ST952-15 An Introduction to Statistical Practice

23/24

Department
Statistics
Level
Taught Postgraduate Level
Module leader
Teresa Brunsdon
Credit value
15
Module duration
10 weeks
Assessment
50% coursework, 50% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module runs in Term 1 and is core for students on an MSc in Statistics. It is not available for undergraduate students.

Module web page

Module aims

Students on the Diploma and MSc often had diverse academic backgrounds. This course complements ST903 Statistical Methods in giving a common starting point to the programme, with an emphasis on learning skills in practical statistics.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

- Exploratory data analysis (numerical and graphical measures)
- A hands-on introduction to R, exercises to learn basics of R.

- Simpson's paradox, Regression to the mean, Correlation vs causation
- Simple linear regression; Correlation coefficient, SD line, Regression Line
- Multiple linear regression; Diagnostic plots, Hypothesis testing, ANOVA
- Structured Data (coming from simple experimental designs)
- Generalised Linear Models; Poisson and Binomial data
- Resampling methods such as the BootStrap

Learning outcomes

By the end of the module, students should be able to:

- Computational skills: Basic use of R, search for commands in help files and understand them, dealing with data (collecting, typing in, downloading, storing, sharing etc.)
- Descriptive statistics and Explorative Data Analysis (EDA): Data structures, appropriateness of data (relevance to the scientific question(S), completeness, quality etc.), representation of data (choice of the form, optimal layout, misleading representation etc.), strategies to explore certain aspects of the data
- Modelling and analysis: choice of model, discussion of model assumptions, fitting models, validation and comparison of models, prediction, sensitivity analysis (in respect to assumptions and sample data), simulation
- Context: translating scientific queries into statistical questions, classification of investigations, drawing scientific conclusions from statistical analysis
- Communication skills: listening, asking questions, explaining analysis, approach and delivering results to a non-statistician, writing a report

Indicative reading list

View reading list on Talis Aspire

Subject specific skills

-Data structures, appropriateness of data (relevance to the scientific question(s), completeness, quality etc.), representation of data (choice of the form, optimal layout, misleading representation etc.), strategies to explore certain aspects of the data
-choice of model, discussion of model assumptions, fitting models, validation and comparison of models, prediction, sensitivity analysis (in respect to assumptions and sample data), simulation
-translating scientific queries into statistical questions, classification of investigations, drawing scientific conclusions from statistical analysis

Transferable skills

-Basic use of R, search for commands in help files and understand them, dealing with data (collecting, typing in, downloading, storing, sharing etc.)
-listening, asking questions, explaining analysis approach and delivering results to a non-statistician, writing a report.

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Practical classes	10 sessions of 2 hours (13%)
Private study	36 hours (24%)
Assessment	74 hours (49%)
Total	150 hours

Private study description

Weekly revision of lecture notes and materials, wider reading, practice exercises, learning to code in R and preparing for examination.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group C4

	Weighting	Study time
Assignment 1 & 2	50%	72 hours

You will work as part of a small group to carry out analysis of a dataset and provide a written report in response to a set of prompt questions.
500 words is equivalent to one page of text, diagrams, formula or equations.

You will work as part of a small group to carry out analysis of a dataset and provide a written report in response to a set of prompt questions.
500 words is equivalent to one page of text, diagrams, formula or equations.

On-campus Examination	50%	2 hours

The examination paper will contain four questions, of which the best marks of THREE questions will be used to calculate your grade.

	Weighting	Study time

- Answerbook Pink (12 page)
- Students may use a calculator
- Cambridge Statistical Tables (blue)

Feedback on assessment

Feedback for reports will be available within 20 working days.

Cohort level feedback and solutions will be provided for the examination.

Past exam papers for ST952

Availability

Post-requisite modules

If you pass this module, you can take:

- ST409-15 Medical Statistics with Advanced Topics

Courses

This module is Core for:

- Year 1 of TSTA-G4P1 Postgraduate Taught Statistics