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

1. Title

FUNDAMENTALS OF
SEISMIC SOIL-STRUCTURE INTERACTION AND FOUNDATION DESIGN

2. Description

Recent research works have highlighted that the design strategy of foundations influences the seismic response of aboveground structures. In particular, a proficient seismic design of foundations can provide a reduction of the structural damage and consequently of the restoration time, ensuring an improvement of the resilience of buildings and infrastructures.
This course aims at providing the basic concepts and skills to face the complexity of this problem. The first lectures will describe the main aspects of soil-foundation-structure interaction with the relevant models and methods of analysis. Their use will be then specified with reference to innovative approaches for the seismic design of the three most widespread foundation types, i. e. shallow footings, caissons or piles.
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 and foundation design. For the practical exercise it will be thus required to bring a laptop.
It is expected that attendants have a preliminary knowledge not only of basic soil mechanics and foundation engineering, but, hopefully, also of main concepts of structural and soil dynamics.

3. Teachers

-Fundamental of soil-structure interaction: Prof. Luca de Sanctis - Full Professor in Geotechnical Engineering, University of Naples “Parthenope”

-Shallow foundatons: Dr. Filomena de Silva - Research Fellow in Geotechnical Engineering, University of Naples “Federico II”

-Caisson foundatons: Dr. Domenico Gaudio - Research Fellow in Geotechnical Engineering, University of Rome “La Sapienza”

-Pile foundatons: Prof. Raffaele di Laora - Associate Professor in Geotechnical Engineering, University of Campania “Luigi Vanvitelli”

4. Duration and Credits

16 hours (2 CFU)

5. Activation mode and teaching period

The course will be held in presence for four days, possibly in the same week (from Tuesday to Friday). Tentative dates: April 2025, 1-4.

6. Final exam

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