Module Specification

Advanced Statistics

Version: 2021-22, v1.0, 03 Aug 2020

Contents

Part 1: Information

Module title: Advanced Statistics

Module code: UFMFJR-15-M

Level: Level 7

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: In this module, students will learn advanced statistical modelling techniques for complex data using modern statistical programming software. This module will cover dimension reduction, data visualisation, supervised and unsupervised learning, in the framework of creating reproducible research.

Features: Not applicable

Educational aims: This module is concerned with the application of modern statistical methods suitable for modelling complex data. There will be extensive use of statistical computer packages,

On successful completion of this module students will be able to

1) produce reproducible statistical research using modern programming tools

2) identify appropriate exploratory data analysis techniques and then combine appropriate modelling techniques for a variety of situations

3) assess model diagnostics to inform empirical model building

4) interpret and explain a wide variety of statistical models in different contexts to both expert and non-expert audiences

5) examine limitations of inference from statistical models based on model evaluation techniques

Outline syllabus: Supervised learning

Random Forests

Unsupervised learning (clustering)

Semi-supervised learning

Dimension reduction (Principal Component Analysis/ Factor Analysis)

Variable selection

Visualisation

Part 3: Teaching and learning methods

Teaching and learning methods: The learning will take place in PC lab tutorials and lectorials working on empirical dataset

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

MO1 assess model diagnostics to inform empirical model building On successful completion of this module students will achieve the following learning outcomes.

MO2 interpret and explain a wide variety of statistical models in different contexts to both expert and non-expert audiences On successful completion of this module students will achieve the following learning outcomes.

MO3 identify appropriate exploratory data analysis techniques and then combine appropriate modelling techniques for a variety of situations On successful completion of this module students will achieve the following learning outcomes.

MO4 examine limitations of inference from statistical models based on model evaluation techniques On successful completion of this module students will achieve the following learning outcomes.

MO5 produce reproducible statistical research using modern programming tools

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Lectorials = 36 hours

Total = 150

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/22AD558B-DF30-1F22-6BB7-E69B1F5CEBAD.html

Part 4: Assessment

Assessment strategy: Formative assessment will be delivered throughout the module.

Summative assessment will be in the form of an assessment of practical and analytical skills, understanding and application of knwledge using a an individual coursework submission based on a data analytics scenario.

Assessment components:

Written Assignment - Component A (First Sit)

Description: Individual course work report. 2000 words.

Weighting: 100 %

Final assessment: No

Group work: No

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

Written Assignment - Component A (Resit)

Description: Individual course work report. 2000 words.

Weighting: 100 %

Final assessment: No

Group work: No

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

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Data Science [Sep][FT][GCET][1yr] MSc 2021-22

Data Science [Sep][FT][Frenchay][1yr] MSc 2021-22

Data Science [Sep][PT][Frenchay][2yrs] MSc 2021-22

Data Science [Sep][FT][TBC][1yr] MSc 2022-23