

## MODULE DESCRIPTOR

|                     |                         |                     |                      |
|---------------------|-------------------------|---------------------|----------------------|
| <b>MODULE TITLE</b> | MICROCONTROLLER SYSTEMS |                     |                      |
| <b>MODULE CODE</b>  | EL3250 (L6)             | <b>CREDIT VALUE</b> | 20 CREDITS / 10 ECTS |
| <b>CAMPUS</b>       | UCLAN CYPRUS            |                     |                      |
| <b>SCHOOL</b>       | SCHOOL OF SCIENCE       |                     |                      |

### MODULE AIMS

To provide students with the competence to design and implement a microcontroller system through the acquisition of skills in embedded software development and hardware interfacing.

### MODULE CONTENT

Characteristics of modern 32 bit microcontrollers and their instruction sets.  
 Instruction set efficiency and density.  
 Flash memory, SRAM, Cache and Memory Accelerator Modules.  
 External memory controllers and interfacing. Address decoding.  
 I/O Ports and interfacing.  
 Characteristics and programming of common I/O devices.  
 Network and serial communication systems (e.g. CAN, I2C, SPI).  
 Analogue to digital and digital to analogue conversion.  
 Transistor switching circuits and I/O drivers.  
 Real Time clocks.  
 Watch Dog Timers.  
 System clock and power on reset.  
 SWD in system programming.  
 Embedded In Circuit Emulation.  
 Strategies for power conservation, PLL and peripheral clocks.  
 Event Driven Software Systems.  
 Interrupt structures, fast interrupts, vectored interrupt controllers, interrupt priorities.

### INTENDED LEARNING OUTCOMES

| On successful completion of this module a student will be able to: |  |
|--|--|
| 1.   | Evaluate current applications, trends and new directions in micro-controller systems   |
| 2.   | Evaluate the internal architectural features and common characteristics of modern micro-controllers.                               |
| 3.   | Design, breadboard and program a micro-controller system.  |
| 4.   | Evaluate and use various IO devices (e.g. keypads, ADC, LCD modules, relays).  |
| 5.   | Design basic IO device drivers (e.g. I <sup>2</sup> C, SPI, CAN) and a embedded system that will respond to peripheral interrupts. |

### TEACHING METHODS

Regular lectures are scheduled to present theoretical aspects of the syllabus.

### ASSESSMENT METHODS

This module is assessed through an end of year examination (75%) and a practical assignment (25%).