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: 2024-25

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, evaluate and apply the relational model to structure data using a range of data query and manipulation languages and frameworks.

MO2 Design, develop and validate a range of data models and schemas incorporating a critical reflection on the value and ethical concerns of data.

MO3 Demonstrate competence with theoretical and practical aspects of enterprise data methods and strategies.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 126 hours

E-learning/online learning = 24 hours

Total = 0

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk 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 and tutor feedback to monitor and improve basic skills.

Students will then undertake an individual design project presented as a portfolio which will be the main assessed coursework incorporating evidence of their ability to design, develop, apply and validate data queries and demonstrating an understanding of strategic, operational and ethical issues in data management.

The resit will be the same as the first sit.

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

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

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Data Science [UWE online] MSc 2024-25

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