620–371 Linear Models

Lecturer
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Lectures
Monday 10 – 11 Russell Love, Richard Berry Building
Wednesday 11 – 12 Russell Love, Richard Berry Building
Friday 11 – 12 Russell Love, Richard Berry Building

Practice class
Thursday 3:15 – 4:15 Russell Love, Richard Berry Building

Lab class (optional)
TBA 1–2 Nanson computer lab, RBB

Student consultations
TBA 11–12 Room 113, Richard Berry Building
TBA 11–1 Room 113, Richard Berry Building

Details

Assessment
• Assignments 20%
• Project 15%
• Examination 65%

Computing
► R will be used throughout the course.
► R can be downloaded free from the web.
► You will need a Mac running OS X, a PC running Windows 95 or later, or a Unix box (e.g., Linux or a BSD).
Resources

Lecture notes
Available from the University bookroom.

Useful (optional) references
Rao  Statistical Inference and its Applications (2nd edition) (1973)
Weisberg  Applied Linear Regression (2005)
Rencher  Linear Models in Statistics (2000)

Objectives 1

By the end of the subject, students should be able to apply the techniques of General Linear Models to analyse data in a variety of practical situations and have enhanced their skills in the areas of teamwork and communication.
Specific objectives to this end include being able to:

▶ state the main theoretical results of General Linear Models concerning
  ▶ model formulation,
  ▶ model assumptions,
  ▶ estimation (including the concept of estimability),
  ▶ inference (hypothesis testing and confidence intervals),
▶ understand and use the geometric formulation of linear models and least squares

Objectives 2

▶ analyse data for which the General Linear Model assumptions are appropriate, including the following commonly encountered situations:
  ▶ ANOVA (Analysis of Variance) with one or more factors
  ▶ ANCOVA (Analysis of Covariance)
  ▶ multiple regression
  ▶ crossed and nested designs
  ▶ $2^n$ factorial experiments, including the use of confounding
▶ use the following techniques:
  ▶ exploratory data analysis (EDA)
  ▶ model checking using residuals and case analysis
  ▶ model selection
  ▶ multiple comparisons
  ▶ transformations
▶ participate effectively as a team member in a small project
▶ present the results of a statistical analysis in the form of a scientific report
## Revision of 2nd year material

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