Cloud-Native Application Programming 371

Module name:	Cloud-Native Application Programming 371
Code:	CNA371
NQF level:	7
Type:	Core – Bachelor of Information Technology
Contact Time:	52 hours
Structured time:	8 hours
Self-directed time:	50 hours
Notional hours:	110 hours
Credits:	11
Prerequisites:	CNA271

Purpose

In this course, the students will learn about the tools necessary to successfully create, deploy, manage and monitor micro-service based applications. After taking this course, the students will understand the DevOps environments in which micro-services run. They will also be able to use the tools that enable micro-service applications in the operational and production environments.

Outcomes

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

- Integrated knowledge of the central area of cloud-native application design, including an understanding of and the ability to apply and evaluate the key terms, concepts, facts, principles, rules and theories of cloud-native application design; and detailed knowledge of micro-service design patterns and how that knowledge relates to cloud engineering in general.
- An understanding of the cloud-native application development life cycle; and the ability to select and use a range of tools and/or a framework within the development cycle.
- The ability to identify, analyse and critically reflect on cloud-native application infrastructure requirements, applying evidence-based solutions and theory-driven arguments.

Assessment

- Continuous evaluation of project work, whereby the student must evaluate and present results on given case studies. Students will work in groups and conduct peer assessments. The grade will reflect participation in the project, the role and mastery of course through a presentation.
- Final assessment through a written examination.

Teaching and Learning

Learning materials

Presentation notes and hand-outs.

Additional Reference Material:

📖 To be advised

Learning activities

The teaching is a combination between presentation of theoretical concepts and exercises and discussions. Lectures, assignments and project work will build discipline specific expertise in the area of innovation management. Assignments will be reviewed in class. The project involves working in a team, conducting user studies with members of the group whereby groups will develop an understanding of how to overcome the inhibitors of innovative products or services. The project culminates in an individual report and a group presentation.

Notional learning hours

Activity	Units	Contact Time	Structured Time	Self-Directed Time
Lecture		42.0		20.0
Formative feedback		6.0		
Project	1	4.0		9.0
Assignment	1			3.0
Test	3		6.0	6.0
Exam	1		2.0	12.0
		52.0	**8.0**	**50.0**

Syllabus

- Cloud Application Development Life Cycle
- Micro-service design patterns
- Application development
    - Building and deploying a micro-service
    - Service discovery and invocation
    - Circuit breakers
    - Pipelines
    - Authentication
    - Logging, monitoring and tracing
    - Frameworks for cloud application development

- Application Requirements on Infrastructure
    - Application Runtime and Isolation
    - Resource Allocation, Scaling and Scheduling
    - Environment Isolation
    - State Management
    - Metrics Aggregation
    - Frameworks for application monitoring and management