Module Details

Module Code:	COMP I8010
Full Title:	Cloud Architecture APPROVED
Valid From::	Semester 1 - 2019/20 (June 2019)
Language of Instruction:	English
Duration:	2 Semesters
Credits::	10
Module Owner::	Peadar Grant
Departments:	Unknown
Module Description:	This module covers Cloud concepts, technologies and patterns.

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Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	**Module Learning Outcome Description**
MLO1	Describe principle cloud computing concepts, service models and benefits.
MLO2	Assemble virtual cloud infrastructure on commercial cloud service providers incorporating identity and access management and other security considerations.
MLO3	Migrate backend application workloads from development and on-premises deployments to public, hybrid and private cloud infrastructure.
MLO4	Design cloud-first architectures to leverage managed database, cache, load balancing and storage services.
MLO5	Automate provisioning, deployment, scaling and monitoring operations.
MLO6	Evaluate the suitability of commercial cloud platforms for existing on-premises and new workloads.

Pre-requisite learning
Module Recommendations   *This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named DkIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
No recommendations listed

Module Indicative Content

Cloud Fundamentals
Cloud computing definition; Outsourcing in the business and technology contexts; Public, private and hybrid cloud models. Understanding the cloud computing stack: IaaS, PaaS, SaaS, Storage as a Service. Comparison of cloud to on-premises deployments. Examine terms-of-service and SLAs offered by commercial cloud providers.

Cloud Infrastructure
Assembly of infrastructure on commercial cloud providers incorporating compute, networking and storage as a service. Provisioning of compute capacity for multiple server operating systems. Evaluation of object, block and network file systems for storage workloads. Migration of existing web and other backend workloads to IaaS platforms. Setup of IP and DNS for reachability.

Application design
Design of cloud-first applications designed for on-demand horizontal scaling. Selection of managed cloud platform services: databases (relational, non-relational, graph, full-text search), in-memory caches, messaging queues, notification services, directory services, edge caching, content delivery networks, managed DNS. Replication across multiple geographic regions for availability and performance optimisation.

Cloud Migration
Evaluate current business applications and their suitability for migration and/or full/partial redesign for cloud deployment. Consideration of access management, security vulnerabilities, data availability, response time, backup, licensing. Design of partial and staged migrations that link on-premises and cloud workloads, incorporating VPN and dedicated links.

Automation
Automation of provisioning and lifecycle management using provider tools and self-built automation scripting. Usage of infrastructure-as-code patterns to assemble cloud infrastructure and managed services. Automated scaling of component services to optimise identified performance and cost metrics.

Module Assessment

Assessment Breakdown	%
Course Work	100.00%

Module Special Regulation

Assessments

Full Time On Campus

Course Work

Assessment Type	Class Test	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	1,2,6
Duration in minutes	0		

Assessment Description
Class test to assess material delivered during Semester 1

Assessment Type	Continuous Assessment	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	1,2,3,5
Duration in minutes	0		

Assessment Description
Design/implementation of cloud infrastructure

Assessment Type	Continuous Assessment	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	3,4,5,6
Duration in minutes	0		

Assessment Description
Design/implementation on managed cloud platform services

Assessment Type	Class Test	% of Total Mark	40
Marks Out Of	0	Pass Mark	0
Timing	Sem 2 End	Learning Outcome	1,2,3,4,5,6
Duration in minutes	120		

Assessment Description
2-hour lab-based examination (theory and problem solving)

No Project

No Practical

No Final Examination

Part Time On Campus

Course Work

Assessment Type	Class Test	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	1,2,6
Duration in minutes	0		

Assessment Description
Class test to assess material delivered during Semester 1

Assessment Type	Continuous Assessment	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	1,2,3,5
Duration in minutes	0		

Assessment Description
Design/implementation of cloud infrastructure

Assessment Type	Continuous Assessment	% of Total Mark	20
Marks Out Of	100	Pass Mark	40
Timing	End-of-Semester	Learning Outcome	3,4,5,6
Duration in minutes	0		

Assessment Description
Design/implementation on managed cloud platform services

Assessment Type	Class Test	% of Total Mark	40
Marks Out Of	0	Pass Mark	0
Timing	Sem 2 End	Learning Outcome	1,2,3,4,5,6

Duration in minutes   0

Assessment Description
2-hour lab-based examination (theory and problem solving

No Project

No Practical

No Final Examination

Reassessment Requirement

A 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.

Reassessment Description
Reassessment will include both theoretical and practical components.

Module Workload

Workload: Full Time On Campus

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Formal lecture covering theory	Every Week	1.00	1
Practical	Contact	1x 2h lab to cover Demonstration, tutorial and practical work	Every Week	2.00	2
Directed Reading	Non Contact	Articles, papers etc.	Every Week	3.00	3
Independent Study	Non Contact	Development work	Every Week	2.00	2
				Total Weekly Learner Workload	8.00
				Total Weekly Contact Hours	3.00

Workload: Part Time On Campus

Workload Type	Contact Type	Workload Description	Frequency	Average Weekly Learner Workload	Hours
Lecture	Contact	Formal lecture covering theory	Every Week	1.00	1
Practical	Contact	1x 2h lab to cover Demonstration, tutorial and practical work	Every Week	2.00	2
Directed Reading	Non Contact	Articles, papers etc.	Every Week	3.00	3
Independent Study	Non Contact	Development work	Every Week	2.00	2
				Total Weekly Learner Workload	8.00
				Total Weekly Contact Hours	3.00

Module Resources

Recommended Book Resources

Thomas Erl. (2013), Cloud Computing: Concepts, Technology & Architecture (Prentice Hall Service Technology Series from Thomas Erl), 1st. 16, Prentice-Hall, [ISBN: 0-13-338752-6].

Michael J. Kavis. (2014), Architecting the Cloud, 1st. 16, Wiley & Co., [ISBN: 978-1-118-617].

Christopher M. Moyer. (2011), Building Applications in the Cloud, Concepts, Patterns and Projects, 1st. 9, Addison-Wesley, p.296, [ISBN: 0-321-72020-2].

This module does not have any article/paper resources

This module does not have any other resources