4CE112 Geotechnical Engineering –I

L-T-P-Cr:3-1-0-4 Prerequisite: A Pass grade or having attended at least 75% of the classes conducted or at least 60 % attendance and a minimum of 40% marks in the course (s) Earth Sciences / Earth & Climate Science.

Objective: To impart knowledge and skill for soil identification, classification other physical

Properties of soils, viz seepage, stress distribution, compaction and consolidation. Theory: 1. Introduction, Origin and Classification of soils, Soil weight volume relationships, Index properties of soil, Soil Structures and Clay Minerals. 9 Lectures

2. Effective stress principle, Surface Tension and Capillarity, Permeability of soils, Darcy‘s law, tests for determination of permeability, engineering use of permeability. 4 Lectures

3. Seepage analysis, flow nets, flow through dams, filter design criteria 4 Lectures

4. Effective stress concept in soils, 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. 8 Lectures

5. Compressibility and consolidation 8 Lectures 6. Vertical stress below applied load in soils (Boussinesq, Westergaard, and graphical solutions), one and two-dimensional cases. Lectures 7. Compaction characteristics, water content - dry unit weight relationships, OMC, max. Dry unit weight, field compaction control. 4 Lectures

8. Soil Stabilization 1 Lecture

Text Books: 1. A Text Book of Soil Mechanics and Foundation Engineering - V.N.S. Murthy, Saikripa Technical Consultants, Bangalore. 2. Geotechnical Engineering - S. K. Gulatiet. al., TMH Publishing Co. Ltd, New Delhi. 3. Basic and Applied Soil Mechanics - GopalRanjan and A. S. R. Rao, Wiley Eastern Ltd, New Delhi. 4. Soil Mechanics and Foundation Engineering - K. R. Arora, Standard Pub. and Dist., Delhi. Reference Books: 1. Soil Mechanics in Engineering Practice - Terzaghi and Peck, John Wiley and Sons Inc

New York. 2. Soil Mechanics- Lamb and Whitman, Wiley Eastern Pvt. Ltd, New Delhi. 3. Fundamentals of Soil Mechanics - Taylor, John Wiley and Sons Inc New York. End Semester Examination (3 Hrs.): The duration of the Examination will be 3 hrs. The questions will be comprehensive, i.e. from the entire unit, may have subsections with theory and numerical with approximately 50% weightage and may / may not have choices. Minimum five questions will have to be answered. Expected Outcome: The students would be able to identify, classify and determine physical properties of different types of soils.