Course unit title:	Soil Structure Interaction		
Course unit code:	CE475		
Type of course unit:	Elective		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	4		
Semester when the unit is delivered:	7 or 8		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Christakis Onisiphorou, Dr. Panayiotis Papadopoulos		
Learning outcomes of the course unit:	1. Describe soil stiffness measurement techniques in laboratory and in-situ, non-linear stiffness. 2. Understand soil-structure interaction analysis methods: p-y analysis, subgrade reaction, finite element analysis. 3. Select and critically appraise appropriate methods for various geotechnical analyses. 4. Assess vulnerability of various structure types (new and old) to foundation distortions. 5. Assess allowable settlement of various buildings. 6. Apply the outputs of soil-structure interaction analyses to the design of pads, rafts, piles, pile caps, basement walls and struts. 7. Apply techniques learned in course to prepare and defend a designed solution for a foundation and a retaining wall.		
Mode of delivery:	Face-to-face		
Prerequisites:	CE315	Co-requisites:	None
Recommended optional program components:			
Course contents:	**Introduction:** Revise essential material from course Geotechnical Design. **Site investigation and monitoring**: methods of measuring soil stiffness in situ and laboratory: seismic method, pressuremeter, penetration methods; local measurement on triaxial specimens. Site monitoring methods by total station, precise levelling, wall inclinometers. **Analysis methods**: p-y analysis, subgrade reaction method and finite element analysis applied to shallow foundations, piles and retaining walls. **Allowable settlement**: empirical and analysis methods of determining sensitivity of structures to distortions, combined analysis of structure and ground. Estimating allowable settlement values. **Structural design of foundations**: using outputs of structural forces from analyses in structural design in accordance with Eurocodes 2 and 3. **Design projects**: application of all techniques into design projects, using real information where possible.		
Recommended and/or required reading:			
Textbooks:	"Principles of Foundation Engineering", Das M.D., International edition, Nelson Engineering. "A Short Course in Foundation Engineering", Simons N. & Menzies B., 2nd ed., Thomas Telford.		
References:	"Foundation Design and Construction", Tomlinson, M.J., 7th ed., Prentice Hall. "Finite Element Analysis in Geotechnical Engineering Vol. 1 and 2", Potts D. & Zdravkovic L., Thomas Telford.		

Planned learning activities and teaching methods:	The course will be presented through theoretical lectures in class. The lectures will present to the student the course content and allow for questions. Part of the material will be presented using visual aids. Lecture notes, project assignments, practice questions, feedback and additional material such as site videos and photographs will be available to students at any time on the e-learning platform. The learning process will be enhanced with the requirement from the student to solve exercises. These include self-evaluation exercises which will be solved in class. These exercises will not be graded. Design projects will be given as part of their assessment. The instructor will be available to students during office hours or by appointment in order to provide any additional tutoring.
Assessment methods and criteria:	• Coursework 40% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No