University of the West of Scotland

Module Descriptor

Session: 2023/24

Last modified: 12/04/2023 19:25:44
Status: Published

Title of Module: Database Design & Implementation

Code: COMP11109	**SCQF Level: 11** (Scottish Credit and Qualifications Framework)	**Credit Points: 20**	**ECTS: 10** (European Credit Transfer Scheme)
School:	School of Computing, Engineering and Physical Sciences		
Module Co-ordinator:	Graeme A McRobbie		

Summary of Module

Databases are such an integral part of our day-to-day life that we are often not aware that we are using one. To illustrate this point, a range of example databases are demonstrated and discussed. The longevity and popularity of a particular type of database software called Database Management System (DBMS) is examined. The typical functions and services (including data integrity, authorisation and security) that enable DBMS to manage and secure data are discussed. Example DBMSs (e.g. Microsoft SQL Server and MySQL) are used to illustrate these services.

This module examines how a DBMS can be used to meet the needs of a particular case study. This is achieved using a structured approach to the creation of a database system, which is called the Database Systems Development Lifecycle (DSDL). The stages of the DSDL are discussed with particular attention to the earlier stages including database planning, systems definition, requirements collection and analysis and database design.

Ensuring that the database design meets the data needs of a particular case study is key to building the right database system. A popular database design technique used to identify the required data is called entity-relationship (ER) modelling and this technique is discussed and illustrated. The database design technique of normalisation is also explored as a means of building/validating a database.

- This module sets the scene by first considering our current digital environment and how recent advancements in technologies has led to the “data explosion” and the creation of Big Data. Vast quantities of Big Data (i.e. structured and unstructured data) are being created daily and businesses are seeking ways to effectively capture, organise and secure this valuable business asset. This module examines how database technologies can fulfil this role.

- There are various ways to represent data in a database, however this module explores the power and simplicity of the relational data model. Through practical classes, students are introduced to a relational DBMS and learn how to create, access and update data using a relational database language called Structured Query Language (SQL). Examples of how relational databases can be maliciously attacked are discussed as well as measures that can protect databases.

- This module ensures that students have an excellent grounding in the fundamental knowledge (DBMS functions and services and the Database Development Lifecycle) and skills (ER modelling, normalisation and SQL programming) associated with developing database systems.

- This module will work to develop a number of the key 'I am UWS' Graduate Attributes to make those who complete this module: Universal (Critical Thinker, Ethically-minded, Research-minded), Work Ready (Problem-Solver, Effective Communicator, Ambitious) and Successful (Autonomous, Resilient, Driven).

Module Delivery Method

Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
				✓	

Face-To-Face
Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.

Blended
A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered "blended" if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations

Fully Online
Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.

HybridC
Online with mandatory face-to-face learning on Campus

HybridO
Online with optional face-to-face learning on Campus

Work-based Learning
Learning activities where the main location for the learning experience is in the workplace.

Campus(es) for Module Delivery

The module will **normally** be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)

Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
✓				✓		

Term(s) for Module Delivery

(Provided viable student numbers permit).

Term 1	✓	Term 2	✓	Term 3	✓

Learning Outcomes: (maximum of 5 statements)

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

L1. Demonstrate knowledge and a critical understanding of the "data explosion" and the implications for businesses and on how data models and database management software can be used to represent and manage this valuable business asset.

L2. Demonstrate knowledge and a critical understanding of the stages and techniques associated with the Database System Development Lifecycle, which enables the creation of a database system to meet the needs of users

L3. Use a range of routine and specialist skills and techniques to design and implement a database using appropriate CASE tools and Relational Database Management System (DBMSs)

Employability Skills and Personal Development Planning (PDP) Skills

SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	SCQF Level 11. A critical understanding of the principal theories, concepts and principles associated with the "data explosion" and the consequences for the management of Big Data. A critical understanding of the principal theories, concepts and services associated with software that manages data; namely Database Management

	Systems (DBMS). Extensive, detailed and critical knowledge and understanding of the principles of the Database System Development Lifecycle. A critical understanding of the principal theories, concepts and principles associated with the relational data model and language (i.e. SQL) and awareness of alternative data models and languages. Extensive, detailed and critical knowledge and understanding of the theories, concepts and principles associated with database design techniques (e.g. entity-relationship (ER) modelling and normalisation)
Practice: Applied Knowledge and Understanding	SCQF Level 11. Use a range of the principal professional skills, techniques, practices and/or materials associated the design and implementation of a database system using a relational DBMS
Generic Cognitive skills	SCQF Level 11. Apply critical analysis, evaluation and synthesis to forefront issues and routine problems (including those associated with the security and privacy of data) associated with the development and use of database systems in a business environment
Communication, ICT and Numeracy Skills	SCQF Level 11. Use a range of routine and specialised skills to establish the requirements for a database system
Autonomy, Accountability and Working with others	SCQF Level 11. Take responsibility for own work and/or significant responsibility for the work of others and for a range of resources in undertaking the necessary activities to complete the module coursework

Pre-requisites:	Before undertaking this module the student should have undertaken the following:	
	Module Code:	**Module Title:**
	Other:	
Co-requisites	**Module Code:**	**Module Title:**

* Indicates that module descriptor is not published.

Learning and Teaching	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Tutorial/Synchronous Support Activity	12
Laboratory/Practical Demonstration/Workshop	12
Independent Study	152
	200 Hours Total

****Indicative Resources: (eg. Core text, journals, internet access)**

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Database Systems: A Practical Approach to the Design, Implementation and Management
Thomas Connolly and Carolyn Begg

(**N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Engagement Requirements

In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: Academic engagement procedure

Supplemental Information

Programme Board	Computing
Assessment Results (Pass/Fail)	No
Subject Panel	Applied & Business Computing
Moderator	tbc
External Examiner	tbc
Accreditation Details	pending
Changes/Version Number	1

Assessment: (also refer to Assessment Outcomes Grids below)

Formative assessment is available using on-line practice tests - that allow students to test their progress and understanding of the syllabus. The first summative component of assessment is a class test worth 10% (individual) and this takes place approximately halfway through the module and the third summative component of assessment is towards the end of the module and this class test is worth 30% (individual). The results for these two summative assessments are combined to give a total worth 40%.

Formative assessment is available through completion of the practical labs - that allow students to test their progress and understanding of the practical aspects of the syllabus. The second summative assessment is lab-based, group work coursework worth 60% which is undertaken in the second half of the module.

(N.B. (i) **Assessment Outcomes Grids** for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed.
(ii) An **indicative schedule** listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class test (written)	✓	✓		40	3

Component 2

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Dissertation/ Project report/ Thesis	✓	✓	✓	60	0
Combined Total For All Components				100%	3 hours

Footnotes
A. Referred to within Assessment Section above
B. Identified in the Learning Outcome Section above

Note(s):
1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).
   This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

UWS Equality and Diversity Policy

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)