DESIGN OF REINFORCED CONCRETE FOUNDATIONS

(Professional Elective-II)

Course Code: 19CE2253	**L**	**P**	**C**
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The students will be able to:

CO 1. Design combined footings for two and three column loads.
CO2. Design a raft foundation both flat slab type and slab and beam type.
CO 3.Anlayse and design Cantilever and Counter-fort retaining walls.
CO 4. Design Driven and Bored piles for its soil capacity and also structural capacity.
CO 5. Analyse and design Block type Machine Foundation.

UNIT-I **(10-Lectures)**

DESIGN OF SHALLOW FOUNDATIONS

Introduction –Types of Reinforced Concrete foundations and their behavior – Design of combined footings with two point loads and three point loads – Reinforcement detailing.

LO1 : Design a combined footing for two points loads.
LO2 : Design a combined footing for three point loads.

UNIT- II (10-Lectures)

RAFT FOUNDATION:

Introduction – Types of Raft foundation, allowable pressures for raft in cohesive and cohesion-less soils, Conventional design of raft foundation, Design of flat slab raft foundation, Design of beam and slab raft foundation.

LO1 : Design a flat –raft foundation.
LO2 : Design a slab and beam type raft foundation.

UNIT- III (10-Lectures)

RETAINING WALLS & DIAPHRAM WALLS

Introduction –Types of Retaining walls – Earth pressure on walls – Calculation of earth pressure – Earth pressure of submerged soil –

Earth pressure due to surcharge – Drainage of retaining walls – Stability requirements – Design of cantilever retaining wall – Design of counter-fort Retaining wall – Reinforcement detailing.
LO1: Design a cantilever Retaining wall.
LO2 : Design a counter-fort Retaining wall.

UNIT- IV (10-Lectures)
PILE FOUNDATION
Introduction – Types of piles – Design of driven (pre-cast) and Bored piles – Soil Design – Structural design – Loads on pile groups – Reinforcement detailing – Design of pile caps – Two, three and four pile caps – Truss theory and Bending theory – Reinforcement detailing.
LO1: Design a precast pile and bored pile including estimating its soil capacity.
LO2 : Design a pile cap system to support a column.

UNIT – V (10-Lectures)
DESIGN OF MACHINE FOUNDATIONS
Introduction – Types of machine foundations –General requirements – Dimensional criteria – Design data – Dynamic loads – permissible amplitudes – permissible bearing pressures – Analysis and design of aBlock type machine foundation.
LO1: Understand the impact of dynamic loads on foundation.
LO2: Design a Block type Machine foundation.

Text Books:
1. Varghese, P.C., ‑Reinforced concrete Foundations‖, prentice hall of India pvt. Ltd., New Delhi, 2011.
2. H.J. Shah, ‑Reinforced Concrete Vol. 1 (Elementary Reinforced Concrete) Charotar publishing house pvt. Ltd., 2016.
3. P. Srinivasulu& C.V. Vaidyanathan, ‑Hand book of Machine Foundations,Structural Engineering Research Centre, Madras, Tata Mc Graw Hill Publishing Company Ltd., 1990.

Reference Books:
1. Das B.M., ‑Principles of Foundation Engineering,‖ Sixth edition (India), Thomson, 2007.
2. IS : 2911 (Part 1) 2010 Design and construction of pile foundation.
Sec 1 : Driven cast –in-situ concrete piles.
Sec 2 : Bored cast-in-situ concrete piles.
Sec 3 : Driven precast concrete piles.

3. IS : 2950 (Part 1) -1981, Code of practice for Design and Construction of raft foundations.
4. IS : 2974 (Part 2)-1980, Code of Practice for Design and Construction of Machine Foundations, Foundations for Impact type Machines.