5CE118 Geotechnical Engineering – II

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 Geotechnical Engineering–I (CE114).

Objective: To impart knowledge and skill for engineering properties of soils, bearing capacity, shallow foundation and deep foundation (pile foundation only).

Theory: 1. Earth pressure theories & Retaining Walls: Analytical and Graphical Methods. 6 Lectures 2. 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, chart. 8 Lectures

3. Explorations, geophysical investigations. Characterization of ground, site investigations, methods of drilling, sampling. 6 Lectures

4. Bearing capacity and In -situ tests: SPT and plate load tests, estimation of ultimate bearing capacity based on in - situ tests. Bearing capacity, general, local and punching shear failures, correction for size, shape, depth, water table, compressibility, ultimate and allowable stresses, Effect of groundwater level. 8 Lectures

5. Design of footings and rafts. Foundations subjected to eccentric loads and moments, Footings on slopes, Contact pressure distributions, Sub grade modulus. 8 Lectures

6. Pile foundation; driving stresses, load tests, pile groups, pile caps. Settlement of foundation 6 Lectures

Text Books: 1. A Text Book of Soil Mechanics and Foundation Engineering - V.N.S. Murthy, Saikripa Technical Consultants, Bangalore. Revised and enlarged 4th edition, 1993. 2. Basic and Applied Soil Mechanics - GopalRanjan and A. S. R. Rao, Wiley Eastern Ltd, New Delhi. 3. Soil Mechanics and Foundation Engineering - K. R. Arora, Standard Pub. and Dist., Delhi.,1992. Reference Books: 1. Soil Mechanics in Engineering Practice - Terzaghi and Peck, John Wiley and Sons IncNewyork, 1967. 2. Soil Mechanics- Lamb and Whitman, Wiley Eastern Pvt. Ltd, New Delhi, 1969. 3. Fundamentals of Soil Mechanics - Taylor, John Wiley and Sons IncNewyork, 1948. 4. Foundation Engineering- R. B. Peck, W. E. Hanson and T. H. Thournburn, John Wiley, New York. 5. Foundation Analysis and Design- J. E. Bowles, McGraw Hill Book co. 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% weight age and may / may not have choices. Minimum five questions will have to be answered.

Expected Outcome: The students would be able to determine the shear strength and earth pressure and analyse and design the problems related with stability of slopes, bearing capacity, proportioning of shallow and pile foundations.