



<b>Title:</b>	Operating Systems in Practice <b>APPROVED</b>
<b>Long Title:</b>	Operating Systems in Practice
<b>Module Code:</b>	COMP6042
<b>Duration:</b>	1 Semester
<b>Credits:</b>	5
<b>NFQ Level:</b>	Fundamental
<b>Field of Study:</b>	Computer Science
<b>Valid From:</b>	Semester 1 - 2017/18 ( September 2017 )
<b>Module Delivered in</b>	<a href="#">6 programme(s)</a>
<b>Module Coordinator:</b>	Sean McSweeney
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<b>Module Description:</b>	A computer Operating System (OS) manages the hardware and software resources of a computer system in order to provide the services needed by users' programs. This module introduces students to the fundamental operation of a computer operating system. It focuses on practical work in installing, using and managing the Linux operating system.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Describe the fundamental operation and structure of a computer system.
LO2	Explain the structure and management of processes.
LO3	Outline the fundamentals of memory management.
LO4	Install and configure a Linux Operating System.
LO5	Describe the Linux operating system organisation, components and file system.
LO6	Use the Linux graphical user Interface and command line interface to perform standard user and administration tasks.
<b>Pre-requisite learning</b>	
<b>Incompatible Modules</b>	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b>	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
<b>Co-requisites</b>	
No Co Requisites listed	

**Module Content & Assessment**

**Indicative Content**

**Introduction to operating systems**

Definition, goals and roles of an operating system; Review of basic structure of a computer system: (Processor, memory, secondary memory, peripherals, elements of a standard processor: ALU, CU, IR, PC, MBR, MAR, IO AR, I/O BR, status register, data registers, data/address/control bus, Fetch-execute cycle); Interrupts, interrupt handling.

**Process Management**

What is a process?, process vs program, process priorities and CPU scheduling, process creation and destruction, process state transitions, process control block.

**Memory Management**

Types of memory, memory associated with a process, user and kernel space, introduction to memory management using paging, swap space, virtual vs physical addresses. Issues in memory management: storage efficiency, address mapping.

**Practical Work: Introduction to Linux**

Linux History, Philosophy and Concepts; Use of the Graphical Interface.

**Practical Work: Overview of Linux Structure**

Linux Documentation; root user; process creation & structure, system calls, Kernel; Boot sequence; File System (pathnames, system directories, file types, ownership); User Environment; User levels; I/O redirection & piping; Processes; Device files.

**Practical Work: Linux Installation**

Overview of distributions (Suse, Debian, RedHat, Mint, etc.); Installation; Dual boot; System Configuration; Software Package Installation

**Practical Work: Linux Command Interpreter Operation**

Command recall, tab completion, shortcuts. Standard Utilities: File & Directory Operations (cd, mkdir, cp, mv, rm, etc.) System information (who, date, etc.), Process management (nice, renice, bg, fg, top, htop, kill, killall, ps, pstree), Searching (find, grep, etc.), Compression (tar, zip), Local Security/Permissions (chmod, chown, chgrp), users & groups; Memory management (/proc\*/maps, /proc/meminfo, vmstat, free).

**Practical work: Common Applications**

Installation and use; e.g. Window Managers, Desktop Environments.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Installation and Configuration of a Linux OS, and creating a practical and attractive desktop environment	4,5,6	20.0	Week 5
Practical/Skills Evaluation	Perform a set of tasks in GUI and command line.	5,6	30.0	Week 11

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End of Semester Formal Examination	1,2,3,5	50.0	End-of-Semester

Reassessment Requirement
<p><b>Repeat examination</b>  <i>Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</i></p>

The institute reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Presentation of theory components of module.	2.0	Every Week	2.00
Lab	Practical work on Linux operating system.	2.0	Every Week	2.00
Independent Learning	Study of theory components and preparation and practice of practical work.	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

<b>Workload: Part Time</b>				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Presentation of theory components of module.	2.0	Every Week	2.00
Lab	Practical work on Linux operating system.	2.0	Every Week	2.00
Independent Learning	Study of theory components and preparation and practice of practical work.	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

## Module Resources

### Recommended Book Resources

- Brian Ward 2015, *How Linux Works: What Every Superuser Should Know*, 2nd Ed., William Pollock [ISBN: 9781593275679]

### Supplementary Book Resources

- Mark G. Sobell, 2012, *A Practical Guide to Linux Commands, Editors, and Shell Programming*, 3rd Ed., Prentice Hall [ISBN: 9780133085044]
- Stallings, W. 2014, *Operating Systems: Internals and Design Principles*, 8th Ed., 0,1,2,3,7,9, Prentice Hall USA [ISBN: 9781292061351]

*This module does not have any article/paper resources*

### Other Resources

- Website: *Link to e-book on Linux*  
<http://www.makeuseof.com/tag/5-downloads-ble-books-to-teach-yourself-linux/>
- Website: *Links to e-books on Linux*  
<http://www.computerworld.com/article/2481462/windows-pcs/the-best-five-books-for-linux-beginners.html>
- Website: Stallings 2014, *Stallings Book Companion website*  
<http://williamstallings.com/OperatingSystems/OS8e-Student/>

**Module Delivered in**

<b>Programme Code</b>	<b>Programme</b>	<b>Semester</b>	<b>Delivery</b>
CR_KSDEV_8	<a href="#"><u>Bachelor of Science (Honours) in Software Development</u></a>	2	Mandatory
CR_KDNET_8	<a href="#"><u>Bachelor of Science (Honours) in Computer Systems</u></a>	2	Mandatory
CR_KITMN_8	<a href="#"><u>Bachelor of Science (Honours) in IT Management</u></a>	2	Mandatory
CR_KITSP_7	<a href="#"><u>Bachelor of Science in Information Technology</u></a>	2	Mandatory
CR_KCOMP_7	<a href="#"><u>Bachelor of Science in Software Development</u></a>	2	Mandatory
CR_KCOME_6	<a href="#"><u>Higher Certificate in Science in Software Development</u></a>	2	Mandatory