

## H8CAO: Computer Architecture Operating Systems and Networks

<b>Module Code:</b>	H8CAO
<b>Long Title</b>	Computer Architecture Operating Systems and Networks <b>APPROVED</b>
<b>Title</b>	Computer Architecture Operating Systems and Networks
<b>Module Level:</b>	LEVEL 8
<b>EQF Level:</b>	6
<b>EHEA Level:</b>	First Cycle
<b>Credits:</b>	5
<b>Module Coordinator:</b>	CRISTINA HAVA MUNTEAN
<b>Module Author:</b>	CRISTINA HAVA MUNTEAN
<b>Departments:</b>	School of Computing
<b>Specifications of the qualifications and experience required of staff</b>	Msc degree in Computer Science. Experience Lecturing , work experience or projects in the specific domain
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
<b>#</b>	<b>Learning Outcome Description</b>
LO1	Identify and describe the relationship between each component of the computer system and how each individual component works
LO2	Develop a conceptual understanding of different operating systems architectures
LO3	Demonstrate competent use of the system utilities, tools and user interface to exercise, demonstrate and investigate the Operating System
LO4	Have an understanding of the theory, concepts, principles, issues and limitations of network technologies and internet technologies and how these technologies are used for inter-computers communication.
<b>Dependencies</b>	
<b>Module Recommendations</b>	
No recommendations listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Entry requirements</b>	Internal to the programme

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Module Content & Assessment	
<b>Indicative Content</b>	
<b>Computer Architecture</b> • System Overview • Data Transfer and Bus Architecture – Serial and Parallel • Internal Memory • The Power Supply – Importance, problems, standards, voltage, wattage, power supply fan • Peripherals – Input, output and external storage devices • The Central Processing Unit – Instructions, Arithmetic, number systems, The Processor, datapath	
<b>Architecture of different Operating Systems</b> • Operating Systems (OS) Overview: Characteristics and desirable features of an OS, types of OS, early OS, security issues • Windows NT OS Architecture • UNIX OS Architecture	
<b>Techniques used in Operating Systems</b> • User Interfaces: Graphical User Interface, Command Line Interface, Batch File programming • Interprocess Communications • Memory management: objectives, organisation • Processes scheduling algorithms • Device Handlers • Buffering • Spooling • File system management	
<b>Inter-computers Communication</b> • Introduction to data communication: distributed processing, categories of networks, internet, protocol and standards • Network models: layered architecture, encapsulation, OSI model, TCP/IP model • Introduction to Wireshark • Introduction to Packet Tracer - Networking Configuration and Troubleshooting • Transmission media: guided media – twisted pair cable, co-axial cable, fibre-optic cable; unguided media •Wired and wireless LANs	
<b>TCP/IP Protocol Suite</b> • TCP/IP versions • Type of addresses: MAC address, IP address, Port address • TCP, UDP and IP protocols • IP addressing: binary and dotted decimal notations, classes , unicast, multicast and broadcast addresses, routing	
<b>Virtualization and Cloud Computing</b> • Advent of Cloud Computing • The illusion of Infinite Resources • As A Service • What is Virtualization - Abstraction • The Hypervisor • Techniques and Tools • Configuration and Spinning of a Virtual Machine • Imaging and Snapshots • Best Practice	
<b>Linux Fundamentals</b> • Origins of Linux • Linux Distros - Ubuntu / OpenSUSE / Mint • Basic Commands and Navigation • Desktop & Server • Complex Commands - Permissions / Bash / Scripting	
<b>Containerization</b> • What is a Containerization • Introducing Docker • The Development Environment • Online IDE - C9 / CodeAnywhere • Introduction to APIs - REST/SOAP /Postman / Dell Boomi	
<b>Principles of IT security</b> • Threats - Malware / Virus / DDos / EDos / SQL injection / XSS / CSRF • Countermeasures - CIA / Least Privilege • Compliance & Risk • Patches , Update, Maintenance & Best Practise • Red & Blue Book - Strategies for Attack & Defence	
<b>CAQSN in Industry, Trends &amp; Upcoming Technology</b> • Current Industry Standards • Recent Trends in IT domain and Architectures • 5/6G / IoT / Blockchain / Serverless Computing / Cashless Society • Bleeding Edge Use Cases : Libre / Neom / Estonia / China • Certifications & Accreditation - CCNA / NET+ / ECDL	
<b>Assessment Breakdown</b>	<b>%</b>
Coursework	50.00%
End of Module Assessment	50.00%

## Assessments

Full Time			
<b>Coursework</b>			
<b>Assessment Type:</b>	Assignment	<b>% of total:</b>	50
<b>Assessment Date:</b>	n/a	<b>Outcome addressed:</b>	3,4
<b>Non-Marked:</b>	No		
<b>Assessment Description:</b> The Continuous assessment comprises in-class quizzes and laboratory exercises where the student uses the Operating System utilities, tools and the user interface to exercise, demonstrate and investigate the Operating System as well as to understand the network technologies and how these technologies are used to support inter-computers communication. The typical tools used by students in these exercises are Virtual Box/ Ubuntu, Bash, Perl, tshark, Socat and Nmap.			
<b>End of Module Assessment</b>			
<b>Assessment Type:</b>	Terminal Exam	<b>% of total:</b>	50
<b>Assessment Date:</b>	End-of-Semester	<b>Outcome addressed:</b>	1,2,4
<b>Non-Marked:</b>	No		
<b>Assessment Description:</b> End-of-Semester Final Examination			
No Workplace Assessment			
<b>Reassessment Requirement</b>			
<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>			
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Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	No Description	24	Per Semester	2.00
Tutorial	No Description	12	Per Semester	1.00
Independent Learning	No Description	89	Per Semester	7.42
Total Weekly Contact Hours				3.00
Workload: Online				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	No Description	12	Per Semester	1.00
Tutorial	No Description	12	Per Semester	1.00
Directed Learning	No Description	12	Per Semester	1.00
Independent Learning	No Description	89	Per Semester	7.42
Total Weekly Contact Hours				3.00
Workload: Part Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	No Description	24	Every Week	24.00
Lab	No Description	12	Every Week	12.00
Independent Learning	No Description	89	Once per semester	7.42
Total Weekly Contact Hours				36.00

## Module Resources

### *Recommended Book Resources*

- Patterson, D and Hennessy, J. (2012), *Computer Organization and Design: The Hardware/Software Interface, Revised 4th Edition*. Waltham, MA : Morgan Kaufmann.
- Stallings, W. (2014), *Operating Systems Internals and Design Principles, 4th*. Prentice Hall.
- Andrew S. Tanenbaum. (2014), *Modern Operating Systems, 4th*. Prentice Hall.
- Forouzan, B.A. (2011), *Data Communications and Networking*, McGraw Hill.

### *Supplementary Book Resources*

- Silberschatz, Galvin and Gagne. (2012), *Operating System Concepts*, John Wiley & Sons.
- Morris, M. and Kime C. (2008), *Logic and Computer Design Fundamentals*, Pearson International Edition.
- Stallings, W. (2013), *Data and Computer Communications*, Prentice-Hall.
- Forouzan, B. (2009), *TCP/IP Protocol Suite*, McGraw-Hill International Editions.

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

*This module does not have any other resources*

**Discussion Note:**