H8CAO: Computer Architecture Operating Systems and Networks

Module Code:	H8CAO
Long Title	Computer Architecture Operating Systems and Networks APPROVED
Title	Computer Architecture Operating Systems and Networks
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	5
Module Coordinator:	CRISTINA HAVA MUNTEAN
Module Author:	CRISTINA HAVA MUNTEAN
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Msc degree in Computer Science. Experience Lecturing , work experience or projects in the specific domain

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
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.

Dependencies
Module Recommendations
No recommendations listed
Co-requisite Modules
No Co-requisite modules listed

Entry requirements	
	Internal to the programme

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Module Content & Assessment

Indicative Content

Computer Architecture
• System Overview • Data Transfer and Bus Architecture – Serial and Parrellel • 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

Architecture of different Operating Systems
• 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

Techniques used in Operating Systems
• 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

Inter-computers Communication
• Introduction to data communication: distributed processing, categories of networks, internet, protocol and standards • Network models: layered architecture, encapsusation, 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

TCP/IP Protocol Suite
• 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

Virtualization and Cloud Computing
• Adevent 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

Linux Fundamentals
• Origins of Linux • Linux Distros - Ubuntu / OpenSUSE / Mint • Basic Commands and Navigation • Desktop & Server • Complex Commands - Permissions / Bash / Scripting

Containerization
• What is a Containerization • Introducing Docker • The Development Environment • Online IDE - C9 / CodeAnywhere • Introduction to APIs - REST/SOAP /Postman / Dell Boomi

Principles of IT security
• Threats - Malware / Virus / DDos / EDos / SQL injection / XSS / CSRF • Countermeasures - CIA / Least Priviledge • Compliance & Risk • Patches , Update, Maintenance & Best Practise • Red & Blue Book - Strategies for Attack & Defence

CAOSN in Industry, Trends & Upcoming Technology
• 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

Assessment Breakdown	%
Coursework	50.00%
End of Module Assessment	50.00%

Assessments

Full Time

Coursework

Assessment Type:	Assignment	**% of total:**	50
Assessment Date:	n/a	**Outcome addressed:**	3,4
Non-Marked:	No		

Assessment Description:
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.

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	50
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,4
Non-Marked:	No		

Assessment Description:
End-of-Semester Final Examination

No Workplace Assessment

Reassessment Requirement

Repeat examination
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.

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Module Workload

Module Target Workload Hours 0 Hours

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
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

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
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

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
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), omputer 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:	