Module Code : SA0951A
Module Title : Database Design and Implementation

Principal Domain : School of Computing and Creative Technologies
Principal Division : Software Applications   **Weighting :** 100%

Level : 9
SCQF Credits: 15
Status : Approved School Executive
Semester : Semester 1   **Year :** 2009/10
Last Updated : 14/08/09

Pre–requisites :
Co–requisites :
Replaced Modules : SA0952A SI0932A SI0932A
Prohibited Combinations :

External Examiners : FINCHER, PROFESSOR SALLY

Module Tutor : BALL , LES

Brief Description
Develop database systems using industry standard software including advanced functionality. Practical skills are integrated with conceptual database design theory.

Aim
The aim of this module is to provide the student with: an extensive experience in designing and implementing advanced database applications.

Learning Outcomes
By the end of this module the student should be able to :
1. Critically analyse application requirements and design appropriate conceptual database models.
2. Implement effective databases using a mainframe DBMS, including database programming techniques.
3. Evaluate the different approaches to data manipulation using SQL demonstrating one of the options within an application.

Indicative Content

1. *Relational Model*
Schemas, tables, tuples, attributes, relationships.
2. *Database Concepts Environment*
History, early data models, DBMS, Database users; Procedures, policies, standards; data dictionary; DBMS architecture (eg. Oracle).
3. *Database Design – Conceptual Modelling*
The tool kit for good database design: Entity– relationship modelling and mapping, normalisation: Using rules of Normal Form to test whether a database is well designed. Comparison of normalisation and ERM.
4. *SQL queries*
Standard structures, aggregates, advanced concepts of nested queries, set theoretic operations.
5. *SQL Data Definition Language*
Creating tables. Naming constraints. Synonyms and operator commands. Data dictionary.
6. *Procedural Programming*
Loops, If statements, error trapping, embedded SQL, variables.
7. *Triggers*
Event driven programs to perform dynamic updates on databases
8. *Stored Programs*
Procedures and functions.
9. *Testing*
Strategies for testing the integrity of a database.
10. Legal issues
Data Protection Act and its implications. International equivalents.

Statement on Teaching, Learning and Assessment
Lectorials are interactive classes and will cover the conceptual and theoretical elements of this module while the labs give ample opportunity to develop practical skills using a commercial RDBMS such as Oracle. Timetabling: 1 hour lectorial per week for all students; requires interactive whiteboard (i.e. Room 3004 or equivalent) and data projector. Week 1 should have two lectures, Week 12 no lecture. Weeks 1, 6–12: 2–hour lab in 4534.1 for all students (class size should be around 50 in total?) with both tutors. Weeks 2–5: Each student to attend one 1–hour tutorial with one tutor – should make 4 groups of around 12–15 students each. Room 2021 for tutorials. 2 to be scheduled at same time as lab in other weeks; the other 2 on the same day if at all possible. Scheduling: Lecture and lab to be timetabled as a 3 hour block (a half day, morning or afternoon – to facilitate part–time study) with LAB coming first.

Teaching and Learning Work Loads :

Total : 150 hours
Lecture : 12 hours
Tutorial/Seminar : 4 hours
Supervised Practical Activity : 16 hours
Unsupervised Practical Activities : 12 hours
Assessment : 60 hours
Independent : 46 hours

Assessment

Class Test 1 DB concepts. 105 mins.
Weighting   : 40%
Workload   : 24 hrs
Issue Week   : 13
Submission Week : 13
Return Week   : 17
Associated Learning Outcomes :
Assessment Tutor : BALL , LES

Portfolio 2 DB Implementation + Viva
Weighting   : 60%
Workload   : 36 hrs
Issue Week   : 7
Submission Week : 17
Return Week   : 20
Associated Learning Outcomes :
Primary Assessment Tutor : BALL , LES

Additional Assessment Information
Class test (unit 1) is a paper based test which covers database concepts (ERM, mapping, Normalisation). Portfolio (unit 2) will develop SQL and other programming code from exercises set in class. A viva will be conducted for each student in week 16 for the portfolio. WebCT may be used for some background questions.

Additional Tutors :
LEIMICH , PETRA

Supportive Reading
Rob P, Coronel C and Crockett K 2008 *Database Systems International Edition* Course Technology
Rosenzweig B and Silvestrova E 2003 *Oracle® PL/SQL by Example* Prentice Hall (on Safari)
Earp R and Bagui S 2003 *Learning SQL: A step–by–step guide using Oracle* Pearson, US

Specialist Resources
Oracle 10g server in labs and lecture room. Lecture room requires data projector and must be suitable for student activities in pairs or small groups.

Teachability Issues for this module are :
Oral,Visual,Aural,Diagrammatic,Computer Based,Reading,Collaboration

Key Transferable Skills for this module are :
Problem Solving,ICT Skills