



Module Specification

Big Data

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Part 1: Information

Module title: Big Data

Module code: UFCE9M-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: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: A key first step into the world of Big Data is to understand what it is, why it is different and how it is best managed. This module will introduce Big Data concepts and applications and compare traditional (SQL) to alternative (NoSQL) approaches to data storage and retrieval. In addition to key concepts of data integrity and quality, you will have the opportunity to gain hands-on experience with big data tools.

Features: Not applicable

Educational aims: The module has good mix of lectures and practical work. It will enable students to understand the importance of data for business applications. Students will thoroughly understand the four dimensions of Big Data i.e. volume, velocity, variety, veracity, with real life case studies elaborating challenges in the delivery of business benefits from Big Data. It will equip students with problem solving skills necessary for identifying solutions by understanding the challenges associated with the storage and retrieval of small/large amounts of data.

Outline syllabus: Data Storage and Retrieval: Importance of data for business; Understand the difference between data, information and knowledge; Traditional ways to store and retrieve data; and Big Data challenges and opportunities.

Introduction to Big Data: Defining Big Data; Sources of Big Data; Introducing storage and MapReduce; Business application of Big Data; Establishing the business importance of Big Data; and Addressing the challenge of extracting useful data/knowledge.

SQL Databases vs. NoSQL Databases: Understand the growing amounts of data; The Capabilities of traditional RDBMSs; Understanding the difference between a relational DBMS and a NoSQL database; and Identifying the need to employ a NoSQL DB.

Storing Big Data: Analysing data characteristics; Selecting data sources for analysis; Working with selected Big Data stores.

Achieving Data Quality: Introduction to data quality; Why is data quality a business problem? Problems when data is not “fit for purpose”; Preparing and ways to improve data quality; Understand ETL - Extract, Transform, Load procedures to improve Data Quality.

Knowledge-based Information Retrieval: Introduction to knowledge-based information retrieval; Machine learning for knowledge acquisition; Capabilities of different modelling, analysis and algorithmic techniques.

Big Data and Cloud Computing (technology, challenges and trends):

Cost of storing Big Data; Is cloud computing a solution? Issues: privacy and trust;

Future of Big Data and cloud computing; and Future research trends in Big Data.

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 text, diagrams, animations, video and interactive video, activities, quizzes and asynchronous discussions.

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. 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.

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

MO1 Understand the importance of data for business applications and the difference between data, information and knowledge in terms of their uses.

MO2 Understand the four dimensions of Big Data i.e. volume, velocity, variety, veracity, which are important challenges the delivery of business benefits from Big Data.

MO3 Apply problem solving skills necessary for identifying the organizational needs to employ a SQL or NoSQL DB by understanding the challenges associated with the storage and retrieval of small/large amounts of data.

MO4 Be able to apply problem-solving skills to address the challenge of extracting useful data and learn ways to improve data quality.

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://uwe.rl.talis.com/modules/ufcf8h-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufcf8h-15-m.html>

Part 4: Assessment

Assessment strategy: The coursework normally involves researching and solving an industry related Big Data adoption problem based on given requirements, proposing a solution and/or recommending implementation specifications. The actual

assignment topics are carefully chosen to demonstrate some basic principles, which are especially significant to the course. The coursework is required to be carried out by individual students and the assessment should be made on written work provided by each individual.

Assessment tasks:**Report (First Sit)**

Description: Individual coursework report (2000 words)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Report (Resit)

Description: Individual coursework report (2000 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