Module: Cloud-Native Architecture 261

Module name:	Cloud-Native Architecture 261
Code:	CNA261
NQF level:	6
Type:	Fundamental – Diploma in Information Technology (Infrastructure stream)
Contact time:	34 hours
Structured time:	6 hours
Self-directed time:	40 hours
Notional hours:	80 hours
Credits:	8
Prerequisites:	IOT261

Purpose

In this course, the student will learn about micro service-oriented architecture, and why it is well-suited to modern cloud environments which require short development and delivery cycles. Students will learn the characteristics of micro-services and they will be exposed to the components of a cloud-native application. The course concludes with the student decomposing a monolithic application into a cloud-native application.

Outcomes

Upon successful completion of this module, the student will be able to demonstrate:

- Demonstrate detailed knowledge of cloud-application architectures, including an understanding of and the ability to apply concepts.

- Produce and communicate information in respect to cloud-application engineering, cloud-native application design, and knowledge of distributed systems.

- The ability to evaluate, select and apply appropriate techniques in particular to model application architecture that is distributable, scalable, multi-tenant and platform independent.

- The ability to evaluate and analyse existing applications for the purpose of designing and implementing application architecture that is compatible with the cloud.

- Demonstrate the ability to evaluate, select and apply tools to create images, containers within a cloud environment.

Assessment

Assessment is performed using a variety of instruments:

- Continuous evaluation of theoretical work through written assignment, a formative, and a summative test.
- Continuous evaluation of project work, where the student must design, manage and report on the evaluation of testing methodologies and the selection of an appropriate methodology for a given scenario, justifying the choice made with well-formed arguments and evidence.

- Final assessment through a written examination.
- The assignments or projects collectively will count 30% of your class mark.
- All tests will collectively account for 70% of your class mark.
- Your class mark contributes 30% towards your final mark for the subject, while the final assessment accounts for 70% of your final mark.

Teaching and Learning

Learning materials

Prescribed books (EBSCO)

- 📖 *Dan. C, Cloud computing theory and practices, 2013*
- 📖 *Rountree. D The Basics of Cloud computing: Understanding the fundamentals of cloud computing in theory and practice.*

Learning activities

Learning will be facilitated by the lecturer with student centred activities that involve problem-based learning where pupils are presented with challenges that replicate the situation in the real-world environment. This will be achieved through a combination between presentation of theoretical concepts, guided exercises, group work and discussions during the module. One mandatory assignment and one project must be completed during the course.

Notional learning hours

Activity	Units	Contact Time	Structured Time	Self-Directed Time
Lecture		27.0		13.0
Formative feedback		3.5		
Project	1	3.5		9.0
Assignment	1			3.0
Test	2		4.0	8.0
Exam	1		2.0	7.0
		34.0	**6.0**	**40.0**

Syllabus

- Cloud Engineering Trends
- Traditional vs. Micro-service systems architecture
- Components of a cloud-native application
  - o DevOps
  - o Containers
  - o Continuous Integration
  - o Micro-services
- Cloud-Native Application Architecture
  - o Business logic
  - o Caching

- o   Aggregation
- o   Message queues
- o   API gateways
- o   Backend resources
- o   Discovery Services
- o   Health and monitoring
- Decomposing monolithic applications