Course unit title:	**Embedded Systems**		
Course unit code:	AEEE396		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	2		
Semester when the unit is delivered:	4		
Number of ECTS credits allocated :	5		
Name of lecturer(s):	Dr. Haris Haralambous		
Learning outcomes of the course unit:	1. Distinguish between computers and embedded systems in terms of implementation and constraints. 2. Demonstrate the concept of real-time processing and identify the strengths and limitations of microcontrollers.Describe the internal structure and operation of a CPU datapath and design a simple single-cycle and a multi-cycle non-pipelined CPU. 3. Produce efficient real-time designs using microcontroller processors. 4. Demonstrate real-time algorithmic design techniques for embedded applications using assembly programming. 5. Implement and test real-time control applications.		
Mode of delivery:	Face-to-face		
Prerequisites:	AEEE294	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	• **Introduction to Embedded Systems Design:** Introduction to embedded processor/ microcontroller systems. Design considerations. Microcontroller and microprocessor differences. Microcontroller families. • **Embedded System Architecture:** Architecture of CPU, I/O interface, system memory, busses and timer. Harvard and Princeton Architectures. Complex instruction set computing and reduced instruction set computing architectures. • **8051-Based Microcontrollers:** The 8051 microcontroller system, real-time input and output applications. CPU timing and the instruction cycle. The quartz crystal oscillator. Pin allocation of the 8051 IC. Analysis of the special function registers and flags. • **Assembly Programming:** Manipulation of register banks and stacks memory. Loop and call instructions. Creating time delays and calling subroutines. I/O programming, bit manipulation. Arithmetic and Logic functions, signed and unsigned addition and multiplicatio. • **Applications:** Serial Communication programming. Real world interfacing. Interfacing LCD. Control of stepper motor.		
Recommended and/or required reading:			
Textbooks:	Muhammad Ali Mazidi, The 8051 Microcontroller and Embedded Systems, Prentice Hall, 2000.		
References:	T. Noergaard, Embedded Systems Architecture: A Comprehensive Guide for Engineers and Programmers, Newnes, 2005.		

Planned learning activities and teaching methods:	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks.
Assessment methods and criteria:	• Tests: 40% • Final Exam 60%
Language of instruction:	English
Work placement(s):	No