Module Documentation

COMP07070

Database Technologies

COMP07070 Database Technologies

Short Title	Database Technologies & DBMS				
Full Title	Database Technologies				
Attendance	N/A		Discipline	481 COMPUTER SCIENCE	
Coordinator	Sean Duignan		Department	Computing	
Official Code	COMP07070	NFQ Level	07	ECTS Credit	10

Module Description

This module will provide coverage of the main issues related to data storage and manipulation — the object of Database Systems. In particular, this module is aimed at the detailed presentation of the theory and practice of the relational model, as well as emerging trends in database systems.

Learning Outcomes

On completion of this module the learner will/should be able to

1. Demonstrate the need for database systems and provide a general description of a database environment. 1. Demonstrate the need for database systems; 2. Provide a general description of a database environment;
2. Thoroughly describe the relational model as the underlying framework of most industrial database management systems
3. Demonstrate proficiency in a relational database language: SQL
4. Describe the issues pertaining to database design, focussing on conceptual design (through E/R modelling) and logical design (through normalisation)
5. Develop practical skills in designing and implementing a relational database and with cognisance of present issues pertaining to data protection: security, recovery and concurrency control, and distributed architectures.
6. Describe new approaches to database systems: NOSQL models.

Teaching and Learning Strategies

- Lectures, Design and Modelling, Group Work, Lab Work

Assessment Strategies

- Lab based exams (SQL), design project (ERDs), implementation project.

Repeat Assessment Procedures

- Lab based exams (SQL), design project (ERDs), implementation project.

Module Dependencies

Prerequisite Modules

None

Corequisite Modules

None

Incompatible Modules

None

Indicative Syllabus

- Database - Basic Concepts
  - File based systems
  - ANSI/SPARC Architecture
  - Architecture
  - Data Models
- The Relational Model and Relational DBMSs
  - The relational model - generalities
  - Relational data objects
  - Data deinition in a relational DBMS
  - Relational operators
  - Data manipulation and the optimiser
  - Relational data integrity
  - Integrity Constraints
- SQL
  - Data Definition Language (DDL)
  - Domains
  - Base Re;ations
  - Data Manipulation Language (DML)
  - Integrity and Constraints
  - Views
- Designing Relational Database Systems
  - Conceptual Modelling
  - Entity Relationship Model
  - Transforming ER Model to relational model
  - Normalisation (1NF, 2NF, 3NF, Boyce Codd NF)
  - Further Normalisation 4NF and 5NF
- Data Protection
  - Data Recovery
  - Transaction Management
  - Locking
  - Deadlock
  - Serialisability
  - SQL Support

- ♦ Concurrency Control
- ♦ Data Security

- Distributed Database Systems
  - ♦ Distributed Processing
  - ♦ Parallel DBMS Processing
  - ♦ Hetrogenicity in distributed databases
  - ♦ Fragmentation
  - ♦ Replication
  - ♦ Allocation

- NOSQL Databases
  - ♦ Alternative data models
  - ♦ Limitations of the Relational Model
  - ♦ Key-Value Store
  - ♦ Column Family Store
  - ♦ Graph Databases
  - ♦ Document Stores

CourseWork / Assessment Breakdown

CourseWork / Continuous Assessment	100 %

Coursework Assessment Breakdown

Description	Outcome Assessed	% of Total	Assessment Week
Lab Exam	1,2,3	30	Week 5
Database Implementation	4,5	40	Week 9
Project	6	30	Week 13

End Exam Assessment Breakdown

Description	Outcome Assessed	% of Total	Assessment Week

ACCS Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld

Total Average Weekly Learner Workload 0.00 Hours

Open Learning Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld

Total Average Weekly Learner Workload 0.00 Hours

Distance Learning Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld

Total Average Weekly Learner Workload 0.00 Hours

Part Time Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld
Lecture	Lecture Theatre	Lecture	3	Weekly	3.00
Laboratory Practical	Computer Laboratory	Lab / Practical	3	Weekly	3.00

Total Average Weekly Learner Workload 6.00 Hours

Full Time Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld

Total Average Weekly Learner Workload 0.00 Hours

Online Learning Mode Workload

Type	Location	Description	Hours	Frequency	Avg Wkly Wrkld

Total Average Weekly Learner Workload 0.00 Hours

Module Resources

Module Book Resources

None

Module Alternate Book Resources

None

Module Other Resources

IEEE Xplore Digital Library

Module URLs

- www.databaseanswers.org

  Data Modelling Tool - MYSQL Workbench

https://www.mysql.com/products/workbench/

Additional Information

None

ISBN BookList

Book Details

Thomas Connolly 2014 *Database Systems: A Practical Approach to Design, Implementation, and Management (6th Edition)* Pearson
ISBN-10 0132943263 ISBN-13 9780132943260

Dan McCreary 2013 *Making Sense of NoSQL: A guide for managers and the rest of us* Manning Publications
ISBN-10 1617291072 ISBN-13 9781617291074

Approval Information

School Approval by	Sean Duignan on 07-01-2016
Academic Council on	07-01-2016

Programme Membership

Code	Intake Year	Programme Title
GA_KWEBG_B07	201500	Bachelor of Science in Web Technologies and Programming