

# UE Soil dynamics and nonlinear site response analysis



Level  
Baccalaureate  
+5



ECTS  
3 credits



Component  
UFR PhITEM  
(physique,  
ingénierie, terre,  
environnement,  
mécanique)



Semester  
Printemps

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX9CEAP

## Presentation

### Description

**Fundamentals:** Soil behaviour under earthquake loading: Fundamentals of soil behaviour under cyclic and dynamic loading. Basic mechanical models. Non-linear stiffness, damping, cyclic strength, liquefaction.

**Geotechnical characterisation:** Techniques and examples of characterization of layered soils by in situ tests: borehole and surface methods. Techniques and examples of results of laboratory tests: cyclic triaxial, simple shear, torsional shear, resonant column. Factors influencing stiffness and damping. Linear equivalent models for dynamic analyses.

**Liquefaction:** Case histories of liquefaction worldwide; Evaluation of liquefaction potential by empirical to analytical methods. Zonation for liquefaction.

**Slope stability:** Case histories of slope failures worldwide; Analysis: pseudo-static methods, displacement analysis, advanced analyses. Examples of seismic analysis of natural slopes, earth dams and embankments. Zonation of slope stability.

**Tutorials (with laptop):** 1D site response analysis and assessment of liquefaction potential. Slope displacements by simplified dynamic analysis

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## Course parts

CM	Lectures (CM)	21h
<b>Period</b> : Semester 9		

## Useful info

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### Campus

> [Grenoble - University campus](#)