

Name of Faculty: Prof. Rashid Mustafa
Discipline: Civil Engineering (6th Semester)
Subject: Geotechnical Engineering-II (PCC-CE 304)
Course Credit : 03

Subject Synopsis/ Indicative Syllabus	<p>Module1: Consolidation of Soil - Introduction, comparison between compaction and consolidation, initial, primary & secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation.</p> <p>On completion of this module, the student must be able to:</p> <ul style="list-style-type: none"> •Understand the basic mechanism of consolidation of soil; •Determine various consolidation parameters of soil through laboratory test; Evaluate ground settlements against time. <p>Module2: Shear Strength - Mohr circle and its characteristics, principal planes, relation between major and minor principal stresses, Mohr-Coulomb theory, types of shear tests: direct shear test, merits of direct shear test, triaxial compression tests, test behaviour of UU, CU and CD tests, pore-pressure measurement, computation of effective shear strength parameters. Unconfined compression test, vane shear test.</p> <p>On completion of this module, the student must be able to:</p> <ul style="list-style-type: none"> •Determine graphically and analytically the stress state in any plane of the soil mass. Perform various shear strength tests and appreciate the different field conditions which they simulate; •Understand the significance of shear strength parameters in various geotechnical analyses; •Evaluate the stiffness of soil using shear strength parameters <p>Module3:Stability of Slopes - Introduction, types of slopes and their failure mechanisms, factor of safety, analysis of finite and infinite slopes, wedge failure Swedish circle method, friction circle method, stability numbers and charts.</p> <p>On completion of this module, the student must be able to:</p> <ul style="list-style-type: none"> •Differentiate various modes of slope failure; •Evaluate factor of safety of infinite slopes based on different ground conditions and Understand various methods for computation of factor of safety for finite slopes. <p>Module4:Soil Exploration- Introduction, methods of site exploration and soil</p>
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	<p>investigation, methods of boring, soil samplers, sampling procedures, trail pits, borings, penetrometer tests, analysis of borehole logs, geophysical and advance soil exploration methods.</p> <p>On completion of this module, the student must be able to:</p> <ul style="list-style-type: none"> •Specify a strategy for site investigation to identify the soil deposits and determine the depth and spatial extent within the ground; •Understand various site investigation techniques and their in-situ applications; Prepare a soil investigation report based on borehole log data and various in-situ tests like SPT, CPT, etc. <p>Module5: Application of soil mechanics to determine earth pressures, analysis of retaining walls, cuts & excavations and sheet piles, stability of slopes, instrumentation.</p>
<p>Gate Syllabus of Geotechnical Engineering-II</p>	<p>One- dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths. Sub-surface investigations: Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes: Finite and infinite slopes, Bishop's method.</p>
<p>Reading List and References</p>	<ol style="list-style-type: none"> 1. Soil Mechanics by Craig R.F., Chapman & Hall 2. Fundamentals of Soil Engineering by Taylor, John Wiley & Sons 3. An Introduction to Geotechnical Engineering, by Holtz R.D. and Kovacs, W.D., Prentice Hall, NJ 4. Principles of Geotechnical Engineering, by Braja M. Das, Cengage Learning 5. Principles of Foundation Engineering, by Braja M. Das, Cengage Learning 6. Essentials of Soil Mechanics and Foundations: Basic Geotechnics by David F. McCarthy 7. Soil Mechanics in Engineering Practice by Karl Terzaghi, Ralph B. Peck, and Gholamreza Mesri. 8. Geotechnical Engineering: Principles and Practices of Soil Mechanics and Foundation Engineering (Civil and Environmental Engineering) by V.N.S. Murthy