Module Specification

Multivariate Statistical Modelling

Version: 2021-22, v2.0, 28 Jun 2021

Contents

Part 1: Information

Module title: Multivariate Statistical Modelling

Module code: UFMFW9-30-3

Level: Level 6

For implementation from: 2021-22

UWE credit rating: 30

ECTS credit rating: 15

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: Statistical Modelling 2021-22

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 is concerned with the application of modern statistical methods suitable for modelling complex data. There will be extensive use of statistical computer packages, including: Minitab, R and SPSS

Outline syllabus: Bayesian Statistics:

Bayesian paradigm

Conjugacy

Computing Posterior Densities – exact and numerical methods

Prior Elicitation including building robust priors

Multivariate Statistics:

Cluster Analysis, CHAID/CART

Factor Analysis and Principal Components Analysis

Structural Equation Modelling

Correspondence Analysis

Multidimensional Scaling

Multivariate Multiple Regression

Generalised Linear Models:

Introduction to the exponential family of distributions

Canonical form of the natural exponential family

Link functions

Associated model diagnostics, model fitting and model building

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled teaching hours will take the form of lectures, workshops and computer practicals. The students will be directed to a programme of self study initiated by the lecture sessions and supported by the practicals/workshops.

Contact time 72 hours

Assimilation and development of knowledge 150 hours

Assessment 78 hours

TOTAL 300 HOURS

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

MO1 Determine appropriate statistical techniques for given contexts and then apply these using modern day software On successful completion of this module students will achieve the following learning outcomes.

MO2 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.

MO3 Assess model diagnostics to inform empirical model building On successful completion of this module students will achieve the following learning outcomes.

MO4 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.

MO5 Examine limitations of inference from statistical models based on model evaluation techniques

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

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/ufmfw9-30-3.html

Part 4: Assessment

Assessment strategy: Component A consists of an examination which assesses students' understanding of concepts and techniques as well as their ability to interpret results within different contexts.

Component B consists of an assignment that will focus on the statistical modelling of data and the mathematical principles on which those techniques are based.

Assessment components:

Examination (Online) - Component A (First Sit)

Description: Online Written examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3, MO4, MO5

Written Assignment - Component B (First Sit)

Description: Coursework (max 12 pages)

Weighting: 50 %

Final assessment: No

Group work: No

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

Examination (Online) - Component A (Resit)

Description: Online Written examination

Weighting: 50 %

Final assessment: Yes

Group work: No

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

Written Assignment - Component B (Resit)

Description: One coursework comparable with the coursework in the first assessment attempt. (max 12 pages)

Weighting: 50 %

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:

Mathematics and Statistics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2019-20

Mathematics and Statistics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19

Mathematics and Statistics {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19

Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2019-20

Mathematics [Sep][SW][Frenchay][5yrs] MMath 2018-19

Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2018-19

Mathematics {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19