Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Soil Dynamics

TEACHER: Roberto Vassallo

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Language: Italian/English if foreign students will attend

ECTS: 6	n. of hours: 54	Academic year: 2015-16	Campus: Potenza	Semester: I

TOPICS

The course teaches the fundamentals of soil response in cyclic and dynamic conditions and provides the principles and the methods for their application to the problem of evaluating the free-field Local Site Effects. Fundamentals of foundation design under seismic loading are also taught within the general framework of structural design. The main recommendations of the Italian technical code in the field of geotechnical engineering are analyzed.

TEACHING METHODS (please tick one or more options)

x Theoretical lessons
x Tutorials in classroom
□ Tutorials in laboratory
x Project works
□ Technical visits
Other activities (please specify) _____

TEXTBOOKS

G. Lanzo, F. Silvestri – Risposta Sismica Locale – Hevelius
F. Vinale, C. Mancuso, F. Silvestri – Dinamica dei terreni (in 'Manuale di Ingegneria Civile', Vol. 1) – Zanichelli
S.L. Kramer – Geotechnical Earthquake Engineering – Prentice-Hall

ON-LINE EDUCATIONAL MATERIAL

web address: http://oldwww.unibas.it/utenti/vassallo/home.shtml

LEARNING OUTCOMES

Learning the peculiarities of soil response when subjected to dynamic actions, either seismic or not. Understanding the fundamentals of wave propagation and seismology, necessary to characterize the dynamic load. Knowledge of *in situ* and laboratory tests for soil dynamic characterization. Ability to evaluate the effect of the seismic action on a real subsoil. Learning the basic skills for appropriate foundation design under seismic loading within the framework of seismic technical codes, including the planning of geotechnical investigations required for an adequate modelling of soil-structure interaction.

REQUIREMENTS

A good knowledge of Soil Mechanics and of the basics of Structural Engineering is required.

EVALUATION METHODS (please tick one or more options)

□ Intermediate verifications
□ Written examination
□ Discussion of a project work
□ Practical test
x Oral examination
Other methods (please specify) _____

DETAILED CONTENT

Introduction to the role of Soil Dynamics in engineering practice; Fundamentals of Single-Degree-of-Freedom oscillating systems; Fundamentals of Wave Propagation in homogeneous and heterogeneous subsoil; Soil response under cyclic and dynamic conditions: equivalent shear modulus and damping – shear strength and liquefaction – simple constitutive models; Geotechnical characterization of dynamic soil properties: laboratory and in situ tests – main factors affecting constitutive parameters; Seismic load: earthquakes – ground motion parameters – seismic hazard; Analysis of seismic vulnerability: Local Site Effects for an ideal and a real subsoil. Basics of structural dynamics; Modal analysis using response spectra; Pseudostatic approach; Italian seismic technical code (D.M. 14.01.2008); Planning geotechnical investigations and foundation analysis according to the Italian Code; Dynamic Soil-Structure Interaction.

Tutorials: Analysis of a case-history: free-field Local Site Effects; foundation design under seismic loading

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EXAMINATION SESSIONS (PLANNED)
12/01/16, 02/02/16, 01/03/16, 05/04/16, 03/05/16, 01/06/16, 05/07/16, 26/07/16, 06/09/16, 04/10/16, 08/11/16, 06/12/16, 20/12/16

SEMINARS BY EXTERNAL EXPERTS YES □ NO X

FURTHER INFORMATION