MODULE **DESCRIPTOR**

MODULE TITLE	Database Systems		
MODULE CODE	CO2701 (L5)	**CREDIT VALUE**	20 credits / 10 ECTS
SCHOOL	SCHOOL OF SCIENCE		

MODULE **AIMS**

1. To explore database concepts and outline the benefits of the relational database theory.
2. To study and use a relational query language.
3. To provide the student with experience of implementing a database in a suitable database environment.
4. To demonstrate the need for data analysis and apply a suitable technique to database design.
5. To familiarise the student with the structure and functions of database management systems (DBMS).

MODULE **CONTENT**

Module tutors typically investigate some of the following indicative topics:

Introduction
- File-based approach vs. DBMS approach
- Three-level architecture, data independence and data models
- Client-server architecture
- Overview of a commercial multi-user DBMS

Data Models
- Relational model concepts
- Integrity rules, data duplication vs. data redundancy
- Relational algebra
- Semi-structured data and XML

Database Management System
- Integrity constraints
- Transactions and concurrency control
- Security
- Recovery
- Storage structures
- Query processing

Database Application Development
- SQL
- Persistent stored modules such as PL/SQL procedures and functions
- Constraints and triggers
- Views and indexes
- Web interaction with DBMS using Java and .NET

Database Design

Apply a bottom-up or top-down technique or integrate both
- Normalisation
  - Update anomalies
  - Determinancy
  - Normalisation up to 3NF

Higher normal forms such as BCNF
Entity Relationship modelling (ER)
Entities, attributes, relationships, enterprise rules and assumptions
Degree of association and participation condition
M:M decomposition
Extended ER such as subclasses and superclasses
ERD to relations

INTENDED **LEARNING OUTCOMES**

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

1. Discuss the major characteristics of data models or DBMS and their benefits, particularly in terms of data integrity.
2. Use SQL to retrieve, manipulate or create data in relations.
3. Apply an appropriate technique for the construction of a conceptual data model suitable for implementation.
4. Develop a relational database using an appropriate DBMS.

TEACHING METHODS

Lectures introduce general concepts and theory. The tutorial classes develop database analysis and design techniques such as normalisation. In the practical classes students follow guided workbooks or worksheets to gain practical skills in using SQL.

As well as providing a traditional question assessing the students' understanding of theoretical concepts, the lab-based examination will mainly allow students to demonstrate their ability to construct SQL queries to meet requirements. There will be a compulsory section to develop a series of increasingly difficult queries. The interactive environment used in this assessment more closely models the way that students would work in employment and assesses their ability to design and debug statements rather than construct them on paper.

The assignment assesses the students' ability to develop a relational database using a commercial environment.

ASSESSMENT METHODS

This module is assessed through a Lab-based examination (50%) and an Assignment (50%).