### Module Code
CS3041

### Module Name
Information Management and Data Engineering

### Module Short Title
N/a

### ECTS weighting
5

### Semester/term taught
Michaelmas Term

### Contact Hours
- Lecture hours: 33
- Lab hours: 0
- Tutorial hours: 0
- Total hours: 33

### Module Personnel
Lecturing staff: Prof. Séamus Lawless
           Prof. Vincent Wade

### Learning Outcomes
Having completed the module the student will be able to:
- Define and comprehend the theoretical and practical issues in management, retrieval, organisation, indexing and storage of large quantities of data
- Model data within an organisation or enterprise, and analyse data relationships for exploitation within database management systems
- Program a database management system for database creation, information retrieval and database management
- Analyse and assess various database concurrency protocols and algorithms to assess their performance and relative appropriateness in differing operating environments.
- Evaluate existing concurrency control algorithms and appropriate data structures for data management.

### Module Learning Aims
This module is focused on the modelling of information and database system technology. More specifically, it focuses on state-of-the-art database technology, from both the user and systems perspectives.

From a system engineering perspective, the module examines the concepts and algorithms for: transaction processing, concurrency control, metadata representation, semantic representation and active databases, recovery, database security policies, integration of databases on the web and emerging database technologies.

From an information designer’s perspective, the module examines the theoretical model underpinning relational databases, functional dependency theory and normalisation (for information modelling), functional dependency modelling, object relational modelling, implementation of databases and database applications.

Thus the module is intended to enable the students to design information models and implement these models in state of the art databases (relational and native web databases), as well as be able to analyse and evaluate approaches to information organisation, storage, transaction support and management.
Specific topics addressed in this module include:

- Overview of database systems and users
- Database system concepts and architecture
- Relational database management
- Relational model
- Functional dependency theory and normalisation
- On-line module on SQL (relational database query language)
- SQL/PL (SQL as a programming language)
- Transaction processing
- Query processing
- Concurrency control
- Modelling semantics
- Active databases
- Database recovery
- Security and authorisation
- Software engineering for database applications and database development
- Web databases
- Metadata models for open content management

**Recommended Reading List**


**Module Pre-Requisite**

None

**Module Co-Requisite**

None

**Assessment Details**

% Exam: 75
% Coursework: 25

Alongside the lectures, a full online course on the application of database language SQL is delivered. This online course must be taken by all students taking this module. Project work which integrates the lectures, tutorials and online course accounts for 25% of the module’s overall mark. Attendance at all lectures and tutorials is compulsory.