

Liverpool John Moores University

Title: ADVANCED AND DISTRIBUTED DATABASES
Status: Definitive
Code: **6123COMP** (121299)
Version Start Date: 01-08-2021

Owning School/Faculty: Computer Science and Mathematics
Teaching School/Faculty: Computer Science and Mathematics

Team	Leader
Glyn Hughes	Y

Academic Level: FHEQ6
Credit Value: 20
Total Delivered Hours: 55
Total Learning Hours: 200
Private Study: 145

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	22
Practical	33

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	NoSQL Database Design Task	40	
Artefacts	AS2	NoSQL Development Task	60	

Aims

The aim of this module is build a recognition that traditional relational database approaches are incapable of dealing with "big data".

Learning Outcomes

After completing the module the student should be able to:

- 1 Critically evaluate and select an appropriate NoSQL database approach for a given subject area
- 2 Formulate a schema-less data model design in a given subject area
- 3 Construct a NoSQL, distributed database application
- 4 Critically evaluate the outcomes of a NoSQL development

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

NoSQL Database Design Task	1	2
NoSQL Development Task	3	4

Outline Syllabus

Review of relational database models
Strengths and weakness of relational databases
NoSQL Databases – schema-less data model
Advantages of NoSQL over relational databases
Big Data
 High Data Velocity
 Data variety
 Data volume
 Data complexity
Continuous Data Availability
Real Location Independence
Modern Transactional Capabilities (from ACID to CAP + AID)
 Flexible Data Models
 Improved Architecture
 Analytical intelligence

Distribution Models
Sharding
Replication
Master-slave
Peer-to-peer
 "Ring" - Cassandra
Types of NoSQL Databases
Key-Value Databases (Cassandra)
Document Databases (MongoDB)
Column Databases (e.g. HBase, Big Table)
Graph Databases (Neo4j)
Evaluating NoSQL databases:
 Performance
 Scalability
 Flexibility
 Complexity

Functionality
Domain-Driven Design for NoSQL databases
Cassandra

Learning Activities

Lectures will introduce the underpinning theories of advanced and distributed database approaches, while practical sessions will implement those theories in a practical manner.

Notes

This module provides modern database modelling experience, thus developing real hands-on experience of distributed database developments.