UNIT – V

Dynamic Soil Properties

Stresses in soil element; Determination of dynamic soil properties; Field tests; Laboratory tests; Model tests; Stress-strain behavior of cyclically loaded soils; Cyclic plate load test; Liquefaction.

Machine Foundations

Types of machines; Basic design criteria; Methods of analysis; Mass-Spring-Dashpot model; Elastic-Half-Space theory; Tschebotarioff's reduced natural frequency method; Types of foundations; Modes of vibrations; Vertical, sliding, torsional (yawing) and rocking (and pitching) modes of oscillations; Design guidelines as per codes; Typical design problems.

TEXT BOOKS:

1. ManojDatta, Shashi K Gulhati, "Geotechnical Engineering", Tata McGraw – Hill Education (2005)

2. K.R. Arora, "Soil Mechanics and Foundation Engineering", 7th ed., Standard Publishers and Distributors, Delhi, 2009.

3. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, "Soil Mechanics and Foundation", 16th ed., Laxmi Publications Pvt. Ltd., New Delhi, 2005.

4. Dass, B.M, "Principles of Geotechnical Engineering", 5th ed., Thompson books, Singapore, 2002.

5. P. Srinivasalu, C. V. Vaidyanathan "Handbook of Machine Foundations" 1st EditionTata McGraw - Hill Education (2004)

REFERENCE BOOKS:

1. B. J. Kasmalkar; "Foundation Engineering", 6th ed., Pune VidyarthiGrihaPrakashan, Pune, 1989.

2. Bowles, J.E., "Foundation Analysis and Design" 4th ed., McGraw-Hill Publishing company, Newyork, 1988.

3. P.PurushotthamaRaj , "A Text book of Soil Mechanics

(CE514) Advanced Prestressed Concrete

Objective of the Course:

To develop an advanced understanding of the behaviour, analysis and design of prestressed concrete members and connections. By the end of the course, students should be able to calculate prestress losses , Design a post-tensioned continuous beam for transfer, serviceability and strength, Design a post-tensioned slab and Specify detailing and material.

UNIT-I:

Introduction, Prestressing Systems and Material Properties

Basic concepts of pre-stressing; Historical development; Advantages and Types of Prestressing, Pre-tensioning Systems and Devices, Post-tensioning Systems and Devices, Need for High strength steel and High strength concrete; Losses Of Prestress: Nature of losses of pre-stress; Loss due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip; Total losses allowed for in design.

UNIT-II:

Analysis of Prestressed Member

Analysis of Members under Axial Load: Analysis at Transfer, Analysis at Service, Analysis for Ultimate Strength, Analysis of Member under Flexure:, Analysis at Transfer and at Service, CrackingMoment, Kern Point, Pressure Line, Analysis for Ultimate Strength, design loads and strength, Calculation of Crack Width, Variation of Stress in Steel, Analysis of a Rectangular Section, Analysis of a Flanged Section.

UNIT-III:

Deflections of Prestressed Concrete Members

Importance of control of deflections; Factors influencing deflections; Short term deflections of uncracked members. Long term deflection of cracked member; Transmission Of Pre-Stress: Transmission of Pre-stressing force by bond; Transmission length; Bond stresses; Transverse tensile stresses; End zone reinforcement; Flexural bond stresses in pre –tensioned and post – tensioned grouted beams, stress distribution in end block, Anchorage zone reinforcements. Shear And Torsion Resistance Of Prestressed Concrete Member Shear and Principal stresses; Ultimate shear resistance of pre-stressed concrete members; Design of shear reinforcement, pre-stressed concrete members in torsion, Design of reinforcements for torsion, shear and bending.