

Module 5: Cloud Computing

Stage	1						
Semester	2						
Module Title	Cloud Computing						
Module Number	5						
Module Status	Mandatory						
Module ECTS Credits	5						
Module NFQ level	9						
Pre-Requisite Module Titles	None						
Co-Requisite Module Titles	None						
Capstone Module?	No						
List of Module Teaching Personnel	Dr Waseem Akhtar Mr Barry Denby						
Contact Hours	Non-contact Hours					Total Effort (hours)	
36					64		100
Lecture	Practical	Tutorial	Seminar	Assignment	Placement	Independent Work	
18	18			30		34	
Allocation of Marks (Within the Module)							
	Continuous Assessment	Project	Practical	Final Examination	Total		
Percentage Contribution	50			50	100		

Intended Module Learning Outcomes

On successful completion of this module the learner will be able to:

1. Analyse and document problems with existing software development strategies as applied to web design
2. Investigate and Employ alternative Agile Development Strategies
3. Evaluate cloud services, Infrastructure as a service, Platform as a service, Software as a service and determine when they are appropriate to use
4. Compare and contrast Web based client-server models and cloud models and their associated models of computation
5. Design and implement cloud applications.
6. Demonstrate a critical understanding of how applications are deployed and costed in the cloud and take advantage of elastic resources
7. Discuss the role of virtualisation in the cloud

Module Objectives

This module aims to introduce the learner to the concept of cloud computing and how it differs from the client server model of computation that is seen on the web today. Cloud computing applications are charged on a per use basis i.e. clients only pay for what they have used. Many companies are using cloud computing to offload some of their work onto these clouds as a means of saving on software and hardware cost.

Due to this new model of computation we require new methods of developing and creating software. At the end of this module the learner will be able to understand the different models of cloud applications (IaaS, PaaS, SaaS) and determine which is the right one for the task they need and will also understand the role virtualisation plays in the cloud and how it will impact their applications. Learners will also be able to develop basic web applications and deploy them to the cloud.

Module Curriculum

- **New approaches to Software Development**
Critical review of traditional models of software engineering in a Web-driven environment / Performance demands in relation to Web and Mobile platforms / Agile Programming / Extreme Programming / Adaptive Software Development / SCRUM
- **Web Frameworks**
Django / Rails / Google App Engine / Suitable IDEs
- **Cloud Services**
Consuming and publishing Web Services / SOAP / REST / XML-RPC / WSDL / CSS / Javascript / AJAX / COMET / Levels of virtualisation (EC2 vs Azure vs AppEngine) / “Big Data” in the cloud (e.g. NoSQL DBs, HBase, BigTable)
- **Cloud Applications**
Overview of current Cloud offerings / Strengths and weaknesses of different approaches / How developing Cloud software differs from building regular software / Evaluating performance of deployed Cloud applications / Diagnostics - how to debug a deployed Cloud application. / Multi-vendor Cloud applications (e.g. AppEngine with S3 storage)

Reading Lists and other learning materials

Recommended Reading

Barnett, 2010, *A Brief Guide to Cloud Computing*, Robinson

Rhoton, 2011, *Cloud Computing Explained*, Recursive Ltd

Secondary Reading

Eerniss, 2006, *Build Your Own Ajax Web Applications*, SitePoint

Van Vliet, Paganelli, 2011, *Programming Amazon EC2*, 2011

Additional reading as recommended by lecturer, appropriate to topic and to each learner's area of research.

Module Learning Environment

Lectures are carried out in class rooms / lecture halls in the College. Lab tutorials are carried out in computer labs. All labs have the software required to deliver the programme.

Library

All learners have access to an extensive range of physical and electronic (remotely accessible) library resources. The library monitors and updates its resources on an on-going basis, in line with the College's Library Acquisition Policy. Lecturers update reading lists for this course on an annual basis as is the norm with all courses run by Griffith College.

Module Teaching and Learning Strategy

The module is taught using a combination of lectures, demonstrations and tutorials. The demonstrations and tutorials focus on getting learners up to standard in practical application development. The lectures supply the necessary theoretical background. In a fast changing technology field learners are expected under guidance to engage in research in relation to the different technologies and products available.

Module Assessment Strategy

This module is 50% continuous assessment and the other 50% is an examination. The full breakdown of module assessment is described in the following table

Element Number	Learning Outcomes Addressed	Percentage of Assessment	Description of Assignment
1	1, 2, 3, 4, and 7	20%	This assignment will test the learners ability to understand cloud computing. This is an essay based assignment and will test the learner's understanding of the theoretical components of the course.
2	2, 5, and 6	30%	This assignment will test the learners ability to produce a cloud application. They should be able to design and implement a full application that runs exclusively on the cloud and presents its results to the user through some interface.
3	1, 3, 4, 6 and 7	50%	Examination that tests the learners understanding of the theoretical material in the module.