Course unit title:	Data Acquisition and Automation Systems		
Course unit code:	ACOE347		
Type of course unit:			
Level of course unit:	Bachelor (1st Cycle)		
Year of study:			
Semester when the unit is delivered:			
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Costas Kyriacou		
Learning outcomes of the course unit:	1. List and describe the function of the main components of an automation system. 2. Describe and explain the operation and characteristics of two-state sensors and actuators found in automation and process control systems. 3. Program the PLC using ladder diagrams to control the operation of systems such as a conveyor belt, assembly system, traffic lights etc. 4. Explain what data acquisition is, and distinguish and select between the various systems available for data acquisition applications. 5. Describe the operation and characteristics of various sensors and transducers used in data acquisition systems. 6. Describe the basics of electronic measurements and instrumentation theory with respect to signals, amplification, grounding, noise, conditioning, accuracy and resolution. 7. Explain how analogue signal can be encoded into digital code, and employ sampling theory in data acquisition applications. 8. Design, build, program and test data acquisition and automation systems using industry standard software such as Labview and hardware such as data acquisition cards.		
Mode of delivery:	Face-to-face		
Prerequisites:	ACOE255, AELE231	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Instrumentation Technology:** Elements of measurement systems: transducers, signal conditioners, display/recorder measurement systems. Operation and use of transducers such as strain gauges, thermistors, lvdt's, piezo-electric transducers. Digital to Analog and Analog to Digital Converters, accuracy and resolution of data converters.. • **Automation Systems:** Types of controllers used in automation systems: microprocessors based controllers, computer based controllers, microcontrollers and Programmable Logic Controllers. Characteristics, advantages and disadvantages. Overview of present technology. Types of sensors and actuators used in automation systems. • **Programmable Logic Controllers:** Hardware components of PLCs: CPU, Memory, I/O Interfacing. Programming of PLCs: Use of instruction sets, ladder diagrams and combination logic design techniques. Applications using timers, set/reset, shift, registers, sequential control techniques and analogy input/output. PLC communications (RS 232 - RS 422/ER3) • **Laboratory Work:** Individual or small group experiments performed on microcomputers, equipped with data acquisition cards and software such as		

	Labview, as well as programmable logic controllers related to real world applications.
Recommended and/or required reading:	
Textbooks:	ACOE347 Laboratory Manual
References:	Grispin, **Programmable Logic Controllers and their engineering applications**, McGraw Hill 2001.
Planned learning activities and teaching methods:	The underlining theory of the course is delivered to the students during lecture sessions, through electronic presentations. After acquiring the theoretical background, students carry out laboratory work that includes the implementation of a predefined procedure and the completion of a design task. Typically, a 2-hour lecture session proceeds a 2-hour laboratory session.
Assessment methods and criteria:	• Tests: 30% • Laboratory Work: 50% • Class Project 20%
Language of instruction:	English
Work placement(s):	No