III Year - II Semester
20CE6012

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SOIL MECHANICS & FOUNDATION ENGINEERING

Course Objectives:
The Students will have to
- Study introduction which include soil formation
- Study about permeability which include soil water, capillary rise
- Study about stress distribution in soils
- Study about compaction which include mechanism of compaction
- Study about shear strength of soils

Course Outcomes
Students will get ability to
- Determine the index properties and classification of soils
- Determine permeability and seepage of soils
- Compute stress distribution in soils with different loading conditions using Boussinesq's and Westergaard's theories
- Determine the compressibility using compaction and consolidation of soils
- Determine shear strength of soil by various theories and laboratory tests

Syllabus

UNIT- I
Introduction: Soil formation and properties – soil structure and clay mineralogy – Adsorbed water – Massvolume relationship – Relative density. Index properties of soils: 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 determination of coefficient of permeability – Permeability of layered systems. Seepage through soils:1-D & 2-D,Flownets: Characteristics and Uses, Quick sand condition and Seepage through soils.

UNIT- III
Stress distribution in soils: Total, neutral and effective stresses, Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart.

UNIT – IV
Compaction: Mechanism of compaction - laboratory compaction tests (Heavy and Light) – factors affecting – effects of compaction on soil properties. – Field compaction Equipment - compaction control. Consolidation: stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation – Terzaghi's Theory determination of coefficient of consolidation from laboratory tests.

UNIT –V

Shear strength of soils: Mohr – Coulomb Failure theories – Types of laboratory strength tests – strength tests based on drainage conditions – Shear strength of sands – Critical Void Ratio – Liquefaction- shear strength of clays

Text Books:
1. Basic and Applied Soil Mechanics by GopalRanjan&ASR Rao, New age International Pvt. Ltd, New Delhi, Third edition, 2016
2. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi, 2009.
3. Soil Mechanics and Foundations by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi publications Pvt. Ltd., New Delhi, Sixteenth edition, 2017.
4. Principles of Geo technical Engineering by B. N. Das and K.Sobhan, Cengage India Private Limited; Ninth edition, 2017

References:
1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.
3. Geotechnical Engineering by Purushotham Raj
4. Fundamentals of soil mechanics by D.W.Taylor
5. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	2	-	-	-	-	-	-	-	2	1	3	2
CO2	3	2	-	2	-	-	-	-	-	-	-	2	1	2	2
CO3	3	2	-	2	-	-	-	-	-	-	-	2	1	2	2
CO4	3	2	-	2	-	-	-	-	-	-	-	2	1	2	2
CO5	3	2	-	2	-	-	-	-	-	-	-	2	1	3	2