Name of Faculty: Rashid Mustafa	
Discipline: Civil Engineering(5th Semester)	
Subject: Soil Mechanics-I(011509)	
Course Credit : 03	
Course Objective	Provide students with knowledge of origin and classification of soil, Index properties of soil, Effective stress principle, seepage analysis, vertical stress in soil and basic understanding of consolidation and compaction.
Subject Synopsis/ Indicative Syllabus	**Introduction:** Origin and Classification of soils, soil weight volume relationships, Index properties of soil, soil structures and Clay Minerals **Effective stress principle:** Surface tension and capillarity, Permeability of soils, Darcy's law, test for determination of permeability, engineering use of permeability. Factors affecting permeability. **Seepage Analysis :** Flow nets, flow through dams **Effective stress:** Distribution in soils under hydrodynamic conditions. Quick sand, Piping, Prevention of piping failures. **Compressibility and Consolidation:** Consolidation Process- Spring analogy, Definition, measurement of consolidations- Determination of void ratio at various load increments, Terzaghi's theory of one dimensional consolidation, Determination of Coefficient of consolidation, Analysis of consolidation data. **Vertical stress:** Below applied load in soils (Boussinesq, Westergaard, and graphical solutions), one and two dimensional cases. **Compaction Characteristics:** Water content – dry unit weight relationships, OMC, max, Dry unit weight field compaction control. **Soil stabilization:** Different methods of stabilization
Gate Syllabus of Soil Mechanics	Origin of soils, soil structure and fabric; Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Darcy's law; Seepage through soils - two-dimensional flow, flow nets, uplift pressure, piping; Principle of effective stress, capillarity, seepage force and quicksand condition; Compaction in laboratory and field conditions; One-dimensional consolidation, time rate of consolidation; Mohr's circle, stress paths, effective and total shear strength parameters, characteristics of clays and sand. Earth pressure theories -Rankine and Coulomb; Stability of slopes - finite and infinite slopes, method of slices and Bishop's method; Stress distribution in soils-Boussinesq's and Westergaard's theories.
Reading List and References	**Recommended Text** Basic and Applied Soil Mechanics by Gopal Ranjan and A.S.R.Rao **<u>References</u>** Das, B M "Introduction to Geotechnical Engineering". ISE. 2nd edition, 2008, Thomson. Murthy, V.N.S "Soil Mechanics and Foundation Engineering". STC 4th edition, 1993. Arora, K.R. "Soil Mechanics and Foundation Engineering". Standard Pub. And Dist.,Delhi.,1992 Terzaghi et.al (1976), "Soil Mechanics in Engineering Practice". John Wiley and Sons Inc. New York, 1967. Taylor, "Fundamentals of Soil Mechanics". John Wiley and Sons Inc New York, 1948.