

Geotechnical Earthquake Engineering (CEGE0035)

Description

This module provides students with an understanding of seismicity and earthquake-induced ground motions, and engineering approaches for modelling them for the purpose of geotechnical and structural seismic design. An overview of the behaviour of geotechnical structures under dynamic loading and their interaction with seismic structure design is provided. The module also introduces nonlinear phenomena in soils due to dynamic loadings, as well as the analysis methodologies for the evaluation of site response and liquefaction potential. This course is intended to cover the following topics: - Introduction: theory of vibrations. - Engineering Characterization of ground motions. - Review of Soil Dynamics and Fundamental of Dynamic Soil Properties. - Ground Response Analysis and Software Applications. - Seismic Design of Shallow and Deep Foundations. - Seismic Slope Stability. - Seismic Design of Retaining Walls. - Nonlinear phenomena in soils under dynamic loadings. - Densification, liquefaction and cyclic mobility.

LEARNING OUTCOMES:

After completion of this module, the students will be able to:

Understand the physical processes which cause earthquakes, the various terminologies which are used to characterize them, and the relationships describing the frequency of occurrence of earthquakes in a regional- and fault-specific context.

Understand the measurement of, and be able to process, earthquake-induced strong ground motion records, characterize strong ground motions in terms of amplitude, frequency content, and duration; and predict ground motion characteristics using empirical models.

Understand, and be able to perform a seismic hazard analysis, both deterministic and probabilistic, and determine design ground motion intensity measures.

Select and modify recorded ground motions for use in dynamic seismic response analyses.

Key information

Year	2019/20
Credit value	15 (150 study hours)
Delivery	PGT L7, Campus-based
Reading List	View on UCL website
Tutor	Dr Susana Lopez-Querol
Term	Term 2
Timetable	View on UCL website

Assessment



- Written examination (main exam period): 50%
- Coursework: 50%

Find out more

For more information about the department, programmes, relevant open days and to browse other modules, visit ucl.ac.uk

Understand methods which can be used to simulate ground motion acceleration time series as a physics-based alternative to empirical ground-motion prediction models.

Understand the theory, and be able to perform 1-D ground response analysis.

Understand, and be able to perform liquefaction potential assessment.

Understand the behaviour of geotechnical structures under dynamic loading and their interaction with the seismic structure.





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