

## **Course Name:**

Soil-Structure Interaction

Course Number: 20-152	Credit: 3
Program: Graduate	Course Type: Technical Selective
Prerequisite: -	Corequisite: -

## **Course Description (Objectives):**

The main objective of this course is to examine the mutual interaction between soil and structure under dynamic loading conditions. This interaction, known as soil-structure interaction, plays a crucial role in geotechnical and earthquake engineering analyses.

## **Course Content (outline):**

- Chapter 1: Definition of soil-structure interaction and its effects
- Chapter 2: Purpose of soil-structure interaction analysis
- Chapter 3: Analysis methods, including the direct method and the substructure method
- Chapter 4: Equations of motion for the soil-structure system
- Chapter 5: Introduction to wave propagation theory
- Chapter 6: Free-field motion analysis
- Chapter 7: Kinematic interaction and how to calculate it
- Chapter 8: Dynamic stiffness of soil
- Chapter 9: Time-domain and frequency-domain analysis using:
  a. Finite element models via the direct method.
  b. Discrete models with mass-spring-damper systems
- Chapter 10: Effect of soil on the elastic behavior of structures during earthquakes
- Chapter 11: Effect of soil on the inelastic behavior of structures during earthquakes
- Chapter 12: Review of code provisions related to soil-structure interaction

## **References:**

- Dynamic Soil-Structure Interaction, By J.P.Wolf, Prentice-Hall, 1985.Newmark & Hall
- Foundation Vibration Analysis Using Simple Physical Models, By J.P.Wolf, Prentice-Hall, 1994.