Statistical Case Studies - reminder

- Exam Questions and Exercises
  - Explicit instructions
  - Little or no context
  - Data provided, clean, small and ready to go
  - No interaction with other people
  - Completed in a short time
  - Set level of difficulty
- Statistical consultancy with complex real-world data
  - What is the question?
  - Context is very important
  - Data available? Data is a mess?
  - Communication central to success
  - Analysis may evolve over a long time
  - Highly variable level of difficulty

Statistical Case Studies

- Workshop session Thursday 2 hours, 14:10 - 16:00. Will switch room week 3.
- Assessment: 100% coursework.
  - Consultancy style group project. Part 1 - 10% (deadline 14 Feb 16:00, wk 5) and part 2 - 35% (deadline 28 March 16:00, wk 10)
  - Presentation / Poster 10% in week 11. Can choose project from semester 1 or semester 2.
- Self selected groups which can differ between part 1 and 2.
- Lecturer Semester 2: Amy Wilson, Amy.L.Wilson@ed.ac.uk
- Online tools: Learn Ultra, PIAZZA

Time plan (provisional)

- Week 1
  - L0 Overview Semester, L1 Introduction to General Linear Models, L2 Linear Models in R
  - Exercises in R
- Week 2
  - L3 Interpretation, Correlation and Confounding; L4 Model selection
  - Exercises in R
- Week 3
  - Linear model exercises.
  - L5 - responsible statistics.
  - Setting up project groups
  - Project 1 part 1 is handed out start of week; workshop for project support
- Week 4 - 5
  - Workshops for project support
  - Hand in project 1 part 1 end of week 5

Time plan (provisional)

- Week 6 - 10
  - Week 6 hand out project 1 part 2
  - L6 future planning for energy systems
  - L7 other topics
  - workshops for project support
- Week 10 - hand in project 1 part 2
- Week 11 - Presentations

Online tools

- Learn
  - lectures and lecture slides
  - Exercises
  - Project Data and background material
  - Guides for project
- PIAZZA: Question and Answer forum

Methods semester 2

- General linear model introduction; theory results; Interactions and identifiability;
- Linear models in R; Model checking; Prediction;
- Interpretation, correlation and confounding; Model comparison and selection; Model selection strategies.
- Responsible statistics, datasets, real-world applications.
- Emphasis is on application in R, interpretation of results and not on theory.

Methods semester 1

- Books
  - Wood, S. N., Core Statistics, Cambridge University Press, 2015. – Chapter 7.
  - Weisberg, S., Applied Linear Regression, 2nd Edition, Wiley, 2005.
  - Faraway, J.J., 2015. Linear models with R. CRC press. 2nd edition.

Part 1: Insulin vs C-Peptide, a statistical expert witness question.

- Small initial project to get you used to handling data sets, creating informative graphics, and fitting linear models.

Part 2: modelling of GB electricity demand.

- The National Electricity System Operator (NESO) has responsibility for planning investment in the GB electricity system.
- To do this, they:
  - Need to understand the main drivers of peak electricity demand to help them predict future changes.
  - Need to be able to normalise historical data by extracting long-term trends in peak demand but at the same time, keeping fluctuations due to weather conditions.
- The part 2 project will look at a dataset of GB electricity demand and a number of possible covariates to try and help answer these questions.