WM144-18 Operating Systems in the Cyber Context

24/25

Department
> WMG

Level
> Undergraduate Level 1

Module leader
> Sarah Aktaa

Credit value
> 18

Module duration
> 30 weeks

Assessment
> Multiple

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

An operating system performs two main tasks. Firstly, it provides a simplified, logical view of a computer where the quirks of particular hardware devices and the intricacies of their use are hidden behind consistent software interfaces. The operating system also provides several powerful, simplifying views of aspects of the computer such as files, folders and processes, none of which actually exists. Secondly, it manages the resources offered by a computer, making sure that, if there are several active users, they get their fair share of the CPU, memory, storage and peripherals. Even if there is only one user, they may be running several programs at once and the operating system will manage the competing demands from each program. This module will outline the principles of how an operating system is constructed, how it works, and its critical role in cyber security. This module gives a solid understanding of how a modern operating system satisfies its requirements in the cyber context.

Module aims

Articulate the key principles behind the organisation and operation of a typical general-purpose operating system.
Explain how simple process, memory and file management algorithms and data structures work.

Select and apply security and protection mechanisms.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Outline content
The content of this module will be taught from a cyber security perspective.

- Overview of operating systems
- Operating system principles
- Concurrency and synchronisation
- Scheduling and dispatch
- Memory management
- Security and protection
- File systems
- Interaction and network communication

Learning outcomes

By the end of the module, students should be able to:

- Articulate the key principles behind the organisation and operation of a typical general-purpose operating system.
- Explain how simple process, memory and file management algorithms and data structures work.
- Select and apply security and protection mechanisms.

Indicative reading list

Love, Robert, "Linux System Programming: Talking Directly to the Kernel and C Library", 2 Ed, O'Reilly (2013)

Silberschatz, Abraham, Galvin, Peter B., Gagne, Greg, "Operating System Concepts", 9 Ed, Wiley (2013)

Tanenbaum, Andrew S., Bos, Herbert, "Modern Operating Systems", 4 Ed, Pearson (2014)

Subject specific skills

Articulate the key principles behind the organisation and operation of a typical general-purpose operating system.
Explain how simple process, memory and file management algorithms and data structures work.
Select and apply security and protection mechanisms.

Transferable skills

Critical thinking

Study

Study time

Type	Required
Supervised practical classes	18 sessions of 3 hours (56%)
Private study	43 hours (44%)
Total	97 hours

Private study description

Independent activity between workshops.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A2

	Weighting	Study time
Coursework	30%	43 hours

This might be a visual representation in the form of a poster/info-graphic relating to the operation and organisation of a general-purpose operating system.

	Weighting	Study time
Coursework	70%	43 hours

The report may require the student to explain and articulate the lifecycle of a process that starts and terminates at the command line.

Assessment group R1

	Weighting	Study time
Coursework (Resit)	100%	

Feedback on assessment

Written feedback for each assignment

Verbal feedback during tutorial sessions
Solutions provided to tutorial questions
Summative feedback on assignments and exam

Availability

Courses

This module is Core for:

- UWMA-H651 Undergraduate Cyber Security
  - Year 1 of H651 Cyber Security
  - Year 1 of H651 Cyber Security
  - Year 1 of H651 Cyber Security