2024 / 25

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Module Descriptor

Advanced NoSQL Databases (Computing and Mathematics)

Advanced NoSQL Databases (A36141)

Short Title: Adv. NoSQL
Department: Computing and Mathematics
Credits: 5 **Level:** Advanced

Description of Module / Aims

This module will facilitate the student to understand the application of NoSQL databases in organisations and gain knowledge and practical experience that enables them to analyse, design and construct complex NoSQL database solutions to handle large volumes of either structured, semi structured or unstructured data. The student will gain competence about NoSQL databases and be able to exercise judgments in using different types in a centralised or distributed manner to solve problems. Specifically, the student will be introduced to the concepts of CAP, Sharding and Replication and be able to independently appraise their relevance and application in regard to NoSQL database development.

Programmes

	stage/semester/status
HDip in Science in Data Analytics (WD_KDAAN_G)	2 / 3 / M

Indicative Content

- Emergence & Drivers of NoSQL databases
- NoSQL Database Concepts & Document Oriented Modelling Techniques
- Types of NoSQL Databases: Key-value databases, Document databases, Column family databases and Graph databases
- CAP Theorem
- Data Persistence, Database Consistency and Replication
- Distribution of data and functionality
- NoSQL Database Sharding techniques & Strategies

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Appreciate & explain the relevance and application of NoSQL databases in Organisations.
2. Design, Construct and Maintain a schemaless NoSQL database solution.
3. Investigate the appropriateness and application of Sharding on NoSQL database Clusters.
4. Assess and make judgements on the relevance of data consistency, availability and network partition tolerance in relation to NoSQL databases.
5. Appraise the application of replication techniques to improve end user productivity and efficiency.

Learning and Teaching Methods

- The lectures will introduce the theory content to the student. The student will be encouraged to participate in class discussions and ask questions to support their learning process.
- The practical classes facilitate the student in implementing the theory learned in the lectures.
- The continuous assessment will require the student to apply the theory and practical knowledge gained in the lectures and practicals to design, develop fully operational NoSQL database solution to a new business scenario or problem.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	12
Practical	24	12
Independent Learning	87	111

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	100%	1,2,3,4,5

Assessment Criteria

<40%: Unable to interpret, describe and apply key concepts of NoSQL database solutions.

40%–49%: Be able to interpret, describe and apply key concepts of NoSQL database solutions.

50%–59%: Ability to discuss key concepts of design and implementation of NoSQL database solutions and ability to integrate related knowledge in a realistic NOSQL implementation.

60%–69%: Be able to solve complex problems within the design and implementation of NoSQL database solutions by experimenting and applying the appropriate skills and tools.

70%–100%: All the above to an excellent level. Be able to analyse and design solutions to a high standard for a range of both complex and unforeseen problems through the use and modification of appropriate skills, tools and techniques

Supplementary Material(s)

- Fowler, M. *NoSQL Distilled A brief guide to the emerging world of polygot persistence. New Jersey: Pearson, 2013.* . 1. New York: Pearson, 2013.

Requested Resources

- Computer Lab: BYOD Lab