Geotechnical Earthquake Engineering (CEGE0035)

Description

Outline:

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:

1. Introduction:
   theory of vibrations;
2. Engineering Characterization of ground motions;
3. Review of Soil Dynamics and Fundamental of Dynamic Soil Properties;
4. Ground Response Analysis and Software Applications;
5. Seismic Design of Shallow and Deep Foundations;
6. Seismic Slope Stability;
7. Seismic Design of Retaining Walls;

Aims and Learning Outcomes:

The specific aims of the course are:

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

Key information

Year 2018/19
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

BAD ASSESEMENT DATA

Find out more

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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;

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 seismic structure;
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3. Review of Soil Dynamics and Fundamental of Dynamic Soil Properties;
4. Ground Response Analysis and Software Applications;
5. Seismic Design of Shallow and Deep Foundations;
6. Seismic Slope Stability;
7. Seismic Design of Retaining Walls;
8. Nonlinear phenomena in soils under dynamic loadings. Densification, liquefaction and cyclic mobility;

**Aims and Learning Outcomes:**

*The specific aims of the course are:*

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 test time-scale. Apply this knowledge to the design of geotechnical and structural systems, and to the evaluation of site response and liquefaction potential.

**Key information**

- **Year**: 2018/19
- **Credit value**: 15 (150 study hours)
- **Delivery**: UGM L7, Campus-based
- **Reading List**: [View on UCL website](#)
- **Tutor**: Dr Susana Lopez-Querol
- **Term**: Term 1
- **Timetable**: [View on UCL website](#)

**Assessment**

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**Find out more**

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**Disclaimer:** All information correct as of December 2018. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
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