Course offered for the PhD Program in
Structural Engineering, Geotechnics and Seismic Risk

1. Title

DYNAMIC SOIL-FOUNDATION-STRUCTURE INTERACTION:
TESTS AND METHODS OF ANALYSIS

2. Description

Detailed analyses of data recorded on structures founded on soft soil demonstrated that their seismic response is significantly affected by the dynamic interaction between the structure, the foundation and the surrounding soil (SFSI). Neglecting such effects may imply misleading interpretations of monitoring data as well as inaccurate numerical models.
The course is aimed at providing the basic concepts and skills to identify the dynamic behavior of existing structures affected by SFSI and at analyzing their response in seismic conditions by means of simplified to advanced approaches. The first lectures will describe the main aspects of kinematic and inertial interaction with the relevant models and methods of analysis for structures founded on shallow footings or piles. The SFSI influence on the seismic hazard, vulnerability and risk will be discussed. The subsequent lectures will be focused on analytical tools to quantify the SFSI from large-scale measurements and *ad-hoc* experimental tests on single structures.
The theoretical framework, some numerical applications and experimental observations will be examined. The course will include hands-on tutorials in which students will be guided to solve practical exercises on soil-structure interaction. For the practical exercise part is thus required to bring a laptop. The preliminary knowledge of basic concepts such as complex algebra, dynamic soil behavior, dynamic equilibrium of a simple oscillator and response spectrum is expected.

3. Teachers

- Dr. Filomena de Silva - Research Fellow in Geotechnical Engineering, University of Naples Federico II
- Eng. Chiara Amendola - PhD candidate in civil engineering, Aristotle University of Thessaloniki - Politecnico di Milano

4. Duration and Credits

16 hours (2 CFU)

Final exam

Discussion on a synthetic report on the exercises solved during the tutorials.