H6ADA: Advanced Databases

Module Code:	H6ADA
Long Title	Advanced Databases APPROVED
Title	Advanced Databases
Module Level:	LEVEL 6
EQF Level:	5
EHEA Level:	Short Cycle
Credits:	10
Module Coordinator:	
Module Author:	Alex Courtney
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	Master's degree in computing or cognate discipline. May have industry experience also.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
#	**Learning Outcome Description**
LO1	Illustrate Transaction Management in a DBMS.
LO2	Implement techniques for query processing and optimization in relational DBMSs.
LO3	Describe the IR paradigm and classic information retrieval models.
LO4	Describe approaches for securing a DBMS
LO5	Draw comparison between different business intelligence technologies in order to identify the current trends in business intelligence technologies
LO6	Critically assess the suitability of novel data models in different contexts in order to implement effective data management solutions
LO7	Discuss Legal, Ethical and Intellectual Properties Rights issues in relation to Data Management

Dependencies	
Module Recommendations	
No recommendations listed	
Co-requisite Modules	
No Co-requisite modules listed	
Entry requirements	Learners should have attained the knowledge, skills and competence gained from stage 1 of the BSc (Hons) in Computing.

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Module Content & Assessment

Indicative Content

Transaction Management –
ACID. Transaction Support . Concurrency Control: Various techniques and associated issues . Database Recovery

DBMS File Organizations and Indexes
Heap Files. Ordered Files. Hash Files. Single-Level Ordered Indexes. Mutli-Level Indexes. B-Trees and B+-Trees

Query Optimization
Tuning at The Internal Level . Query Optimization Using SQL. Query Processing

Information Retrieval
Introduction. Structured, Unstructured & Semi-structured Data. The Retrieval process. Retrieval vs. Filtering. Ranking. Information Retrieval Models

Distributed Databases
Introduction to Distributed Databases . DDBMS Characteristics . Distributed Processing Vs. Parallel Processing . Functions and Architecture of a DDBMS . Transparencies in a DDBMS . Distributed Relational Database Design . Types of DDBMS

Introduction to NoSQL Databases
NoSQL Overview and Data Models Document Model, Key-Value Model, Column Family, Aggregates, Graph Model, Triple Stores). CAP Theorem. BASE vs ACID. NoSQL Data Modelling Concepts

NoSQL Systems
Query Languages for Data in NoSQL. NoSQL systems

From DBMS to BDMS – Big Data Management Systems
Introduction to Big Data Management Systems.

Business Intelligence Technologies
Introduction to Data Warehouses and related concepts. Introduction to Data Lakes . Data Lakes vs Data Warehouses

Advanced Database Security
Introduction to Database Security . Threats and Countermeasures . Security in DBMSs . DBMSs and Web Security

Professional, Legal, and Ethical Issues in Data Management
Defining Legal and Ethical Issues. Legislation related to Data . Establishing a Culture of Legal and Ethical Data Stewardship. Intellectual Property Rights Issues for Data

Revision
n/a

Assessment Breakdown	%
Coursework	40.00%
End of Module Assessment	60.00%

Assessments

Full Time

Coursework

Assessment Type:	Formative Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4,5,6,7
Non-Marked:	Yes		

Assessment Description:
Ongoing independent and group class activities and feedback.

Assessment Type:	Project	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	5,6,7
Non-Marked:	No		

Assessment Description:
Students to collaborate in teams to design, model and implement effective data management solution in a given context. Students will be asked to present and communicate the results of their project. Project will involve comparing different BI technologies, critically assessing the suitability of different data models and will also cover legal, ethical and intellectual property rights issues. While the project will be practical in nature there will also be a theory element which may be assessed by written test to assess students' knowledge of the underlying principles.

End of Module Assessment

Assessment Type:	Terminal Exam	**% of total:**	60
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3,4,5,6,7
Non-Marked:	No		

Assessment Description:
Written proctored end of semester examination to access all the learning outcomes

No Workplace Assessment

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.

Reassessment Description
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. Learners who fail this module will be required to sit a repeat module assessment where all learning outcomes will be examined.

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Module Workload

Module Target Workload Hours 0 Hours

Workload: Full Time

Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	Classroom & Demonstrations (hours)	24	Every Week	24.00
Tutorial	Other hours (Practical/Tutorial)	24	Every Week	24.00
Independent Learning	Independent learning (hours)	202	Every Week	202.00
			Total Weekly Contact Hours	48.00

Module Resources

Recommended Book Resources

Robinson, I., Webber, J. & Eifrem E. ,. (2015), ,Graph Databases USA: O'Reilly ,.

White, T. ,. (2016), ,Hadoop: The Definitive Guide (4th ed) O'Reilly , USA ,.

Dayley, B. ,. (2014), ,NoSQL With MongoDB in 24 Hours Sams Teach Yourself ,].

Begg, T. C. ,. (2014), ,Database Systems: A Practical Approach to Design, Implementation, and Management (6th ed) , ,Pearson Education.

Supplementary Book Resources

Manning C., Raghaven, P. & Schutze, H. ,. (2008), ,Introduction to Information Retrieval ,Cambridge University Press.

Niemiec, R. ,. (2015), ,Quick Start Guide to Oracle Query Tuning: Tips for Dbas and Developers , Oracle Press.

Gaetjen, S. ,. (2015), ,Oracle Database 12c Security.

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note: