2024 / 25

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Module Descriptor

NoSQL Databases (Computing and Mathematics)

NoSQL Databases (A11158)

Short Title: NoSQL Databases
Department: Computing and Mathematics
Credits: 5 **Level:** Intermediate

Description of Module / Aims

This module will introduce the student to the principles and practice of designing database solutions for large volumes of either structured or unstructured data. The student will gain competence in determining the suitability of a schemaless database or a data warehouse. The student will be introduced to the concepts of data persistence, consistency and distribution in the NoSQL database context. They will gain experience in the design and implementation of a NoSQL database system for unstructured data. The module will also introduce them to the use of data warehouses for storage of large volumes of structured data.

Programmes

		stage/semester/status
COMP-0661	BSc (Hons) in Applied Computing (International) (WD_KACCM_BI)	3 / 5 / M
COMP-0661	BSc (Hons) in Applied Computing (WD_KACCM_B)	3 / 5 / M
COMP-0661	BSc (Hons) in Applied Computing (WD_KCOMP_B)	3 / 5 / M
COMP-0661	BSc (Hons) in Computer Forensics and Security (WD_KCOFO_B)	3 / 5 / M
COMP-0661	BSc (Hons) in Computer Science (WD_KCMSC_B)	3 / 5 / M
COMP-0661	BSc (Hons) in Creative Computing (WD_KCRCO_B)	3 / 6 / M
COMP-0661	BSc (Hons) in Software Engineering (WD_KDEVP_BI)	3 / 5 / M
COMP-0661	BSc (Hons) in Software Systems Development (WD_KDEVP_B)	3 / 6 / M
COMP-0661	BSc (Hons) in the Internet of Things (International) (WD_KINTT_BI)	3 / 5 / M
COMP-0661	BSc in Applied Computing (WD_KCOMP_D)	3 / 6 / M
COMP-0661	BSc in Information Technology (WD_KINFT_D)	3 / 6 / M
COMP-0661	BSc in Multimedia Applications Development (WD_KMULA_D)	3 / 6 / M
COMP-0661	BSc in Software Systems Development (WD_KCOMC_D)	3 / 6 / M

Indicative Content

- Introduction to storing large volumes of structured or unstructured data
- Emergence of NoSQL databases
- Aggregate data models
- Key-value databases, document databases, column family databases and graph databases
- Data persistence, database consistency (CAP theorem, version stamps) and distribution of data storage
- Fundamentals involved in the storage of large volumes of structured data in a data warehouse

Learning Outcomes

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

1. Analyse a business scenario to determine a suitable big data database solution.
2. Create at least one type of NoSQL database.
3. Assess the growth and use of NoSQL in business.
4. Appraise the distribution of data on clusters.
5. Examine the issue of consistency in relation to NoSQL databases.
6. Summarise the characteristics, design and implementation of data warehouses for structured data.

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 to a new business scenario.

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
Final Written Examination	50%	3,4,5,6
Continuous Assessment	50%	
Assignment	50%	1,2

Assessment Criteria

<40%: Unable to interpret and describe key concepts of Big Data database solutions.

40%–49%: Be able to interpret and describe key concepts of Big Data database solutions.

50%–59%: Ability to discuss key concepts of design and implementation of Big Data database solutions and ability to discover and integrate related knowledge in other knowledge domains.

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

70%–100%: ll 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 and tools.

Supplementary Material(s)

- "TDWI research in the business intelligence and data warehousing industry." http://tdwi.org
- "comprehensive resource on NoSQL database solutions." http://nosql-database.org
- Connolly, T. and E. Begg Connolly. *Database Systems: A practical approach to design, implementation and management.* NY: Addison-Wesley, 2015.
- Sadalage, J. and M. Fowler. *NoSQL Distilled A brief guide to the emerging world of polygot persistence.* New Jersey: Pearson, 2013.

Requested Resources

- Room Type: Computer Lab