 2.4 Boussinesq's formula- stress due to line load,
- 2.5 Circular and rectangular loaded area – approximate methods
- 2.6 Use of influence charts – Westerguard equation for point load.

## **UNIT-3 SHEAR STRENGTH AND SLOPE STABILITY**

- 3.1 Shear strength of cohesive and cohesion less soil- Mohr,
- 3.2 Coulomb failure theory- Measurement of shear strength- direct shear,
- 3.3 Triaxial compression, UCC and Vane shear tests- Types of shear tests based on drainage and their applicability- Drained and undrained behaviour of clay and sand.
- 3.4 Slope failure mechanisms- Modes- Infinite slopes- Finite slopes- Total and effective stress analysis
- 3.5 Stability analysis for purely cohesive and  $C \Phi$  soils- Method of slices- Modified Bishop's method- Friction circle method - stability number.

## **UNIT-4 SOIL EXPLORATION**

- 4.1 Scope and objectives- Methods of exploration
- 4.2 Averaging and boring- Wash boring and rotary drilling- Depth of boring- Spacing of bore hole
- 4.3 Sampling- Representative and undisturbed sampling- sampling techniques- Split spoon sampler, Thin tube sampler, Stationary piston sampler
- 4.4 Bore log report- Penetration tests (SPT and SCPT)- Data interpretation (Strength parameters and Liquefaction potential).

## **UNIT-5 FOUNDATION- BEARING CAPACITY AND SETTLEMENT**

- 5.1 Introduction- Location and depth of foundation- Selection of foundation based on soil condition
- 5.2 Codal provisions- bearing capacity of shallow foundation on homogeneous deposits
- 5.3 Terzaghi's formula and BIS formula- factors affecting bearing capacity- problems

- 5.4 Bearing Capacity from insitu tests (SPT, SCPT and plate load)- Allowable bearing pressure,  
5.5 Settlement- Components of settlement- Determination of settlement of foundations on granular and clay deposits- Allowable settlements  
5.6 Codal provision- Methods of minimising settlement, differential settlement.

#### References Books

1. Coduto, D.P, Geotechnical Engineering Principles and Practices, Prentice Hall of India Private Limited, New Delhi, 2002.
2. McCarthy D.F, Essentials of Soil Mechanics and Foundations Basic Geotechniques, Sixth Edition, Prentice-Hall, New Jersey, 2002.

