

Foundations

General principles of foundation design. Shallow foundations: Bearing capacity of foundations under central, eccentric and inclined loading. Principles of calculation of foundation settlement. Models of the soil reaction, contact pressures, settlements of foundations in cohesive and cohesionless soils, allowable deformations. Design of shallow foundations: spread and combined footings, strip foundations, mat foundations. Deep foundations: Construction considerations. Methods of deriving pile capacity for driven and bored piles in cohesive and cohesionless soils. Settlement of single piles. Axial capacity and settlement of piles in groups. Negative shaft friction, lateral loading of piles. Principles of the foundation design based on Eurocode EC-7.

- Semester 6
- Teaching hours 4
- Website
<http://mycourses.ntua.gr/announcements/announcements.php?cidReq=CIVIL1029>
- Instructors [V. Georgiannou \(Coordinator\)](#), [M. Kavvadas](#)

Prerequisite Knowledge

Basic knowledge of Mechanics and Soil Mechanics

Course Units

	Title	Description	Hours
1	Principles of foundations	Foundation types. Contact stresses at the foundation base and linear distribution.	1X4=4
2	Bearing capacity of surface foundations.	Vertical axial and eccentric loading. Limit analysis methods.	2X4=8
3	Calculation of settlements in surface foundations.	Calculation using elastic formulae. Settlement analysis in clays and sands. Settlements of beam foundations. Modulus of subgrade reaction.	4X3=12
4	Pile foundations	Axial capacity of single piles using analytical methods and pile load tests. Settlement of single piles and pile groups.	4X4=16
5	Horizontal loading of piles. Analysis of foundations using Eurocode 7.	Partial factors and analysis methods for surface foundations and piles.	

Learning Objectives

Analysis of the bearing capacity and settlements of different types of surface and pile foundations

Teaching Methods

Teaching methods	Class lectures and tutor classes.
Teaching media	Use of blackboard and PowerPoint slides.
Problems - Applications	Yes
Assignments (projects, reports)	Yes. Home assignment of problem sets.
Other	Πρόχειρο διαγώνισμα

Student Assessment

- Final written exam: 60%
- Mid-term exam: 30%
- Problems - Applications: 10%

Textbooks - Bibliography

ΣΗΜΕΙΩΣΕΙΣ ΘΕΜΕΛΙΩΣΕΩΝ, Β.Ν. Γεωργιάννου "Ανάπτυξη διαφανειών από τις παραδόσεις του μαθήματος"

ΣΗΜΕΙΩΣΕΙΣ ΘΕΜΕΛΙΩΣΕΩΝ ΤΕΧΝΙΚΩΝ ΕΡΓΩΝ, Μ. Καββαδάς Περιλαμβάνει τις διαφάνειες των παραδόσεων του μαθήματος

Book (in greek): ΣΧΕΔΙΑΣΜΟΣ ΤΩΝ ΘΕΜΕΛΙΩΣΕΩΝ, Α. Αναγνωστόπουλος & Β. Παπαδόπουλος (από Εύδοξο)

Recommended books:

1. Craig, R.F. (1997), "Soil Mechanics", 6th Edition, E&FN Spon.
2. Poulos, H.G. & E.H. Davis (1980) Pile Foundation Analysis and Design, John Wiley and Sons.
3. U.S. Corps of Engineers publications : <http://www.usace.army.mil/pubtypes.html>
<http://www.usace.army.mil/inet/usace-docs/eng-manuals/cecw.html>
4. US Federal Highway Administration, Geotechnical Engineering Publications :
<http://www.fhwa.dot.gov/bridge/geopub.html>

Lecture Time - Place: Monday, 11:45 – 13:30 & Friday 9:45-11:30, Rooms: Αιθ. 17, 1, Ζ. Κτ. 1 Πολ.