1. Course number and name

RB-S1-19-W3C-8C, **Foundation Engineering**

2. Credits and contact hours*

4 ECTS, lectures: 15 hours**, classes: 4 hours**, laboratory: 10 hours**, project: 16 hours**

3. Instructor's or course coordinator's name

Krzysztof Sternik PhD

4. Text book, title, author, and year

- Das B.M.: Principles of Foundation Engineering. Cengage Learning, 2014.

a. other supplemental materials

- Bond A., Harris A.: Decoding Eurocode 7, Taylor & Francis, 2008
- Frank, R., Bauduin, C., Driscoll, R., Kavvadas, M.: Designers' Guide to EN 1997-1 Eurocode 7: Geotechnical Design General Rules
- Tomlinson M.J., Boorman R.: Foundation Design and Construction 7th Edition, Pearson Education Ltd, 2001
- Standards: EN 1990:2002, EN 1991-1-1: 2001, EN 1997-1.

5. Specific course information

a. brief description of the content of the course (catalog description)

Lectures:

(1) Field explorations, (2) Selection of foundation type, (3) Spread footings and mat foundations, (4) Bearing-capacity analysis, (5) Geotechnical categories and reliability in spread foundation design, (6) Settlement analyses, (7) Dewatering and groundwater control.

Classes:

The spread footing project overview and guidelines.

Project:

Consulting the spread footing project according to EC7: bearing resistance, settlement, reinforcement, drawing.

Laboratory:

Overview of laboratory testing of soils mechanical parameters (triaxial apparatus, oedometer, shear box). Oedometer test: determination of constrained modulus. Shear box test: determination of cohesion and friction angle.

b. prerequisites or co-requisites

Soil mechanics course

c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

Required.

6. Specific goals for the course

a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic

A student knows and understands:

- the site investigation techniques
- foundation types
- spread footing design principles
- dewatering, drainage and groundwater control principles

A student can:

- design a spread footing
- determine mechanical parameters of soils

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

K1A_W07, K1A_U04

7. Brief list of topics to be covered

1. Field explorations: Investigational programs, Soil boring program, Field measurements of relative density and consistency, Boring logs, Groundwater observations, In situ load tests, Geophysical exploration, Borehole surveying .
2. Selection of foundation type: Adverse subsurface conditions, Cost estimates and final selection.
3. Spread footings and mat foundations: Adequate foundation depth, Footing design Mat foundations, Special requirements for mat foundations, Modulus of subgrade reaction for footings and mats, Foundations for towers
4. Bearing-capacity analysis: Bearing capacity of soils, Shear strength parameters, Methods of analysis, Tension forces, Bearing capacity of rock
5. Geotechnical categories and reliability in spread foundation design: Factors affecting the complexity of design, Geotechnical Categories, Design situations, Geotechnical actions, Resistance in geotechnical design, Introducing reliability into the design, Partial factors for general foundations, Design Approaches, Alternative ways of dealing with design uncertainty.
6. Settlement analyses: Settlement problems, Loads causing settlement, Stress computations, Settlement of foundations on clay, Consolidation settlement, Settlement of cohesionless soils, Eliminating, reducing, or coping with settlement
7. Dewatering and groundwater control: Excavations requiring drainage, Seepage control, Seepage cutoffs, Control of surface waters, Sheet-pile cofferdams, Foundation underdrainage and waterproofing.

*- Consultations were not included in the contact hours

**-per semester