Module Specification

Statistical Investigations

Version: 2023-24, v3.0, 19 Jul 2023

Contents

Part 1: Information

Module title: Statistical Investigations

Module code: UFMFKV-30-1

Level: Level 4

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

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: This module enhances skills required for the professional mathematician. Students will develop critical and analytical thinking in a world that is complicated by its random nature. Statistics enables students to conduct effective research, carrying out investigations that determine whether an observed effect is due to chance or is evidence of a real phenomenon. Familiarity with statistics is an essential component of academic literacy, enabling better understanding of reported results. Students will be able to critically assess information and detect misrepresentation of data.

Students will consider the exploration and analysis of real-world problems that reflect the widespread application of statistics to virtually every profession and academic discipline. The inclusion of probability theory in this module allows students to see the wider applicability of the set theory and calculus taught in other modules. This module makes use of the consultancy skills learned throughout the programme.

Students will develop their acquired knowledge via a substantial problem-based learning activity where they will develop critical awareness, intuition and interpretation skills in the application of statistical procedures.

Features: Not applicable

Educational aims: The aim of this module is to introduce fundamental statistical techniques that underpin the analysis of data. This module provides basis for progression to Level 2 which extends the principles learned in this module.

Outline syllabus: Types of data. Data collection methods. Sampling methods. Exploratory data analysis, methods of exploring, summarising and illustrating data. Probability. Single, joint and marginal distributions. Mathematical expectation. Common discrete and continuous probability distributions including binomial, negative binomial, Poisson, uniform, exponential, normal, t, F, Chi.
Estimation. Sampling distributions. Confidence intervals.
Hypothesis testing: z-tests, t-tests, F-test for variances, Chi-square tests for contingency tables and goodness of fit, one-way ANOVA, nonparametric tests.
Correlation, simple linear regression, introduction to multiple regression.
Time series models via moving average and exponential smoothing.

Part 3: Teaching and learning methods

Teaching and learning methods: The delivery will comprise lectures, computer practicals and classroom workshops. The computer practicals and classroom workshops will include the use of statistical software. Emphasis will be on the choice of analysis and on the interpretation and communication of results.

Typically the scheduled teaching hours take the form of:

Whole group lectures, used to deliver new material.
Computer labs where consolidation of previous material via the use of statistical software, e-Assessments and through the completion of analysis templates.
TEAL room lectorials to deliver new and supplementary materials via group working.

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

MO1 Analyse and solve statistical problems using the basic concepts of probability theory, study design and statistical inference.

MO2 Identify, execute and evaluate appropriate statistical analyses for given research questions and data structures.

MO3 Apply statistical software to aid statistical analyses.

MO4 Communicate the results and conclusions of statistical analyses in a manner suitable for a formal report.

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://rl.talis.com/3/uwe/lists/5ACFE1AF-FB39-60D4-6245-3AD41C02A51E.html

Part 4: Assessment

Assessment strategy: Assessment consists of a series of relevant tasks and a portfolio

The tasks assess students' understanding of concepts and techniques together with their ability to apply them. The tasks will be distributed throughout the year. Each assessment task will be of 30 minutes duration.

The portfolio consists of two elements: a written assignment requiring students to report on activities and findings of a week long project-based learning activity that is designed to test understanding of material and formal test reporting. The output will be a maximum of 8 pages and written solutions to problems showing understanding of mathematical statistics theory.

The resit will take the same format at the sit, with equivalent tasks to the sit.

Assessment tasks:

Portfolio (First Sit)
Description: Daily project week assessment activities and written report (8 pages) plus solution to technical problems
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Practical Skills Assessment (First Sit)
Description: A series of short assessments
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Portfolio (Resit)
Description: Daily project week assessment activities and written report (8 pages) plus solution to technical problems
Weighting: 50 %
Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Practical Skills Assessment (Resit)

Description: A series of short assessments

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mathematics [Frenchay] BSc (Hons) 2023-24

Mathematics with Qualified Teacher Status {Foundation} [Sep][FT][Frenchay][3yrs] - Not Running BSc (Hons) 2022-23

Mathematics {Foundation} [Frenchay] BSc (Hons) 2022-23