



Module Specification

Data Management Fundamentals

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Part 1: Information

Module title: Data Management Fundamentals

Module code: UFCE9A-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Computing and Creative Technologies

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module will introduce a range of fundamental and contemporary data management issues, techniques and tools that may be applied across the programme.

Features: Not applicable

Educational aims: To introduce and cement key aspects of data management and form a foundation for further specialisation in data analytics.

Outline syllabus: 1) Relational modelling and key data management concepts

FAIR (Findable, Accessible, Interoperable) principles in data management

CAP, BASE and ACID design principles

Constructing and reverse-engineering entity relationship models

Data normalisation

Referential integrity and master data management

Data processing models (batch, streaming, parallel)

2) Database construction

Forward engineering

Keys, indexes and constraints

3) Data querying and manipulation

SQL basic (create, retrieve, update and delete) and advanced methods

Query profiling and optimisation

4) Data cleansing and aggregation

Removing and refactoring

Transforming and joining

Anonymisation

5) NoSQL stores

Defining

Difference to RDBMS

Query and aggregation syntax

6) Architectures

Data warehousing and batch operations (OLAP, OLTP, ETL)

Data science pipelines

Cloud and distributed data stores

Partitioning and scaling

7) Data Management in Practice

Environments Deployment

Migration and integration

Backup and recovery and disaster/breach mitigation

8) Security, Environmental and Ethical issues

Impact of data centres and mitigating climate footprint

Data security and good governance

Privacy

Part 3: Teaching and learning methods

Teaching and learning methods: The module, presented via our online virtual learning environment, consists of a clearly signposted, easy-to-navigate student journey through carefully chosen learning materials which are designed to engage and challenge students as they work towards achieving the module learning outcomes. Content may be in a range of formats, including clear well-written text, diagrams, animations, video and interactive video, activities, quizzes, asynchronous discussions, coding and interpretation exercises.

Students will be provided with as many opportunities as possible to ‘perform their understanding’ rather than just reading or watching video to passively acquire knowledge. This may be in the form of simple tasks, activities or quizzes that students can engage with in the online environment, or larger pieces of work that may require additional thought. Whatever their nature, such tasks will be authentic (connected to the real world) and directly relevant to the programme learning outcomes.

The online environment also provides important opportunities to encourage students

to work with, and learn from, their peers. The careful use of structured online discussion forums helps to foster an active learning community and enable students to share their responses to key questions, and to discuss, and even challenge, each other's ideas.

All learning materials are produced and presented in a way that ensures that they are appropriate for as diverse an audience as possible. We follow W3C accessibility standards and ensure that all content can be used with all popular screen-readers, offering alternative formats where possible. In general, we aim to avoid using language, idioms, images or other devices which root the content in any particular culture or creed that instead adequately reflect the diversity of the student audience.

In general, modules are designed with a number of key learning principles in mind that align closely with those of the university.

Learning will centre around practical work and a range of individual challenges, scaffolded by worked examples and real-life case studies.

Alongside hands-on design tasks, students will be required to use self-study time to become familiar with data manipulation and definition language syntax.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Understand and use the relational model to structure data for efficient and effective storage and retrieval.

MO2 Design, develop and validate a range of data models and schemas.

MO3 Understand, evaluate and apply a range of data query and manipulation languages and frameworks, critically reflecting on the value and use of data (transactional, social, scientific etc.) as well as its ethical concerns (surveillance issues, privacy and ownership etc.).

MO4 Demonstrate competence with theoretical and practical aspects of enterprise data methods and strategies including data cleansing, backup and recovery, security, replication, clustering, warehousing and cloud computing.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 126 hours

E-learning/online learning = 24 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://rl.talis.com/3/uwe/lists/6A9F5E72-1B5F-9D6B-5868-821E168F1FCD.html) via the following link <https://rl.talis.com/3/uwe/lists/6A9F5E72-1B5F-9D6B-5868-821E168F1FCD.html>

Part 4: Assessment

Assessment strategy: Formative assessment will be employed via automated tools and peer feedback to monitor and improve basic skills. Students will then undertake an individual design project as the main assessed coursework.

Assessment tasks:

Online Assignment (First Sit)

Description: Individual modelling, database design and implementation task
(3,500 words max)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Online Assignment (Resit)

Description: Individual modelling, database design and implementation task.
(3,500 words)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Data Science [UWE online] MSc 2023-24