

SHIV NADAR UNIVERSITY

- I. Course Title: Geotechnical Earthquake Engineering
- II. Course Code: CED671
- III. Course Credits (L:T:P): 4 (3:0:0)
- IV. Total Contact Hours/Batch/Week (L:T:P): 3:1:0
- V. Course Type: Major Elective
- VI. Prerequisite: Structural Dynamics/Soil Dynamics
- VII. School/Department: Civil Engineering
- VIII. Disciplines to which the course may be of interest: Civil Engineering
- IX. **Course Objectives:**

This course aims to introduce the fundamentals of soil dynamics emphasizing on the behavior of soils under seismic and dynamic loading, and the effect of superficial geology on strong-motion. It will help to understand the fundamental physics and mathematics governing soil response to earthquake loading, the parameters controlling that response, and seismic performance assessment.

- X. **Course Content:**

Vibration theory; Engineering seismology; Wave propagation through soils; Dynamic soil properties; Strong ground motion; Seismic hazard analysis; Seismic ground response analysis; Liquefaction and lateral spreading; Seismic microzonation; Seismic analysis and seismic performance assessment of structures.

- XI. **Text Books:**

1. Steven L. Kramer, Geotechnical Earthquake Engineering, Pearson Education, 2007.
2. Ikuo Towhata, Geotechnical Earthquake Engineering, Springer, 2010.
3. Nozomu Yoshida, Seismic Ground Response Analysis, Springer, 2014.
4. Robert W. Day, Geotechnical Earthquake Engineering Handbook, McGraw Hill, 2012.

- XII. **Supplemental Reading:**

1. Several selected research papers will be referred during the course.

- XIII. **Assessment Scheme:**

Homework Students will be assessed on how well they understand and use the fundamentals of structural dynamics through the problems they solve during the lecture classes and examinations. These problems will assess concept understanding, critical thinking, and problem-solving skills.

Homework Assignment – 20%

Project (literature review, project work, report submission and project presentations) – 30%

Mid-term examination – 20%

Final Examination – 30%

Students must score above 40% to pass the course.