Title:	Data Management Systems APPROVED
Long Title:	Data Management Systems
Module Code:	DATA8002
Credits:	5
NFQ Level:	Advanced
Field of Study:	Data Format
Valid From:	Semester 1 - 2016/17 (September 2016)
Module Delivered in	4 programme(s)
Module Coordinator:	Donna OShea
Module Author:	Larkin Cunningham
Module Description:	This module introduces students to the use of database management systems for applications. It includes an evaluation of the relational model and NoSQL data models, and how to query and manipulate data stored using these models. Students will learn how these data models are used in the distribution of data and the emerging "Big Data" paradigm.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Explain the concepts of Database Management Systems and Data Models, such as Relational and NoSQL
LO2	Implement and query relational databases using SQL Data Definition and Manipulation commands
LO3	Evaluate the suitability of data models for a given data management requirement
LO4	Devise solutions to NoSQL database queries using interactive commands
LO5	Compare and contrast approaches to the distribution of data

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.*
No requirements listed
Co-requisites
No Co Requisites listed

Module Content & Assessment

Indicative Content
Traditional Database Systems Concepts DBMS concepts: Data Integration and sharing, comparison with traditional data processing systems; DBMS architectures; Data Independence; The Relational Data Model.
Structured Query Language Manipulating data in SQL; Processing Single & Multiple Tables - SELECT commands. Functions & Group By; Database Definition in SQL - CREATE, DROP, ALTER, CHECK commands.
NoSQL Systems Motivation for NoSQL Data Models and Systems; Types of NoSQL systems / data models: MapReduce framework, Key-value stores, Document stores, Graph database systems. Creating and querying NoSQL Systems.
Distributed Databases Sharding; Master-Slave and Peer-to-Peer Replication; Distributed Filesystems; The Big Data Paradigm.

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	SQL data definition and manipulation	1,2	25.0	Week 7
Practical/Skills Evaluation	Creating and manipulating data in a NoSQL system	1,4	25.0	Week 11

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End-of-Semester Final Examination	1,2,3,4,5	50.0	End-of-Semester

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Theory	2.0	Every Week	2.00
Lab	Lab	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	No Description	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Theory	2.0	Every Week	2.00
Lab	Lab	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	No Description	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- **Thomas M. Connolly, Carolyn E. Begg 2009, *Database systems: A Practical Approach to Design, Implementation and Management*, 5th Ed. [ISBN: 978-0321523068]**
- **Pramod J. Sadalage, Martin Fowler 2012, *NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence* [ISBN: 978-0321826626]**

Supplementary Book Resources

- **Eric Redmond, Jim Wilson 2012, *Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement* [ISBN: 978-1934356920]**

Supplementary Article/Paper Resources

- **Codd, E. F. 1970, *A Relational Model of Data for Large Shared Data Banks*, Communications of the ACM, 13:6, 377-387**

Other Resources

- **Website: *myNoSQL - NoSQL Databases and Polyglot Persistence: A Curated Guide***
  http://nosql.mypopescu.com/

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KCMSD_8	Higher Diploma in Science in Cloud & Mobile Software Development	1	Mandatory
CR_KCLCO_8	Higher Diploma in Science in Cloud Computing	1	Mandatory
CR_SDAAN_8	Higher Diploma in Science in Data Science & Analytics	1	Mandatory
CR_SDAAN_9	Master of Science in Data Science & Analytics	1	Mandatory