--MODULE **DESCRIPTOR**

MODULE TITLE	Digital Systems		
MODULE CODE	EL2242 (L5)	CREDIT VALUE	20 UK CREDITS / 10 ECTS
SCHOOL	SCHOOL OF SCIENCES		

MODULE **AIMS**

To develop students' digital system design skills, enabling them to effectively implement a digital system in dedicated hardware or a micro-controller system; as appropriate.

MODULE **CONTENT**

Indicative syllabus content:

State Machines.
Introduction to a Hardware Description Language (HDL)
Programmable Logic architectures.
Introduction to digital CMOS technology, CMOS logic circuits and devices.
Interfacing – fan-out and noise margins.
Open drains, tri-states and busses.
Power consumption, propagation delays, set-up and hold timing.
Display devices and interfacing (leds, LCD modules, LCD character displays)
Single chip microcontrollers (e.g. low pin count devices)
Memory interfacing. JEDEC standard memory packaging. Memory types (e.g. SRAM, DRAM, EPROM, Flash) and characteristics.
GPIOs and interfacing.
UARTs.
Counter/Timers.
High level language to configure and operate I/O peripherals (programmed I/O)
Event Driven Systems and programming.
Interrupt Service Routines, context switching, register banking and re-entrancy.
Interrupt latency and recovery.

INTENDED **LEARNING OUTCOMES**

On successful completion of this module a student will be able to:

1. Design and synthesise a finite state machine and specify the behaviour of a digital system using a hardware description language.
2. Design a digital system and its interface to external hardware.
3. Configure and use a range of common micro-controller peripherals (e.g. GPIOs, timers, UARTs and ADCs/DACs) using a high level programming language.
4. Design, simulate and test a programme for deployment in an embedded micro-computer.
5. Design an event driven micro-computer system using a high level programming language.

TEACHING METHODS

There will be an emphasis on the development of design and practical skills. Lectures will introduce and explain concepts that will be illustrated by exercises and reviews. Practical work will be based on two design studies which will incorporate design, build, test and evaluation of the finished system.

ASSESSMENT METHODS

This module is assessed through a coursework and an examination.