Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NCED525	Soil-Structure Interaction	3	0	0	3

Course Objective

The course aims at imparting fundamental knowledge on modeling and analyses of soil-structure interaction (SSI) problems.

Learning Outcomes

Upon successful completion of this course, the students should be able to:

- Analyze footing considering static soil-structure interaction (SSI)
- Understand various aspects of modeling and analyses of dynamic SSI
- Carry out SSI analyses for regular civil engineering structures

Unit No.	Topics to be Covered	Lectures	Learning Outcome
1	**Introduction to SSI:** Objectives; Practical significance; Structures on soft ground; Consideration of unbounded media	6L	Understanding of importance of SSI
2	**Static SSI:** Modulus of subgrade reaction; Discrete models: Winkler; Pasternak; Filoneko-Borodich; Kerr models; Beams and plates resting on elastic foundation	12L	Modeling of SSI under static condition
3	**Dynamic SSI:** Control motion; Kinematic and inertial interaction; Direct and substructure method of analysis; Modeling of structure and soil; Consideration of nonlinearity	9L	Understanding on dynamic SSI analysis considering various nonlinearities
4	**SSI Analysis by FEMA:** Base slab averaging; Embedment effect; Foundation and soil flexibility; Period lengthening; Foundation damping; Modeling of basement	12L	Codal guidelines of SSI analyses
5	**Applications of SSI:** SSI for short to medium rise structures; tall structures	3L	Application problems
	Total Contact Hours	**42L**	

Text Books:

1. Wolf, J.P. (1985). Dynamic Soil-Structure Interaction, 1st Edition, Prentice Hall, USA.

Reference Books:

1. Hetenyi, M. (1979). Beams on Elastic Foundation: Theory with Applications in the Fields of Civil and Mechanical Engineering, The University of Michigan Press.
2. FEMA P-2091 (2020). A Practical Guide to Soil-Structure Interaction, Federal Emergency Management Agency, Washington D.C.
3. Selvadurai, A.P.S. (1979). Elastic Analysis of Soil-Foundation Interaction, Elsevier Science.