



## MODULE SPECIFICATION

Part 1: Information			
Module Title	Safety Critical Embedded Systems		
Module Code	UFMF7D-15-M	Level	Level 7
For implementation from	2019-20		
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
<p><b>Educational Aims:</b> See Learning Outcomes</p> <p>In addition, the educational experience may explore, develop, and practise but not formally assess the following:</p> <p>Understanding of the need for high-level professional and ethical conduct.</p> <p><b>Outline Syllabus:</b> The syllabus includes:</p> <p>Real Time Programming:            The use of a compiled high level language (for example C) to effect processing and decision-making in a realtime system.            Use of language subsets for safety critical systems eg MISRA C.            Use of development tools to support best practice, such as IDEs (Integrated Development Environments), version control systems, bug and change tracking            Design methodologies and techniques for embedded development e.g. UML for real-time systems. Design for debug, user interface design.            Use of a real-time executive.</p>

## STUDENT AND ACADEMIC SERVICES

Safety Critical Design:  
 Hazard analysis techniques  
 Examination of robust design, failure tolerance and failure recovery  
 Use of Standards such as DO-178B, IEC61508  
 High level design tools, auto generation of code

**Teaching and Learning Methods:** See Assessment

### Part 3: Assessment

The module will be assessed in two components.

(Component A): Research an embedded systems failure reported through an individual presentation.

(Component B): Demonstration of an innovative solution to a design problem along with submission of a log book.

Formative assessment will be provided as oral feedback throughout the laboratory sessions particularly with respect to the design development and the log-book entries.

Students will also be assessed in their effective use of the test and verification tools, the quality of their programme design and documentation.

Formative feedback will be provided during the laboratory sessions and tutorials.

First Sit Components	Final Assessment	Element weighting	Description
Report - Component B		75 %	Logbook showing development process and demonstration of final product
Presentation - Component A	✓	25 %	Oral presentation
Resit Components	Final Assessment	Element weighting	Description
Set Exercise - Component B		75 %	Design exercise and demonstration
Presentation - Component A	✓	25 %	Oral presentation

### 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
	Investigate a problem and define constraints relating to safety, risk and environmental issues through the use of relevant techniques	MO1
	Apply modelling techniques to evaluate the performance of embedded systems	MO2
	Utilise concepts from outside of engineering and apply them to engineering problems	MO3
	Show awareness of relevant legal and ethical requirements relating to safety and the ability to evaluate risks	MO4
	Demonstrate a thorough understanding of current practice in embedded system design	MO5
	Awareness of developing technologies related to the of safety critical embedded systems	MO6

## STUDENT AND ACADEMIC SERVICES

Contact Hours	<b>Independent Study Hours:</b>	
	Independent study/self-guided study	126
	<b>Total Independent Study Hours:</b>	126
	<b>Scheduled Learning and Teaching Hours:</b>	
	Face-to-face learning	24
	<b>Total Scheduled Learning and Teaching Hours:</b>	24
	<b>Hours to be allocated</b>	150
	<b>Allocated Hours</b>	150
Reading List	<p><i>The reading list for this module can be accessed via the following link:</i></p> <p><a href="https://uwe.rl.talis.com/modules/ufmf7d-15-m.html">https://uwe.rl.talis.com/modules/ufmf7d-15-m.html</a></p>	

### Part 5: Contributes Towards

This module contributes towards the following programmes of study: