



Module Specification

Statistical Applications

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Part 1: Information

Module title: Statistical Applications

Module code: UFMFPV-30-2

Level: Level 5

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 Investigations 2020-21

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module advances critical and analytic thinking using quantitative research methodology. It expands the data handling skills developed at level 4, including greater awareness of different data sources, formats, and applications.

Students will be equipped with tools that they will use to analyse real problems involving 'messy' or 'big' data. The skills developed in this module are applied to an

even broader range of settings in level 6 modules. This is a key module within the programme in which formal report writing and data visualization is developed and assessed.

As part of problem solving, students will critically evaluate and apply appropriate statistical software, including statistical programming language(s) alongside programming language(s) taught in other modules.

Features: Not applicable

Educational aims: This module provides core knowledge of statistical techniques and ensures students develop critical and analytic thinking using quantitative research methodology.

Specifically, students will study fundamental statistical techniques that underpin the analysis of data, with an emphasis on more advanced techniques that involve multiple repeated measures, multiple factors or non-continuous dependent variable.

Outline syllabus: Key concepts in statistical inference

Introduction to R statistical software

Sampling distributions and Bayesian statistics

ANOVA and nonparametric equivalents

Multiple regression

Regression diagnostics and transformations

Binary logistic regression

Time series

Part 3: Teaching and learning methods

Teaching and learning methods: The delivery is designed to promote active learning, comprising interactive lectures, problem-based computer practicals, and lectorials.

The delivery has an emphasis on the use of statistical software, including that seen at level 4, and software introduced in this module. Continued use of software

expands data handling skills, awareness of different data, and tools to analyse 'messy' data. Therefore, as concepts are introduced during lectures, they will be illustrated by examples that demonstrate the use and interpretation of software. To complement this, computer practicals will involve students completing actual data analysis using software. Lectorials provide flexible opportunities for combining the two above approaches.

Lectures also provide space for critical and analytic thinking that does not require software. Therefore lectures will introduce theoretical statistical concepts and provide active learning through engaging with solving examples.

Students develop skills in formal report writing and data visualization through assessment, and also through a continued emphasis on output and communication throughout the delivery. All examples (both in course notes and computer practicals) show a complete data analysis, so that all examples demonstrate the features of a statistical analysis and how these may be critiqued in a formal report. All computer practicals are based around preparing computer output for a formal report, so that feedback and feed-forward on the summative report-writing is strengthened by feedback and feed-forward during computer practicals.

Module Learning outcomes:

MO1 Analyse and solve statistical problems using probability theory, and statistical inference

MO2 Identify, execute and evaluate appropriate statistical analyses for research questions, including those that involve multiple groups or independent variables

MO3 Select and apply statistical software to aid statistical analyses, including those that involve multiple repeated measures, multiple factors or non-continuous dependent variables.

MO4 Communicate the results, conclusions, strengths and limitations of statistical analyses through formal reports

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](https://rl.talis.com/3/uwe/lists/833B0783-74AA-7C5E-3912-0CD2DBD3D6A5.html) via the following link <https://rl.talis.com/3/uwe/lists/833B0783-74AA-7C5E-3912-0CD2DBD3D6A5.html>

Part 4: Assessment

Assessment strategy: Module assessment is designed to allow students to demonstrate their achievement of the learning outcomes, while minimising the amount of assessment necessary for this.

The coursework component of the assessment requires students to communicate data analyses in formal reports. This is specifically one of the learning outcomes. Through formal reports, students will also demonstrate that they can identify appropriate statistical analyses for the reports, and apply appropriate statistical software. Three formal reports are required throughout the year.

The feedback and feed-forward received for each report is an important learning provider, and this is embedded in the spacing of hand-ins. A best-two-out-of-three strategy applies to the grading of coursework. This minimises the assessment burden for students who have demonstrated they meet the learning outcomes through two reports, but also provides opportunities for students to maximise the feed-forward they have received from previous reports.

Component A takes the form of a partially seen 3 hour examination at the end of the module. The partially-seen format allows for exam preparation, in which students identify appropriate statistical analyses for the exam questions, and apply appropriate statistical software. The examination also assesses students' ability to analysis and solve problems using probability and statistical inference theory. Partially-seen exams reduce the assessment burden by reducing anxiety associated

with surprise, and allowing for focused preparation.

The resit assessment strategy retains the 3 hour written examination and replaces component B with a single written report

Assessment components:

Examination (Online) - Component A (First Sit)

Description: Online examination with partially seen or partially redacted questions
(24 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Report - Component B (First Sit)

Description: 3 written reports of maximum 9 pages including supporting material.

Marks from best 2 out of 3 to count

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Examination (Online) - Component A (Resit)

Description: Online examination with partially seen or partially redacted questions
(24 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Report - Component B (Resit)

Description: Written report of maximum 15 pages including supporting material

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2020-21

Mathematics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2020-21

Mathematics with Qualified Teacher Status [Sep][FT][Frenchay][3yrs] BSc 2020-21