

Course Objective:

The object of this course is to make the student to understand the behaviour of soil under different loads and different conditions. This is necessary because the safety of any structure depends on soil on which it is going to be constructed.

UNIT – I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship – Relative density. **INDEX PROPERTIES OF SOILS:** Moisture Content, Specific Gravity, Insitu density, Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT –II

PERMEABILITY:

Soil water – capillary rise – flow of water through soils – Darcy's law permeability – Factors affecting – laboratory and Field determination of coefficient of permeability – Permeability of layered systems. **SEEPAGE THROUGH SOILS:** Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – III

STRESS DISTRIBUTION IN SOILS:

Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart . **COMPACTION:** Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction control.

UNIT – IV

CONSOLIDATION :

Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement..

UNIT – V

SHEAR STRENGTH OF SOILS : Importance of shear strength – Mohr's- Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Shear strength of sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.



Course Outcomes:

On completion of the course, the students will be able to:

- *carry out soil classification*
- *solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram*
- *estimate the stresses under any system of foundation loads solve practical problems related to consolidation settlement and time rate of settlement*

TEXT BOOKS:

1. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
2. Soil Mechanics and Foundation by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).

REFERENCES:

1. Basic and Applied Soil Mechanics by GopalRanjan & ASR Rao, New age International Pvt .Ltd, New Delhi.
2. Soil Mechanics and Foundation Engineering by Purushtoma Raj, Pearson Publications
3. Geotechnical Engineering V.N.S.Murthy, CRC Press, Newyork, Special Indian Edition
4. Geotechnical Engineering by Brijee.M.Das, Cengage Publications, New Delhi.
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