Module Specification

Embedded Systems Development 1

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Part 1: Information

Module title: Embedded Systems Development 1

Module code: UFMFPQ-15-3

Level: Level 6

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

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

Features: Not applicable

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.

Part 3: Teaching and learning methods

Teaching and learning methods: See Learning Outcomes

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

MO1 Choose and use appropriate software design methods for concurrent and control systems development

MO2 Design and develop a computer system for an embedded application.

MO3 Recognise and deal with the inherent complexity of an embedded system

MO4 Explore and integrate considerations and issues relating to embedded systems such as hardware choice, software tools, safety, reliability, power consumption

MO5 Investigate and understand the role of real time operating system in embedded systems

MO6 Work with colleagues and others, including sector experts and reflect on the successes failures therein

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 46 hours

Placement = 56 hours

Face-to-face learning = 48 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/index.html

Part 4: Assessment

Assessment strategy: 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.

Consistent with the largely practical approach of this module, a relatively lowly weighted exam (25% of
the module) assesses the more theoretical element.

Assessment components:

Examination (Online) - Component A (First Sit)
Description: Online exam: 4 hours
Weighting: 25 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO3, MO5

Report - Component B (First Sit)
Description: 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).
Weighting: 38 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO6

Presentation - Component B (First Sit)
Description: Group demonstration and presentation
Weighting: 37 %

Final assessment: No
Group work: Yes
Learning outcomes tested: MO2, MO4

Examination (Online) - Component A (Resit)
Description: Online exam: 4 hours
Weighting: 25 %
Final assessment: Yes
Group work: No
Learning outcomes tested:

Report - Component B (Resit)
Description: 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).
Weighting: 75 %
Final assessment: No
Group work: No
Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs] BEng (Hons) 2018-19