CE 324: Design Of Foundations And Retaining Structures (3-0-0: 3)

Course objectives: This course covers the analysis, design, and construction aspects of shallow and deep foundations and retaining structures. The main objective is to enable students to select, analyze, and design an appropriate foundation and/or an earth retaining structure for a given scenario.

Introduction

Soil exploration, analysis and interpretation of soil exploration data, estimation of soil parameters for foundation design.

Design of shallow foundations

Introduction, Different types of foundations, Design of isolated footings, strip footings, Combined and Raft Foundations.

Design of deep foundations

Introduction, Different types of foundations, Design methodology for piles, Calculation of pile capacity, Stresses in pile, Analysis for Single piles, pile groups and pile caps, Settlement of pile group, Concept of negative skin friction, Piles subjected to lateral loads, Pile load test, Design and construction of well foundation, piers etc.

Design of retaining structures

Introduction, Different types of retaining structures, Stability analysis of rigid walls, Design of cantilever sheet piles, Design of anchored sheet piles, Bracing system for underground construction, Failure analysis for bracing system, Dewatering.

Text Books:

1. *Kurian, P.N., Narosa*, "*Design of Foundation Systems: Principles & Practices"*, 3rd Edition, 2006
2. *Bowles, J.E.* "*Foundation Analysis and Design"*, McGraw Hill, 5th Edition, 1997

References:

1. *Tomlinson, M.J.,* "*Foundation Design and Construction"*, Addison Wesley, 7th Edition, 2001
2. *Tomlinson, M.J.,* "*Pile Design and Construction Practice"*, E & FN Spon, 4th Edition, 1994
3. *Peck, R. B., Hanson, W. E. and. Thornburn, T. H, "Foundation Engineering"*, John Wiley & Sons, 2nd Edition, 1974
4. Literature on Advanced foundations Bureau of Indian Standard codes on foundations.

Expected outcome: The student will be able to understand: application of theories of soil mechanics to foundation design; ability to design foundations (shallow, piled, piled raft); advantages and disadvantages of different earth retaining systems; Select the most technically appropriate and cost-effective type of retaining wall for the application from a thorough knowledge of available system; quantify the lateral earth pressures within reinforced earth structures; Complete the design of retaining structures using appropriate design methods, factors of safety, design charts and field verification methods.
