



Module Specification

Mobile and Embedded Devices

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Part 1: Information

Module title: Mobile and Embedded Devices

Module code: UFCFW5-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Computer and Network Systems 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Pre-requisites: students must take one out of UFCF93-30-1 Computer and Network Systems or UFCFGL-30-1 Programming in C++

Features: Not applicable

Educational aims: See Learning Outcomes.

In addition, the educational experience may explore, develop, and practise but not

formally discretely assess the following:

Working as a member of a team.

Outline syllabus: The syllabus includes:

History of mobile devices.

Architecture of low powered mobile system, exemplified by the ARM-Cortex-M3 processor. Advanced architectures, exemplified by ARM-Cortex A9

The nature of security in embedded and network systems

Cross development and cross compilation

Booting embedded systems

JTAG - controlling dead or locked systems - system initialisation, security implications

Memory technologies at the device level - Flash, SD

Networking technologies - wired and wireless

Configuring and building embedded OS

File systems for embedded systems on a range of devices

Open source development methodologies. Working in OS communities, responsibilities, professionalism and legal implications.

Embedded OS - Linux kernel programming, Linux kernel modules, security concerns

Embedded OS – Android: architecture, programming, security concerns

Reliability of mobile data – jamming devices

File Systems - secure and journaling file systems

Power saving features of mobile and embedded systems: Booting, suspending, sleeping and hibernating

Mobile wireless technology: Wireless and GPS.

Part 3: Teaching and learning methods

Teaching and learning methods: For the most part the course will be delivered through practicals and lectures. The theoretical content will be covered in lectures. In the practical sessions students will gain understanding through designing, implementing, analysing and investigating mobile systems and/or simulations of

mobile systems. Students will be expected to work in groups and, as part of the learning process, to present their work to their peers. The practical sessions will be delivered in such a way that the student is able to focus on activities that most closely align with their degree programme.

The module delivering will therefore include:

Scheduled learning - lectures, demonstrations, practical classes and workshops;

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc.

The lecture series will be supported by weekly practical sessions in which the students have the opportunity to apply some of the concepts discussed during the lecture series. The practicals will allow the students to explore and debug mobile devices and/or device simulations using a range of tools.

Contact Hours:

This module will involve 6 hours contact time per fortnight. The time will be divided between lecture sessions and laboratory sessions.

Module contact time = 72 hours

Over the course of the academic year students should expect to spend approximately:

Activity

Contact time: 72 hours

Assimilation and development of knowledge: 148 hours

Exam preparation: 40 hours

Coursework preparation: 40 hours

Total study time: 300 hours

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

MO1 Understand the characteristics of memory in low-powered mobile and embedded technology

MO2 Analyse and manipulate higher-level software architectures, file systems and memory

MO3 Develop software for mobile and embedded devices for a range of purposes

MO4 Explore booting and system initialisation in a range of devices

MO5 Appraise the role of device drivers in mobile and embedded systems

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufcfw5-30-2.html) via the following link <https://uwe.rl.talis.com/modules/ufcfw5-30-2.html>

Part 4: Assessment

Assessment strategy: In common with many modules that form part of a computing degree, this module aims to equip students with a theoretical understanding that will underpin their mastery of a set of practical skills. In this way, students will be able to extend their practical skills, transfer them to alternative tools and reflect on problems that arise as those skills are applied. The assessment strategy reflects this overarching aim in that students are assessed by examinations and by a piece of practical work.

The assessments are conducted via two tasks in both first sit and resit: (1) A two hour written examination to test theoretical skills, and (2) a portfolio of individual practical works.

Assessment tasks:

Examination (First Sit)

Description: Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Practical Skills Assessment (First Sit)

Description: Individual practical work

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Examination (Resit)

Description: Examination (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Practical Skills Assessment (Resit)

Description: Individual Practical work

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Security and Forensics {Foundation} [Feb][FT][GCET][4yrs] BSc (Hons)
2021-22

Computer Security and Forensics {Foundation} [Oct][FT][GCET][4yrs] BSc (Hons)
2021-22