



Module Specification

Designing and Developing Device Drivers

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Part 1: Information

Module title: Designing and Developing Device Drivers

Module code: UFCFX4-15-3

Level: Level 6

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Not in use for Modules

Field: Computer Science and Creative Technologies

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: Not applicable

Features: Not applicable

Educational aims: This module intends to give the students an in depth practical course in device driver development for general purpose operating systems. The work will be located in the academic field of operating systems development but the

emphasis will be on the practical difficulties in implementing and maintaining system interfaces for heterogeneous and rapidly changing collections of devices. The relationship of devices to the various sub systems within operating systems will be explored and criticised.

The interaction of devices and buses will be examined. The students will develop a practical appreciation of the subject through the laboratory work which will involve the students writing an OS device driver from scratch. Strategies for testing and debugging will be covered as well as documentation standards through either modification of kernel code or through supplemental systems.

In addition the educational experience may explore, develop, and practise but not formally discretely assess the following:

Understand the need to work effectively with colleagues within a team

Outline syllabus: Topics covered will include:

Operating Systems and device drivers :

OS models, HALs types of OS – monolithic, microkernel, distributed device drivers and file systems, devices and buses

Device driver internals:

Device driver models, interfacing to the OS, interrupt and polled devices, DMA, accessing and managing kernel memory

Device driver development:

Finding information on devices, creating a device driver from data sheets, partitioning the driver, testing, debugging and documenting, optimisation and performance

Device driver examples:

Device drivers and system initialisation, I2C, SPI I2S device driver, codec device drivers, network device drivers, graphics drivers

Part 3: Teaching and learning methods

Teaching and learning methods: The course will be paced through lectures, with group practicals and individual assignments providing a broadening experience. The theoretical content, introduced in lectures, will be reviewed in seminars. Personal work time will be used for background reading, report writing and preparation for laboratories.

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

MO1 Master the practical difficulties of implementing system interfaces for heterogeneous and rapidly changing collections of devices.

MO2 Understand the requirements and functionality of device drivers

MO3 Recognise and manipulate the relationship between device drivers and operating systems

MO4 Develop, including debugging, testing and documenting, a device driver

MO5 Benchmark competing device drivers

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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

Part 4: Assessment

Assessment strategy: The students will be assessed through a mix of practical assignment tasks and an examination. The practical tasks are designed to be completed over the course of the module, rather than as a piece of increased effort near the end of the teaching. This approach is taken to ensure sustained student engagement and to allow the student to demonstrate their mastery of a number of practical skills.

The more theoretical aspects of the course are assessed in the exam.

Assessment components:

Practical Skills Assessment (First Sit)

Description: Practical coursework

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Online) (First Sit)

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO5

Practical Skills Assessment (Resit)

Description: Practical coursework

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested:

Examination (Online) (Resit)

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study: