

Name of Faculty: Prof. Rashid Mustafa
Discipline: Civil Engineering (6th Semester)
Subject: Soil and Rock Mechanics (011615)
Course Credit : 03

Course Objective	Provide students with knowledge of shear strength of soil, stability of slopes and basic understanding of retaining wall and lateral thrust acting on this retaining wall.
Subject Synopsis/ Indicative Syllabus	<p>Shear Strength of Soil: Engineering use of shear strength, Direct and triaxial shear tests, Mohr-Coulomb strength criterion, drained, consolidated undrained and undrained tests, strength of loose and dense sands, NC and OC soils, dilation, pore pressure and Skempton's pore pressure coefficients.</p> <p>Earth pressure theories & Retaining Walls : Limit equilibrium method, effect of wall movement on earth pressure, pressure at rest, Rankine state of plastic equilibrium, Coulomb's theory, Rebhann and Culmann's graphical methods. Sheet piles – Types and uses of sheet piles, Analysis of Cantilever and anchored sheet piles in cohesionless and cohesive soil, Rowe's theory of moment reduction.</p> <p>Stability of slopes : Limit equilibrium methods, methods of slices, simplified Bishop's method and friction circle method, factors of safety, stability under conditions of submergence, drawdown and steady seepage, location of critical arc, stability number and chart.</p>
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	<p>Recommended Text Basic and Applied Soil Mechanics by Gopal Ranjan and A.S.R.Rao</p> <p>References 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. IS: 2720-1985 "Methods of test for soils".</p>