Module Descriptor

Title	Database Design & Implementation		
Session	2025/26	**Status**	Published
Code	COMP11109	**SCQF Level**	11
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Computing, Engineering and Physical Sciences**		
Module Co-ordinator	Shahid Mahmood Awan		

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	**On-Campus**[1] ☐	**Hybrid**[2] ☒	**Online**[3] ☐	**Work -Based Learning**[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☐ Lanarkshire ☒ London ☒ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☒	Term 2	☒	Term 3	☒
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
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)
L4	Critically evaluate and apply the ethical, professional, and legal implications of database design and implementation decisions. This includes analysing issues like data privacy, security, ownership, and access control, while also considering the legal frameworks of the UK.
L5	

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

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 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 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 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 11** Use a range of routine and specialised skills to establish the requirements for a database system
Autonomy, Accountability and Working with Others	**SCQF 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

Prerequisites	**Module Code**	**Module Title**
	Other	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning 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
Please select	
Please select	
TOTAL	200

Indicative Resources
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)

Attendance and Engagement Requirements
In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time. **For the purposes of this module, academic engagement equates to the following:** The School of Computing, Engineering and Physical Sciences considers attendance and engagement to mean a commitment to attending, and engaging in, timetabled sessions. You will scan your attendance via the scanners each time you are on-campus and you will login to the VLE several times per week. Where you are unable to attend a timetabled learning session due to illness or other circumstance, you should notify the Programme Leader that you cannot attend. Across the School an 80% attendance threshold is set. If you fall below this, you will be referred to the Student Success Team to see how we can best support your studies.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code. Aligned with the University's commitment to equality and diversity, this module supports equality of opportunity for students from all backgrounds and learning needs. Using the VLE, material will be presented electronically in formats that allow flexible access and manipulation of content. This module complies with University regulations and guidance on

inclusive learning and teaching practice. This module has lab-based teaching and as such you are advised to speak to the Module Co-ordinator to ensure that specialist assistive equipment, support provision and adjustment to assessment practice can be put in place, in accordance with the University's policies and regulations.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Computing**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Business & Applied Computing
Moderator	Raja Ujjan
External Examiner	A Malhi
Accreditation Details	
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	1.1

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
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%.
Assessment 2
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 50% which is undertaken in the second half of the module.
Assessment 3
Formative assessment is available through a written report where students consider the ethical aspects of databases, such as defining ownership of the data, obtaining consent to collect and share data, identifying potential ethical and legal violations, and proposing solutions that balance functionality with ethical considerations while ensuring compliance with relevant UK data protection legislation. The third summative assessment is lab- based, group work report worth 10% 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 Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test (written)	☒	☒	☐	☒	☐	40	3

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Dissertation/ Project report/ Thesis	☒	☒	☒	☒	☐	50	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Data Ethics and Privacy (written report)	☐	☒	☒	☒	☐	10	0
Combined total for all components						100%	3 hours

Change Control

What	**When**	**Who**
Attendance Update & EDI Update and External Examiner updated	20/01/2025	A Adamson