Module Specification

Data Science Fundamentals [TSI]

Version: 2023-24, v2.0, 09 Aug 2023

Contents

Part 1: Information

Module title: Data Science Fundamentals [TSI]

Module code: UFCF8X-12-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 12

ECTS credit rating: 6

College: College of Arts, Technology and Environment

School: CATE School of Computing and Creative Technologies

Partner institutions: Transport and Telecommunication Institute

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: Not applicable

Features: Not applicable

Educational aims: The aim of this module is to familiarise students with the applied statistical procedures and their computer implementation, and the basis of data processing software as Statistica for example.

Outline syllabus: •Introduction to the course. Overview of data science.

•Introduction to core concepts and technologies: the data science process, toolkit and types of data.

•Data intake. Data pre-processing.

•Handling missing data and outliers.

•Descriptive statistics fundamentals.

•Visualization fundamentals.

•Inferential statistics fundamentals.

•Hypothesis testing. Distribution fitting.

•Distribution fitting.

•Inferential statistics fundamentals. Hypothesis testing. Two-sample problem. Homogeneity.

•Machine learning algorithms. Simple regression.

•Machine learning algorithms, multiple regression.

•Machine learning algorithms. Stepwise methods in regression. Non-linear, regression.

•Machine learning algorithms. The generalized linear model, link function, logistic regression.

•Machine learning algorithms.

•Introduction to Bayes Models.

•Time series. Criteria of trend analysis.

•ARIMA model.

•Spatial data.

•Text as data.

Part 3: Teaching and learning methods

Teaching and learning methods: Learning and teaching will be provided to students in two forms: lectures and laboratory works. During lectures, theoretical aspects of the course will be provided to students by the teaching staff. Lectures will be supported by presentations published and available to the students on e.tsi.lv under the module section. Also, additional materials, like publications on the internet, videos etc will be presented in e.tsi.lv.

During laboratory work each student receives an individual variant of the dataset for analysis.

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

MO1 Use data cleansing techniques to make data ready for analysis.

MO2 Create and evaluate models using programming code to perform data exploration, analysis, and to make predictions.

MO3 Extract knowledge and insights from data using a combination of statistical analysis, machine learning techniques, and domain expertise to provide real-world solutions.

Hours to be allocated: 120

Contact hours:

Independent study/self-guided study = 96 hours

Face-to-face learning = 64 hours

Total = 160

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/B1C41FB1-9105-E435-651D-6A48F50762CF.html?lang=en-gb&login=1

Part 4: Assessment

Assessment strategy: To assess the learning outcomes of this course, several types of activities are provided, which include:

1) performing laboratory works,

2) midterm test,

3) examination,

The main task is the acquisition of practical skills and the application of theoretical knowledge gained during the classes. Based on the results of the implementation, a report is prepared. In addition to the assessment, the student receives feedback on

the work done. The course ends with an exam, which is aimed at assessing the theoretical knowledge and practical skills acquired by the student in the process of studying the course.

Resits will be like for like.

Assessment tasks:

Written Assignment (First Sit)

Description: Using a given case study, students will write a report describing their solutions and findings. (max 3000 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Practical Skills Assessment (First Sit)

Description: A controlled simulation to assess students skills and ability to produce data cleansing and data analysis using various techniques. (3 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3

Written Assignment (Resit)

Description: Using a given case study, students will write a report describing their solutions and findings. (max 3000 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Practical Skills Assessment (Resit)

Description: A controlled simulation to assess students skills and ability to produce data cleansing and data analysis using various techniques. (3 hours)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science and Software Development {Double Degree} [Feb][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Oct][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Oct][PT][TSI][5yrs] BSc (Hons) 2020-21

Computer Science and Software Development {Double Degree} [Feb][PT][TSI][5yrs] BSc (Hons) 2020-21