

Course unit title:	Land Surveying		
Course unit code:	CE105		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	1		
Semester when the unit is delivered:	1 (Fall)		
Number of ECTS credits allocated :	5		
Name of lecturer(s):	Dr. Christos Anastasiou		
Learning outcomes of the course unit:	<ol style="list-style-type: none"> 1. Understand the use and importance of surveying in engineering and define basic principles of surveying. 2. Define, understand and apply slope, scale conversions, decimal places and significant numbers in surveying work. 3. Describe types and sources of errors in surveying work and distinguish between accuracy and precision of measurements. 4. Understand and apply on the field various methods of distance measurement for flat and sloping ground. 5. Understand the definition of benchmarks, setting out and basic levelling principles and identify common sources of errors in levelling. 6. Book and reduce levelling data using both the rise and fall and the plane of collimation methods and produce plan, longitudinal and transverse road sections, sewer trench sections, contour formation and measuring headroom of bridges and slabs. 7. Understand and apply the basic principles of Electronic Distance Measurement (EDM), Global Positioning System (GPS) and operate the Total Station for angle and distance measurements. 8. Solve problems for soil volume calculation for earthworks 		
Mode of delivery:	Face-to-face		
Prerequisites:	None	Co-requisites:	None
Recommended optional program components:			
Course contents:	<p><u>Introduction to Surveying and Accuracy of Measurements:</u> Introduction to Land Surveying Science and the art of measurement. Understanding of the relevance of Surveying in Civil Engineering projects and description of the basic principles of surveying. Description of decimal places and significant numbers. Review of related mathematics and trigonometry commonly used in surveying calculations. Description of main types and sources of errors in surveying work. Accuracy and Precision of measurements.</p> <p><u>Distance Measurement:</u> Introduction to distance measurement. Units of measurement and conversion of units. Drawing to scale. Offset and construction of angles using distance measurement. Distance measurement using pacing, chaining and taping. Field application of distance measurement methods for flat and sloping ground. Identification and correction of systematic errors occurring in distance measurement. Distance measurement when obstacles (rivers, lakes etc.) are present but points are visible. Production of drawings and plans based on related field work.</p> <p><u>Levelling Principles and Applications:</u> Introduction to Height measurement and levelling. Definition of benchmarks and temporary benchmarks, setting out and basic levelling principles. Identification and corrections of common sources of errors in levelling. Collimation error and the two peg test. Operation of an optical level instrument for recording heights. Booking and reduction of levelling data, obtained from field work, using both the rise and fall and the plane of collimation methods. Applications of levelling for construction setting</p>		

	<p>out, the creation of longitudinal and transverse road sections, sewer trench sections, contour formation and measurement of headroom of bridges and slabs (reciprocal levelling).</p> <p><u>Modern Surveying equipment (EDM, GPS and Total Station):</u></p> <p>Introduction to modern surveying equipment. Basic principles of Electronic Distance Measurement (EDM) and Global Positioning System (GPS). Solution of problems using field data obtained from EDM and GPS measurements. Description of the various uses of the GPS. Identification of the sources of errors in GPS measurements. Introduction and application of total station for measurement of distances and angles.</p>
Recommended and/or required reading:	
Textbooks:	" Surveying", Bannister, A, Raymond, S. & Baker, R., 7 th ed., Prentice Hall, 1998.
References:	<p>"Surveying for Engineers", Uren, J. & Price, W.F, 4th ed., Palgrave Macmillan, 2005.</p> <p>"Surveying: Principles and Applications" Kavanagh, B.F., 6th ed., Prentice Hall, 2002.</p> <p>"Surveying for Construction" Irvine W. & MacLennan, F., 5th ed., McGraw Hill, 2005.</p>
Planned learning activities and teaching methods:	<p>The course will be presented through formal theoretical lectures and tutorial sessions in class, as well as practical field work with hands-on experience on distance measurement (horizontal and vertical – levelling) instruments by the students. The lectures will present to the student the course content and allow time for questions and discussion. Numerical examples are also solved in class and tutorial questions are provided for private study. 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 (photographs etc) that would otherwise be very difficult to do. Notes shall be taken by the students in class during lectures. In addition, all of the course material, including field work handouts, will be made available through the class website and also through the university's own e-learning platform. The student will contribute throughout the term with the submission of field reports and mid-terms tests. 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"> • Lab Reports 20% • Tests: 30% • Final Exam 50%
Language of instruction:	English
Work placement(s):	No