

Module Title:	Computer Architecture and Operating Systems
Module Code:	06C
Level:	4
Credits:	15
Pre-Requisites:	None

Module Description:

This course is designed to introduce students to the basics of computer architecture and operating system. A key aim for this module is to equip students with a vocabulary and a core set of concepts that can be used in subsequent modules to aid explanation and understanding.

Where possible a non-mathematical, descriptive approach is taken. The emphasis is on actual cases, from which principles will be drawn.

The subject is dealt with in layers: moving up from bits and bytes, through gates, representation and operations to buses and processors and the treatment of operating systems is incorporated into this layered approach.

Simple low-level programming is introduced, with a simulator on an idealised virtual processor, as an aid to demonstration and exploration of the concepts of this and some subsequent modules, rather than in the expectation that students will become fully competent assembler programmers.

The purposes and functions of operation systems are introduced with installation practices.

Indicative Content:

Logic

- Boolean logic principles and logic gates
- Data representation: unsigned, twos complement, ASCII, floating point
- Binary, Denary, and Hex representations

Processor and Memory

- Explain the difference between memory mapped and interrupt-driven i/o access
- a simple idealised, non-pipelined processor
- fetch-execute cycle including the use of buses
- Computer system at block diagram level
- Memory devices and memory systems

Module Specifications: *Schools of Business & Management & Information Technology*

I/O and Peripherals

- Peripheral devices
- I/O access, interrupt, DMA

Operating System

- Purposes and main functions of Operating Systems
- Evolution of Operating Systems
- Operating systems installation
- Operating systems administration, Active Directory
- Safety precautions

Learning and Teaching Methods:

Lectures, workshops and labs will be used. Simulators will be used where these simplify concepts and speed up recovery from, and lessen consequence of, errors. Students will be encouraged to work in small groups in practical sessions to encourage discussion and peer support.

Specific Learning Resources:

Environment in which an operating system can be installed

A simulator for low-level I/O programming

A simulator for investigating logic gates

Bibliography

Highly Recommended

Englander, I. (2014) *The Architecture of Computer Hardware, Systems Software, and Networking: An Information Technology Approach*. (5th Edition). USA: John Wiley & Sons

Recommended

Paterson, D., Hennessy, J. (2013) *Computer Organization and Design: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design)*. USA: Morgan Kaufmann Publishers Inc.

Tanenbaum, A. (2013) *Modern Operating Systems*. Harlow: Pearson Education Ltd

Background Reading

Bucaro, S. (2014) *Computer Architecture*. bucarotechelp.com [Kindle Edition]

Latest operating system installation and user manuals

Module Learning Outcomes

Module Specifications: Schools of Business & Management & Information Technology

Subject Specific Learning Outcomes

On successful completion of this module you will be able to:

LO	Describe the role of logic, data representation and operations within a computer system architecture
LO	Describe the architecture, purposes and main functions of operating systems
LO	Explain the installation, configuration and administration of an operating system

Assessment Title or element	Weighting (%)
Assignment 1: assessed workshops; 300-word report reflecting on the workshops, with documentary evidence of workshop activities (printscreens) in appendices [mid semester]	20%
Assignment 2: microprocessor operations implemented using assembly language (1500 words) [late semester]	40%
Examination: principles of computer architecture and operating systems (1hr 30min) [end semester]	40%