Module Title:	Cloud Data Centers
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	4 programme(s)

Teaching & Learning Strategies:	This module provides lectures on theoretical fundamentals for cloud computing and projects for generating skills to solve relevant problems that will utilize existing public cloud tools.

Module Aim:	This module provides an overview of the field of Cloud Computing, and an in-depth study into its enabling technologies and main building blocks.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
LO2	Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in efficiency, cost, security and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, secure, elastic and cost-efficient.
LO3	Apply software defined networking and outline their role in enabling the cloud computing system model.

Pre-requisite learning
Module Recommendations   *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules   *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements   *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
Learners should have good knowledge of Operating Systems and be comfortable working in a command line environment (Linux and Windows).

Module Content & Assessment

Indicative Content
Cloud Service Models Cloud Computing concept and characteristics. Cloud Delivery and Delopyment Models. Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Public, private, community and hybrid clouds. Brief introduction of Amazon AWS Cloud and Google Cloud Platform (GCP).
Virtualisation Introduction to the concept of virtualisation and hypervisors; role of a hypervisor; Paravirtualisation vs full virtualisation.
Cloud Data Center Architecture Cloud datacenter topologies such as Fat Tree, VL2, and Leaf-Spine.
Cloud Data Center Networking SDN Definition, Path Computation Element, Forwarding and Control Element, OpenFlow Controllers, RESTful APIs, MiniNet
Cloud Security Various security issues such as DDos attack and information leakage, and countermeasures such as Virtual Private Clouds and firewalls.
News trends in cloud computing Mobile Cloud Computing, Network Functions Virtualisation, and Advanced Resource Management in Cloud Datacenter (Virtual Data Center (VDC) Embedding and VM/Container resource mapping to the physical resources in cloud datacenters).

Assessment Breakdown	%
Continuous Assessment	70.00%
Project	30.00%

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	In lab assessment	1,2,3	70.00	Every Week

Project				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Project	1,2,3	30.00	End-of-Semester

No Practical

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Laboratory	12 Weeks per Stage	3.00
Independent Learning	15 Weeks per Stage	5.93
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_KCCGD_B	[Bachelor of Science (Honours) in Computer Games Development](#)	8	Group Elective 1
CW_KCCYB_B	[Bachelor of Science (Honours) in Cyber Crime and IT Security](#)	8	Elective
CW_KCCIT_B	[Bachelor of Science (Honours) in Information Technology Management](#)	8	Group Elective 1
CW_KCSOF_B	[Bachelor of Science (Honours) in Software Development](#)	8	Group Elective 1

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