

ST404-15 Applied Statistical Modelling

24/25

Department

Statistics

Level

Undergraduate Level 4

Module leader

Martyn Parker

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module runs in Term 2 and is core for students on MMORSE or MMathStat courses (Integrated Masters).

It is not available as an Unusual Option to any other students.

Module aims

To introduce the art of statistical model-building and to give practice in team work, in communication and presentation skills, and in writing a report on a statistical investigation.

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.

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Modelling strategies for multiple regression on real data
Diagnostic analysis for statistical linear models using R
Extensions to the classic linear statistical model

Generalised linear models
Teamwork, leadership & communication
Oral presentation and academic writing skills

Learning outcomes

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

- Be able to build, interpret and evaluate a statistical model for a real data set;
- Have gained experience of working in a team on a statistical investigation;
- Have practised their oral and written presentation skills.

Subject specific skills

Exploratory data analysis, practical data modeling, the use of data transformations. Application of generalized linear models, model criticism: residual and influential analysis, multicollinearity, variable selection and shrinkage methods. Use of statistical software.

Transferable skills

Report writing and presentation skills. Team working. Use of code in programs. Critical thinking and problem solving. Self-reflection . Team management.

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (19%)
Practical classes	6 sessions of 1 hour (4%)
Assessment	120 hours (77%)
Total	156 hours

Private study description

No private study requirements defined for this module.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group A5

	Weighting	Study time
Group statistics modelling portfolio	60%	80 hours

A portfolio of work carried out as a team and individual that builds evidence of professional team work to complete a data analysis task. This evidence includes the following.

1. Professional team reports presenting the analysis and findings of the group from the data analysis tasks set.
2. An approximate 20-minute professional team oral presentation detailing the analysis of main findings. The intended audience is considered professional but without formal statistical training.
3. A short individual piece on teamwork.

Due to the nature of the work undertaken and the difficulty in assigning a word count to equations, figures, tables, graphics, data output and computer code, the word count is an approximation, and an individual word count may vary depending on the nature of the analysis undertaken.

The total length of the project will be no more than 12 pages including figures, tables, graphics, output. Computer code should be well commented and included in a separate appendix which does not count towards the page limit, unless specified otherwise. The submitted code must be reproducible, allowing another person to reconstruct presented results without the need to make any changes. The individual piece does not count towards this page limit.

Individual Assignment	40%	40 hours
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Using a provided data set, create research questions, carry out analysis and then present, discuss, and evaluate the results of this analysis.

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Assessment group R1

Weighting

Study time

Statistics Modelling Assessment 100%

An individual data analysis task using a data set, that includes research question specification, analysis and then presentation, discussion, and evaluation of the results of this analysis. The assessment will include a reflection on team working.

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The total length of the project will be no more than 12 pages including figures, tables, graphics, output. Computer code should be well commented and included in a separate appendix which does not count towards the page limit, unless specified otherwise. The submitted code must be reproducible, allowing another person to reconstruct presented results without the need to make any changes.

Feedback on assessment

Coursework with deadline in Term 2 will have feedback within 20 working days of deadline.

Coursework with deadline in Term 3 will not have feedback returned until after the module mark is reported by the exam board.

Availability

Pre-requisites

To take this module, you must have passed:

- All of
 - [ST218-12 Mathematical Statistics Part A](#)
 - [ST219-12 Mathematical Statistics Part B](#)
 - [ST221-12 Linear Statistical Modelling](#)

Courses

This module is Core for:

- USTA-G300 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics
 - Year 3 of G30A Master of Maths, Op.Res, Stats & Economics (Actuarial and Financial Mathematics Stream)
 - Year 3 of G30B Master of Maths, Op.Res, Stats & Economics (Econometrics and Mathematical Economics Stream)

- Year 3 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
- Year 3 of G30C Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream)
- Year 3 of G30D Master of Maths, Op.Res, Stats & Economics (Statistics with Mathematics Stream)
- USTA-G301 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics (with Intercalated
 - Year 3 of G30E Master of Maths, Op.Res, Stats & Economics (Actuarial and Financial Mathematics Stream) Int
 - Year 3 of G30F Master of Maths, Op.Res, Stats & Economics (Econometrics and Mathematical Economics Stream) Int
 - Year 3 of G30G Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream) Int
 - Year 3 of G30H Master of Maths, Op.Res, Stats & Economics (Statistics with Mathematics Stream)
 - Year 4 of G30E Master of Maths, Op.Res, Stats & Economics (Actuarial and Financial Mathematics Stream) Int
 - Year 4 of G30F Master of Maths, Op.Res, Stats & Economics (Econometrics and Mathematical Economics Stream) Int
 - Year 4 of G30G Master of Maths, Op.Res, Stats & Economics (Operational Research and Statistics Stream) Int
 - Year 4 of G30H Master of Maths, Op.Res, Stats & Economics (Statistics with Mathematics Stream)
- Year 3 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- Year 4 of USTA-G1G4 Undergraduate Mathematics and Statistics (BSc MMathStat) (with Intercalated Year)

This module is Optional for:

- Year 1 of TMAA-G1PE Master of Advanced Study in Mathematical Sciences