Anglia Ruskin University

Module Definition Form (MDF)

Module Code: **ED215023S**	Version: 1 Date amended: 9th December 2005

1. Module Title: *maximum 100 characters*
Microprocessor Systems Design

2a. Module Leader:	**2b. Department:**	**2c. Faculty:**
R Toulson	Computing and Technology	Science and Technology

3a. Level: *see guidance notes*	**3b. Module Type:** *see guidance notes*
2	Standard

4a. Credits: *see guidance notes*	**4b. Study Hours:** *see guidance notes*
15	150

5. Restrictions	
Pre-requisites:	A good understanding of basic digital electronics and binary numbers. Normally achieved via successful completion of appropriate Level 1 modules.
Co-requisites:	
Exclusions:	
Pathways to which this module is restricted:	

LEARNING, TEACHING AND ASSESSMENT INFORMATION (for inclusion in the Module Guide)

6a. Module Description: *200 – 300 words*

In this module the student will develop an in-depth understanding of microprocessor system and its relation to the design of modern digital systems. Hands-on programming and simulation of the operation of a commercial microprocessor will be an important part of this module.

The module covers different microprocessor architectures, and core elements like ALU, CU, BIU, memories, caches, pipelines, superscalar architectures, RISC and CISC.

Real time and non real time hardware and software requirements for embedded microcontroller systems are presented and the relationship between system performance and hardware and software interface is covered.

The module delivery strategy combines complex theoretical aspects and case studies presented during lectures, with practical skills - hands on supervised and unsupervised laboratory work, using state-of-the art industry standard CAD tools.

The module is assessed by coursework assignments based on short reports, computer demonstration, personal interview and exam. This combination of assessment methods aims to enhance communication skills and to avoid plagiarism. Students are encouraged to take responsibility for their assignments and to work in their own time as well as during the timetabled classes. The successful completion of this module will increase students' employability, who will acquire industry standard skills, directly applicable to real world projects.

6b. Outline Content:

- Microprocessor System Architecture.
- Basic building blocks (CPU, Memory, Caches, Bus, Peripherals)
- Address decoding.
- Bus Timing.
- I/O parallel and serial
- Polling & Interrupts.
- Subroutines and Stack Management.
- Software to support embedded system design.
- DMA, RISC, CISC, DSP, co-processors and hardware accelerator architectures

6c. Key Texts/Literature:

Wilson, G (2002) Embedded Systems & Computer Architectures. Newnes
Patterson D. and Hennessy J. Computer Organization and Design, Elsevier. Third Edition,
Patterson D. and Hennessy J. Computer Architecture: A quantitative Approach, Elsevier. Third Edition,
Bolton,W (2000) Microprocessor Systems. Longmans
http://www.microchip.com/ (PIC Website)

6d. Specialist Learning Resources:

Laboratories, computers, hardware, software, test equipment as appropriate.

7. Learning Outcomes (threshold standards):

	On successful completion of this module the student will be expected to be able to:
Knowledge and understanding	1. Design a small microprocessor system 2. Write well structured software to support I/O devices and interrupt driven real time systems 3. Analyse different processors' architectures
Intellectual, practical, affective and transferable skills	4. Use modern industry standard CAD tools for electronic system design, including integrated development environment for microprocessor design (IDE), proving the ability to design, develop and implement sample electronic systems and evaluate the results.

8. Learning Activities

Learning Activities	Hours	Learning Outcomes	Additional Comments (including details of use of web-CT)
Lecture:	18	All	
Laboratory:	18	All	
Student managed learning:	114	All	
TOTAL	150		

9. Assessment

Assessment Method	% contribution to module mark or P/F	Learning Outcomes
Coursework assignments based on short reports, computer demonstration and personal interview (questions).	50 %	All
Exam	50 %	1 – 2- 3

In order to pass this module, students are required to achieve an overall mark of 40%
In addition, students are required to (a) for each element of fine graded assessment listed above, achieve a minimum mark of 30% (or higher - see Module Guide) and (b) pass any pass/fail elements

OTHER TECHNICAL DETAILS

10. Delivery of the Module *Please delete as appropriate*

Delivery	*This module is delivered over…*	*Yes or No?*	*Indicate which by deleting as appropriate*	
1	**…a single semester**	Y	~~Semester 1~~	Semester 2

11. Learning Activities – further details

Learning Activities	Details of duration and frequency of learning activities
Teacher managed learning:	First 12 weeks: lectures of 1.5 h First 12 weeks: laboratory (supervised and unsupervised) of 1.5 h
Student managed learning:	114 hours spread across the semester (6 hours each Week for 12 weeks), with 42 hours extra in the last 4 weeks before the exam week.

12. Module Assessment – further details

Method	Length/duration	Fine graded (FG) or pass/fail (PF)	Minimum Qualifying Mark *see guidance notes*	Comments
Coursework assignments based on short reports, computer demonstration and interview	1,000 words report (excluding code listing) supported by individual interview of 15 minutes.	FG	30%	
Exam	2 hours	FG	30%	

13. Subject: *see guidance notes*