Advanced Foundation Engineering - Video course

COURSE OUTLINE

The course "Advanced Foundation Engineering" will cover various aspects of foundation engineering including soil exploration, details of shallow and deep foundations, retaining walls.

The soil-foundation interaction will also be discussed along with the numerical solution techniques of beams and plates resting on elastic foundation bed.

The behavior and design methods of foundation on reinforced earth will be discussed.

The advanced theories and design of various foundation components will be discussed in logical way.

The earth pressure theories for designing the retaining walls will be discussed.

The codal provisions of the design of various types of foundation will also be discussed.

The number of chosen problems will be solved in this course.

The advanced course material will be very useful to undergraduate and post-graduate students, teachers and practitioners.

COURSE DETAIL

Sl. No.	Topic	No. of Hours
1	• Introduction, soil exploration, analysis and interpretation of soil exploration data, estimation of soil parameters for foundation design.	3
2	**Shallow Foundations :** • Methods for bearing capacity estimation, total and differential settlements of footing and raft, code provisions. • Design of individual footings, strip footing, combined footing, rigid and flexible mat, buoyancy raft, basement raft, underpinning.	8
3	**Pile Foundations :** • Estimation load carrying capacity of single and pile group under various loading conditions. • Pile load testing (static, dynamic methods and data interpretation), settlement of pile foundation, code provisions, design of single pile and pile groups, and pile caps.	8

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Civil Engineering

Pre-requisites:

1. Soil Mechanics (Geotechnical Engineering I).
2. Foundation Engg (Geotechnical Engineering II).

Additional Reading:

1. Literature on Advanced foundations Bureau of Indian Standard codes on foundations.

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4	**Well Foundations :** • Types, components, construction methods, design methods (Terzaghi, IS and IRC approaches), check for stability, base pressure, side pressure and deflection.	4
5	**Retaining Walls :** • Types (types of flexible and rigid earth retention systems: counter fort, gravity, diaphragm walls, sheet pile walls, soldier piles and lagging). • Support systems for flexible retaining walls (struts, anchoring), construction methods, stability calculations, design of flexible and rigid retaining walls, design of cantilever and anchored sheet pile walls.	6
6	**Soil-Foundation Interaction :** • Idealized soil, foundation and interface behavior. • Elastic models of soil behavior; Elastic-plastic and time dependent behavior of soil. • Beams and plates on elastic foundation; numerical analysis of beams and plates resting on elastic foundation.	5
7	**Reinforced Earth :** • Geotechnical properties of reinforced soil, shallow foundation on soil with reinforcement, retaining walls with reinforcements, design considerations.	4

References:

1. A.P.S. Selvadurai, "Elastic Analysis of Soil-Foundation Interaction", Elsevier Scientific Publishing Company.
2. Braja M. Das, "Principles of Foundation Engineering", PWS Publishing Company.
3. Joseph Bowles, "Foundation Analysis and Design", McGraw-Hill Book Company.
4. V.N.S. Murthy, "Advanced Foundation Engineering", CBS Publishers and Distributors.