ST404-15 Applied Statistical Modelling

22/23

Department
Statistics
Level
Undergraduate Level 4
Module leader
Paul Skerritt
Credit value
15
Module duration
10 weeks
Assessment
100% coursework
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.

Pre-requisites: ST218, ST219 and ST221

Module web page

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.

- 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.

Indicative reading list

S. Sheather (2009). A modern approach to regression with R. Springer Science & Business Media.
J. Derr (2000). Statistical consulting: A guide to effective communication.
J Faraway (2002): Practical Regression and ANOVA using R.
J. Fox and S.Weisberg (2002): An R Companion to Applied Regression. Springer.

View reading list on Talis Aspire

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 including Bayesian 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 (83%)
Practical classes	6 sessions of 1 hour (17%)
Total	36 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 A3

Assessment component	Weighting	Study time	Eligible for self-certification
Assignment 3	35%	40 hours	Yes (extension)

Due Term 3 Week 2.
You will use provided data sets to devise research questions, carry out analysis and then present, discuss and evaluate the results. 500 words is equivalent to one page of text, diagrams, formula or equations; your ST404 Assignment 3 should not exceed 7 pages in length.

Reassessment component is the same

Assessment component	Weighting	Study time	Eligible for self-certification
Assignment 2: Group Poster Presentation	10%	11 hours	Yes (waive)

Term 2 Week 9 or 10.
An A1 poster containing a description of your methodology and findings, for a non-specialist audience.

Reassessment component is the same

	Weighting	Study time	Eligible for self-certification
Assessment component			
Assignment 2: Feedback and reflection	5%	6 hours	Yes (extension)

Due Term 2 Week 8.
Produce feedback on your team work experience as part of ST404. Describe, critically discuss and reflect on what you have learned. 500 words is equivalent to one page of text, diagrams, formula or equations; your ST404 Assignment 2: Feedback and reflection should not exceed 2 pages in length.

Reassessment component is the same

Assessment component			
Assignment 1: Slide Presentation	5%	6 hours	Yes (waive)

Submission due Term 2 Week 5 with presentation taking place in Term 2 Week 6.
A 10 minute oral presentation of the analysis and main findings of the assignment that is visually appealing to a non-technical audience.

Reassessment component is the same

Assessment component			
Assignment 1: Group Report	20%	23 hours	Yes (extension)

Due Term 2 Week 5.
A formal report, to professional standards, presenting the analysis and findings of the group from the task set. 500 words is equivalent to one page of text, diagrams, formula or equations; your ST404 Assignment 1: Group Report should not exceed 5 pages in length.

Reassessment component is the same

Assessment component			
Assignment 2: Group Report	25%	28 hours	Yes (extension)

	Weighting	Study time	Eligible for self-certification

Due Term 2 Week 8.
A report presenting the analysis and findings of the group from the task set. 500 words is equivalent to one page of text, diagrams, formula or equations; your ST404 Assignment 2: Group Report should not exceed 7 pages in length.

Reassessment component is the same

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

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 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