MODULE SPECIFICATION

Part 1: Information			
Module Title	Embedded Systems Development 1		
Module Code	UFMFPQ-15-3	Level	Level 6
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		

Pre-requisites	None
Excluded Combinations	None
Co- requisites	None
Module Entry requirements	None

Part 2: Description

Overview: This module covers the concepts, tools and techniques necessary for the development of real-time and embedded systems.

Educational Aims: The Embedded System development module will allow students to study the role of hardware and software in developing the functional behaviour of microprocessor systems. The module also provides an introduction to hardware analysis, software requirements, design methodologies necessary for the development of a typical embedded systems product.

Outline Syllabus: A group design & build project will require students to organize and manage themselves into effective
teams.

This will involve: arranging and holding regular meetings, time planning, work allocation, document production, analytical review of the development process.

Concurrent Systems: Intellectual simplicity or system responsiveness; The interleaving problem; Centralized I/O management; Concurrent processes; varying priorities; Scheduling with pre-emption and time-slicing.

Choice of languages for Real-time Systems implementations: The requirements for real-time

systems; Choosing a compiler.

Using a data-flow method for design, eg Ward-Mellor/Yourdon: Diagrams; pseudo-code text; hierarchical design capture; Transformation to code modules; Run-time support facilities; Process communication/synchronization methods.

Teaching and Learning Methods: See Learning Outcomes

Part 3: Assessment

The assessment will demonstrate the learning outcomes by taking an implementation approach which allows the students, through the course of the module, to build on their learning and demonstrate it through the development of a software artefact.

An outline case-study specification will be provided, such as: POS retail network, a distributed Conference support system, or a Secure Access Control System. Students will work in small groups to progressively carry out the series of steps for initial prototype development.

The students are encouraged to document the development process as they go and this too contributes to the final module assessment. The individual's contribution to that group is assessed through an individual statement, verified by other group members' reports. The process is assessed via a record of group review meetings and a final group presentation. The product itself is assessed through a demonstration. Plagiarism is 'designed out' both because the students have to present their work and also because of the bespoke nature of the artefacts produced.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Presentation - Component A		75 %	Group demonstration and presentation
Report - Component A		25 %	Final report (approx. 2000 words + programme code as appropriate) documenting processes undertaken, design strategies and evidence of output produced. Report will contain individual statements from team members to justify their contributions (no more than 250 words).
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Presentation - Component A		75 %	Individual demonstration and presentation
Report - Component A		25 %	Final report (approx. 1500 words + programme code as appropriate) documenting processes undertaken, design strategies and evidence of output produced.

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Choose and use appropriate software design methods for concurrent and control systems development	MO1
Design and develop a computer system for an embedded application.	MO2
Recognise and deal with the inherent complexity of an embedded system	MO3
Explore and integrate considerations and issues relating to embedded systems such as hardware choice, software tools, safety, reliability, power consumption	MO4
Investigate and understand the role of real time operating system in embedded systems	MO5
Work with colleagues and others, including sector experts and reflect on the successes failures therein	MO6

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	46
Total Independent Study Hours:	46
Placement Study Hours:	
Placement	56
Total Placement Study Hours:	56
Scheduled Learning and Teaching Hours:	
Face-to-face learning	48
Total Scheduled Learning and Teaching Hours:	48
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards
This module contributes towards the following programmes of study: