

Module specification

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Module Code	CONL705
Module Title	Database Systems
Level	7
Credit value	15
Faculty	FACE
HECoS Code	100754
Cost Code	GACP

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
MSc Computer Science with Artificial Intelligence	Core
MSc Computer Science with Big Data Analytics	Core
MSc Computer Science (Online)	Core
MSc Computer Science with Software Engineering	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	15 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	15 hrs
Placement / work-based learning	0 hrs
Guided independent study	135 hrs
Module duration (total hours)	150 hrs

For office use only	
Initial approval date	04/09/2019
With effect from date	01/01/2020
Date and details of revision	27/06/2024 Programme revalidation
Version number	2

Module aims

This module is designed to give students an understanding of the role of database systems in Information Management, and the theoretical and practical issues that influence the design and implementation of relational database management systems. The module will provide the student with the skills required to create, maintain, and interrogate a relational database management system using commercially available database software. Additionally, the module will focus on the emergence of NoSQL platforms, their use in industry and their advantages/disadvantages compared with traditional SQL-based systems. The module will equip the students to critically analyse various database issues and recommend solutions in a multiuser relational database environment. By the end of this module, students will be proficient in designing and managing both traditional SQL databases and NoSQL databases, understanding their trade-offs, and making informed choices based on specific use cases.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Demonstrate an advanced understanding of the principles of the relational database model, data integrity and functional dependency.
2	Perform CRUD operations using query language and stored procedures using commercially available DBMS software e.g. PostgreSQL, MySQL.
3	Systematically identify and critically analyse the emergence of NoSQL platforms and their use in industry, demonstrating comprehensive understanding of their advantages/disadvantages compared with traditional SQL-based systems.
4	Identify, critically analyse and demonstrate a comprehensive understanding of a range of complex security, concurrency, and availability issues in a multi-user database environment.

Assessment

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Indicative Assessment Tasks:

Assessment for this module comprises two components; the first is a practically focused coursework assignment, where students will be required to build and interrogate a database of their own design using standard CRUD operations and Stored Procedures. The submission for this assignment will require students to provide an accompanying report detailing and justifying their design decisions, discussing, and analysing the relevant security and concurrency considerations, and demonstrating the effectiveness of their test queries. The second assignment will discuss the emergence of NoSQL systems, their uses in industry and their relative advantages/disadvantages versus traditional systems.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 2, 4	Coursework	75%
2	3, 4	Coursework	25%

Derogations

None

Learning and Teaching Strategies

The overall learning and teaching strategy is one of guided independent study requiring ongoing student engagement. Online material will provide the foundation of the learning resources, requiring the students to log in and engage regularly throughout the eight weeks of the module. There will be a mix of suggested readings, discussions and interactive content containing embedded digital media and self-checks for students to complete as they work through the material and undertake the assessment tasks. A range of digital tools via the virtual learning environment and additional sources of reading will also be utilised to accommodate learning styles. There is access to a helpline for additional support and chat facilities through Canvas for messaging and responding.

Indicative Syllabus Outline

- Introduction to Databases and SQL
- Relational Databases and SQL Fundamentals
- Normalisation and Performance Optimisation
- Advanced SQL Techniques
- Transactions and Concurrency Control
- Introduction to NoSQL Databases
- NoSQL Databases in Practice

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

A. Debarros, *Practical SQL: A Beginner's Guide to Storytelling with Data*, 2nd ed. San Francisco: No Starch Press, 2022.

Other indicative reading

P. J. Sadalage and M. Fowler, *NoSQL Distilled: A Brief Guide to the Emerging World of Polygot Persistence*. Boston: Addison-Wesley Professional, 2012.