

## Module: Cloud-Native Architecture 261

<b>Module name:</b>	Cloud-Native Architecture 261
<b>Code:</b>	CNA261
<b>NQF level:</b>	6
<b>Type:</b>	Fundamental – Diploma in Information Technology (Infrastructure stream)
<b>Contact time:</b>	34 hours
<b>Structured time:</b>	6 hours
<b>Self-directed time:</b>	40 hours
<b>Notional hours:</b>	80 hours
<b>Credits:</b>	8
<b>Prerequisites:</b>	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
		<b>34.0</b>	<b>6.0</b>	<b>40.0</b>

### Syllabus

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

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