Module Specification

Data Analytics for Engineers

Version: 2023-24, v2.0, 27 Mar 2023

Contents

Part 1: Information

Module title: Data Analytics for Engineers

Module code: UFMFGQ-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

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: Not applicable

Features: Not applicable

Educational aims: This module aims to enable students to practice data analysis on already available databases in their industry.

Through this module the students should understand the necessity of a data driven approach to the decision making process.

Outline syllabus: This module will introduce engineers to the field of Data Science. It will cover the following topics:

Introduction to big data and digitalization

Introduction to data analysis methods

Coding methods for data analyses

Statistical thinking for big data

Ethics of big data

Part 3: Teaching and learning methods

Teaching and learning methods: Contact hours will be a mixture of seminar and computer "lectorials" that will take place over a block week delivery. A project based learning approach will be used in this module, where students will be given a group project as an assignment to complete.

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

> **MO1** Present and explain the range of economic, scientific, resource and ethical
>
> challenges associated with big data
>
> **MO2** Conduct a decision making process within a statistical framework
>
> **MO3** Formulate scientific questions that address an industrial need

MO4 Select appropriate tools to conduct a statistical analysis of a real and complex data set

MO5 Critically evaluate the analysis produced from a big data study

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 115 hours

Face-to-face learning = 35 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link
https://uwe.rl.talis.com/modules/UFMFGQ-15-M.html

Part 4: Assessment

Assessment strategy: The module will be assessed through a group project with a group presentation followed by questions (50%), and an individual report (50%). The group presentation therefore creates a feed-forward opportunity for students to take advantage of when producing their individual reports. Building on the variety of background of the students (computer engineers, maths engineers, process engineers etc.), the task within each group will be divided so that each student will have the opportunity to explore the practical aspect of big data in their own domain while learning from the experience of others in the group.

Group project

The students will be divided in groups. They will be given a data set from an open source, and a set of open questions. They will need to:

apply data cleaning techniques

program a data analyses in an appropriate coding language such as python

produce a re-usable, documented analysis pipeline

discuss the ethical consideration of this project

Group presentation

The group presentation will last 15 minutes followed by 5 minutes of questions. Students will receive a group mark which will be moderated following the Engineering Design and Mathematics guidelines for group work.

Individual report

The individual report (max 2000 words) must reflect the students own journey through the project. It will introduce the project as a whole and detail the role and technical contribution of the student.

Note that for any given delivery of the module the precise method for marking group work will be made known to students at the start of teaching.

The resit strategy will be the same as the first sit.

Resit deliverable(s) will be scaled appropriately to group size and task complexity

Assessment tasks:

Report (First Sit)

Description: Individual report (max 2000 words)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Presentation (First Sit)

Description: Group presentation (approx. 15 mins) and questions

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Report (Resit)

Description: Individual report (max 2000 words)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO4, MO5

Presentation (Resit)

Description: Group presentation (approx. 15 mins) and questions

Resit deliverable(s) will be scaled appropriately to group size and task complexity

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Engineering Competence {Apprenticeship-UWE} [Frenchay] PGDip 2023-24

Digital Electronic Systems Engineering {Apprenticeship-UWE} [Frenchay] - Suspended MSc 2023-24

Engineering Competence {Apprenticeship-UWE} [Frenchay] PGDip 2022-23