

Course unit title:	Engineering Geology and Soil Mechanics		
Course unit code:	CE210		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	2		
Semester when the unit is delivered:	3 (Fall)		
Number of ECTS credits allocated :	5		
Name of lecturer(s):	Dr. Christakis Onisiphorou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1. Recognize the relevance of geology to civil engineering projects and relate to the effects of earthquakes and other geological hazards on the built environment. 2. Identify different types of rocks and differentiate between igneous, sedimentary and metamorphic rocks. 3. Describe the geological features of the geological zones in Cyprus, evaluate the main geological hazards present and propose protection measures. 4. Plan the main stages of a site investigation, recognize the importance of groundwater level in construction projects, and assess the suitability of site improvement methods for various ground conditions. 5. Classify different types of soils based on their physical behavior and apply soil phase relationships. 6. Perform seepage calculations for groundwater flow in soils for specific civil engineering problems. 7. Develop skills for measuring soil index properties, permeability and compaction parameters in the laboratory. 		
Mode of delivery:	Face-to-face		
Prerequisites:		Co-requisites:	
Recommended optional program components:			
Course contents:	<p>ENGINEERING GEOLOGY</p> <ul style="list-style-type: none"> • Plate Tectonics, Earthquakes, Structural Geology: Earth structure and formation. Geological history. Plate tectonics. Different types of plate boundaries. Earthquake occurrence and effects on infrastructure. Protection measures. Structural geology: faults, folds and joints. • Earth Surface Processes and Rock Formations: Weathering, erosion, transportation and deposition of sediments. Minerals. Rocks: Igneous, Sedimentary and Metamorphic rocks. Use of sedimentary deposits in the construction industry. Rock cycle. Identification of rocks. Cyprus geological zones and main features. • Geological hazards: Identification of possible geological hazards. Slope failures and landslides. Trigger mechanisms and protection measures. Excessive settlements. Swelling soils. • Site Investigation and Groundwater: Planning of a site investigation. Desk study, sub-surface investigations, in-situ and laboratory testing, geotechnical reports and construction monitoring. Groundwater table and fluctuations of groundwater level. <p>SOIL MECHANICS</p>		

	<ul style="list-style-type: none"> • Soil behaviour: Soil nature and soil properties. Classification of soils. Sieve analysis and grading curve for granular soils. Plasticity of fine soils. Measurement of index properties and Atterberg limits. Phase relationships. • Soil Improvement: Methods of site improvement. Advantages and disadvantages. Field Compaction. Measurement of maximum dry density and optimum water content. • Groundwater Flow and Seepage Calculations: Flow of groundwater in soils. Hydraulic gradient, volumetric flowrate and soil permeability. Flownets and seepage calculations. Measurement of soil permeability.
Recommended and/or required reading:	
Textbooks:	<ul style="list-style-type: none"> • F.G.H. Blyth & M.H. de Freitas, <i>A Geology for Engineers</i>, 7th ed., Elsevier, 2006. • Craig, R.F., <i>Soil Mechanics</i>, 7th ed., Spon Press, 2004.
References:	<ul style="list-style-type: none"> • F.G. Bell, <i>Engineering Geology</i>, 2nd ed., Butterworth-Heinemann, 2007. • N. Simons & B. Menzies, <i>A short course in Geology for Civil Engineers</i>, Thomas Telford Ltd., 2008. • Smith, I., <i>Smith's Elements of Soil Mechanics</i>, 8th ed., Wiley-Blackwell, 2006.
Planned learning activities and teaching methods:	<p>The course will be presented through formal lectures in class and lab sessions in the laboratory. The lectures will present to the student the course content and allow time for questions and discussion. Part of the material will be presented using visual aids such as powerpoint slides. The aim is to familiarize the student with the different and faster pace of presentation and also allow the instructor to present related material (videos, slides, photographs etc.). Notes shall be taken by the students in class during lectures. In addition, all of the course material will be made available through the course e-learning platform. The course includes laboratory classes and writing up of laboratory reports. Finally, the instructor will be available to students during office hours or by appointment in order to provide any necessary tutoring.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> • Coursework 40% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No