

Module Specification

Embedded Real Time Control Systems

Version: 2023-24, v3.0, 11 May 2023

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Part 1: Information

Module title: Embedded Real Time Control Systems

Module code: UFMFTC-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: The module describes in detail a high performance digital signal processing controller and how to use it in real time embedded applications.

Features: Not applicable

Educational aims: In addition to the Learning Outcomes the educational experience may explore, develop, and practise but not formally assess the following:

Page 2 of 6 29 June 2023 Understanding of the need for high level professional and ethical conduct.

Outline syllabus: This module includes topics such as:

The architecture of a high performance digital signal processor controller (DSC).

Processor's peripherals involved in real time system control applications.

The DSC design flow.

Combining hardware and software to achieve optimal control implementations in embedded applications.

Use a front-end DSC integrated development environment.

Programming, debugging and Implementing DSP and control algorithms in hardware.

Use a predefined digital control library to shorten the design cycle (filter library, control library etc).

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled Learning in the form of lectures, tutorials, demonstrations and independent learning laboratory work.

Independent Learning will include directed reading, tutorial exercises, general reading of trade journals, academic papers and other texts.

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

MO1 A comprehensive knowledge and understanding of mathematical models used in digital control and digital signal processing,

Page 3 of 6 29 June 2023 **MO2** An understanding of basic DSP structure and the ability to use it in real time applications.

MO3 The ability to use development tools to design, program, implement and test real time systems.

MO4 The competencies involved in problem identification, analysis, design development of a DSP based system.

MO5 Knowledge and understanding of DSP development systems for designing and testing a real time application.

MO6 Competence in using technical literature and the ability to obtain documentation from various sources.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 126 hours

Face-to-face learning = 24 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link <u>https://uwe.rl.talis.com/modules/ufmftc-15-m.html</u>

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

A formal exam (180 minutes).

Lab-based project: students have to design; test and document a real time embedded system and demonstrate it in the lab at the end of term.

Formative assessment will be provided in laboratory sessions and tutorials

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Resit is the same as the first sit

Assessment tasks:

Practical Skills Assessment (First Sit)

Description: Demonstration of a real time embedded system Weighting: 50 % Final assessment: No Group work: No Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6

Examination (Online) (First Sit)

Description: Online Exam (3 hours) Weighting: 50 % Final assessment: Yes Group work: No Learning outcomes tested: MO1, MO2, MO3, MO5

Practical Skills Assessment (Resit)

Description: Demonstration of a real time embedded system Weighting: 50 % Final assessment: No Group work: No Learning outcomes tested:

Examination (Online) (Resit)

Description: Online Exam (3 hours) Weighting: 50 % Final assessment: Yes Group work: No Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study: Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21 Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20