

SOIL DYNAMICS AND MACHINE FOUNDATIONS (ELECTIVE – III)

Course Code : 13CE1147

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Course Educational Objectives:

- ❖ To familiarize students with the dynamic properties of soil.
- ❖ To create an understanding about the importance of designing machine foundation for reciprocating and impact machines.

Course Outcome:

- ❖ Student will demonstrate the ability to design machine foundations.

UNIT-I (12 Lectures)

THEORY OF VIBRATIONS:

Basic definitions- Free and Forced vibrations with and without damping for Single degree freedom system- Resonance and its effect – Magnification – Logarithmic decrement – Transmissibility, Natural frequency of foundation soil system -Barkan's and IS methods – Pressure bulb concept – Pauw's Analogy.

UNIT-II (12 Lectures)

WAVE PROPAGATION AND DYNAMIC SOIL PROPERTIES:

Elastic waves in Rods – Waves in elastic Half space, Field and Laboratory methods of determination – Uphole, Down hole and Cross hole methods – Cyclic plate load test – Block vibration test – Determination of Damping factor.

UNIT-III (12 Lectures)

MACHINE FOUNDATIONS:

Types, Design criteria, Permissible amplitudes and Bearing pressure, Degrees of freedom - Analysis under different modes of vibration of block foundation

UNIT-IV**(12 Lectures)****DESIGN OF FOUNDATIONS FOR RECIPROCATING AND IMPACT MACHINES:**

Analysis of Two Degree freedom systems under free and forced vibrations
-Principles of Design of Foundations for reciprocating and impact machines as per IS code.

UNIT-V**(10 Lectures)****VIBRATION ISOLATION:**

Types and methods – Isolating materials and their properties

TEXT BOOKS:

1. Barkan, “*Dynamics of Bases and Foundations*”, 2nd Edition McGraw Hill Publishing, 1970.
2. Shamsher Prakash, “*Soil Dynamics*”, 3rd Edition, John Wiley, 2000.

REFERENCES:

1. Richart, Hall and Woods, “*Vibration of Soils and Foundations*”, Prentice Hall, 1981.
2. Prasad.B.B., “*Advance Soil Dynamics and Earthquake Engineering*”, 1st Edition, Prentice Hall, 2011.
3. P.Srinivasulu and G.V.Vaidyanathan, “*Handbook of Machine Foundations*”, 2nd Edition, Tata McGraw Hill, 1999.

