Liverpool John Moores University

Title:	ADVANCED AND DISTRIBUTED DATABASES
Status:	Definitive
Code:	**6019DACOMP** (125379)
Version Start Date:	01-08-2021
Owning School/Faculty:	Computer Science and Mathematics
Teaching School/Faculty:	Computer Science and Mathematics

Team	Leader
Andrew Laws	Y

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

Delivery Options
Course typically offered: S1 and Non Std S2 (S2 for Jan)

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.
This module will have online practical.

Notes

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