

# LTCC Advanced Statistics Course

- Title: **Regression Diagnostics and the Forward Search**
- Basic Details:
  - Core Audience: Statistics
  - Course Format: Advanced (10hr)
- Course Description:
  - Keywords: Data analysis, graphical methods, ordering data, outliers, robustness, unsuspected structure.
  - Syllabus:
    1. Regression diagnostics and their failure in the presence of multiple outliers [1].
    2. The forward search (FS) in regression. The importance of plots [1].
    3. Choosing a Box-Cox transformation. The fan plot and envelopes for statistics in the FS [1].
    4. Building regression and time series models with the FS. The distribution of statistics [1].
    5. A single multivariate sample. Properties of Mahalanobis distances in the FS [1].
    6. Multivariate transformations to normality [1].
    7. Clustering with the FS. Comparisons with other clustering methods [2].
    8. Practical [2].
  - Recommended reading: A.C. Atkinson and M. Riani "Robust, Diagnostic Regression Analysis". Springer (2000).  
A.C. Atkinson, M. Riani and A. Cerioli "Exploring Multivariate Data with the forward Search". Springer (2004).
  - Prerequisites: some knowledge of regression.
  - Preliminary reading: A.C. Atkinson "Plots, Transformations and Regression". Oxford (1985).  
R.D. Cook and S. Weisberg. "Applied Regression Including Computing and Graphics", Chapters 1-7 and 13. Wiley (1999).
- Format:
  - No of problem sheets: The problem sheet will encourage the derivation of theoretical results helpful in the understanding of the details of the course material.
  - Electronic lecture notes: lecture material will be made available in .pdf format.
  - Necessary support facilities
  - necessary software requirements for computing facilities. R or S-Plus
  - Proposed timing: early spring 2009
  - Lecture/computer session/tutorial/discussion split: 8 hours lectures and then, in Week 5, a 2 hour practical class
- Lecturer Details:
  - Lecturer: Prof. A.C. Atkinson
  - Lecturer home institution: LSE
  - Lecturer e-mail: a.c.atkinson@lse.ac.uk
  - Lecturer telephone number: