Module Specification

Data Analysis [TSI]

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

Contents

Part 1: Information

Module title: Data Analysis [TSI]

Module code: UFMFJY-6-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 6

ECTS credit rating: 3

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: Transport and Telecommunication Institute

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: The module is designed to introduce students to concepts and technologies of data analysis.

Features: Not applicable

Educational aims: Students will acquire the ability to understand and interpret statistical data output and apply modern data analysis methods for gaining new business insights.

Outline syllabus: Basic data analysis tasks and techniques review.

Big Data challenges.

Understanding and pre-processing data

Exploratory data analysis: measures of variability, heterogeneity, concentration, asymmetry.

Data visualisation.

Cluster analysis: overview, types of clustering, algorithms (k-means and hierarchical clustering) and applications of clustering.

Statistical classification: overview, classifiers (linear discriminant and logistic regression) and applications of classification.

Forecasting: overview, models (seasonal decomposition, smoothing, ARIMA).

Part 3: Teaching and learning methods

Teaching and learning methods: Learning and teaching will be provided to students in two forms: lectures and computer labs.

During lectures, theoretical aspects of the module will be provided to students by the teaching staff. Lectures will be supported by presentation published and available to the students on e.tsi.lv as well as additional materials (publications, videos, etc.).

Computer labs are devoted to practical data analysis using modern software. SPSS will be used for illustration of techniques and output analysis; students are allowed to use other software packages (e.g., R, Python) by a prior agreement with the module instructor. Computer lab classes are reserved for requirement clarifications, problem

discussion, and assessment.; students are expected to carry out the work independently outside the classes.

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

MO1 Communicate using the conventional terminology of the discipline

MO2 Identify promising business and research applications of data analysis.

MO3 Describe and apply modern methods of data exploration, clustering, classification, and forecasting.

MO4 Evaluate and explain the results of different data analysis algorithms.

MO5 Apply data analysis methods for a real data set and obtain well-grounded business insights

Hours to be allocated: 60

Contact hours:

Independent study/self-guided study = 56 hours

Face-to-face learning = 24 hours

Total = 80

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/77B2FE68-ADB3-9601-6DC5-FC03640CE36D.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

A written examination

Computer lab reports (on clustering, classification, and forecasting). The work will be carried out by students individually and independently.

Individual research project on data analysis. This consists of a collection of data on a topic (of the student's choice) and the application of one data analysis technique.

Resit is the same as the first sit

Assessment tasks:

Laboratory Report (First Sit)
Description: Individual report on computer labs (clustering, classification, and forecasting). (max 1500 words)
Weighting: 15 %
Final assessment: No
Group work: No
Learning outcomes tested: MO4, MO5

Report (First Sit)
Description: Individual research project on data analysis. (max 1500 words)
Weighting: 45 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO5

Examination (First Sit)
Description: A written 2-hour closed-book exam of theoretical questions.
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO3, MO4

Laboratory Report (Resit)
Description: Individual report on computer labs (clustering, classification, and forecasting). (max 1500 words)
Weighting: 15 %
Final assessment: No

Group work: No

Learning outcomes tested:

Report (Resit)

Description: Individual research project on data analysis. (max 1500 words)

Weighting: 45 %

Final assessment: No

Group work: No

Learning outcomes tested:

Examination (Resit)

Description: A written 2-hour closed-book exam of theoretical questions.

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested:

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aviation Management and Sustainability {Double Degree} [TSI] MSc 2023-24