Int. Marks	Ext. Marks	Total Marks		L	T	P	C
30	70	100		3	-	-	3

Pre- Requisites: Engineering Mechanics & DRCS

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

UNIT-I:
Introduction: Soil formation and properties – soil structure and clay mineralogy – Adsorbed water – Mass volume 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

Course Outcomes:

S.No	Course Outcomes	BTL
1	Determine the index properties and classification of soils	L4
2	Determine permeability and seepage of soils	L4
3	Compute stress distribution in soils with different loading conditions using Boussinesq's and Westergaard's theories	L4
4	Determine the compressibility using compaction and consolidation of soils	L4
5	Determine shear strength of soil by various theories and laboratory tests	L4

Correlation of Cos with POs & PSOs:

CO	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

Text Books:
1. Basic and Applied Soil Mechanics by Gopal Ranjan & 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

Reference Books:
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.