Module Specification

Embedded Systems

Version: 2024-25, v2.0, 03 Oct 2023

Contents

Part 1: Information

Module title: Embedded Systems

Module code: UFMF11-15-2

Level: Level 5

For implementation from: 2024-25

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

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 builds on prior knowledge covered in Applied Electronics and Programming modules in Year 1. Students will learn to design software and hardware subsystems which are commonly encountered in embedded system. A design project encompasses multiple subsystems.

Embedded Systems are integral to most high-tech hardware applications including automobile, aeroplanes, robotics, rail networks, communication devices. This module

teaches embedded systems hardware and software design for problems encountered in these applications.

Features: Not applicable

Educational aims: This module aims to develop the students understanding in embedded systems from the knowledge gained at level 4.
This module introduces the different subsystems for interfacing sensors and actuators, their programming and hardware interface. It further enhances the knowledge of embedded systems programming using a high-level language.

Outline syllabus: Bit banging using C

Memories of micro-controllers

Analogue and digital subsystems of a micro-controller

Hardware interface for sensors and actuators

Software interface for micro-controller subsystems

Interrupt-driven programming

Modelling of behaviour of embedded systems

Verification tools and techniques

Part 3: Teaching and learning methods

Teaching and learning methods: The delivery is intended to ensure that students have opportunity to develop practical lab-based skills alongside theoretical understanding of embedded systems design principles through integrated theory and laboratory sessions.

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

MO1 Demonstrate the understanding of the functionalities of the subsystems of an embedded system

MO2 Design hardware and software for interfacing sensors and actuators to embedded systems

MO3 Apply quantitative methods and integrated development tools relevant to the design of embedded systems

MO4 Demonstrate ability in the use of oscilloscopes, logic analysers, and development tools for embedded systems

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Laboratory work = 24 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/942EBEB1-14F5-90A4-D788-8246722A54EE.html?lang=en&login=1

Part 4: Assessment

Assessment strategy: The assessment strategy recognises the fact that the module has many quite diverse topics requiring both, hardware and software design. It uses a portfolio approach whereby the students are required to complete a number of individual tasks that are centred around the individual Input/Output subsystems of typical embedded systems. Included is a final project that encompasses many of the topics assessed earlier and provides a summary assessment.
A laboratory exam assesses the student's ability to design hardware and software subsystems for real-world applications.

The resit strategy uses the same approach with a portfolio of individual tasks and a final project and a laboratory exam.

Assessment tasks:

Examination (First Sit)
Description: Examination of analysis and design skills in the laboratory (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO4

Portfolio (First Sit)

Description: Portfolio consisting of individual and progressively more challenging design assignments and theoretical exercise problems culminating in a design project.

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)

Description: Examination of analysis and design skills in the laboratory (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO4

Portfolio (Resit)

Description: Portfolio consisting of individual and progressively more challenging design assignments and theoretical exercise problems culminating in a design project.

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electrical and Electronic Engineering [Frenchay] BEng (Hons) 2023-24