MAS programmes: **Autumn Term 2019**

Statistical Analysis

Teaching:

• **10 × 3 hour Lectures**:
Mondays, September 30th- December 9th 2019.
(**Note: No lecture November 4th - Reading Week)**.
– **Room 532** Malet St for **September 30th only(!!!)**, from 6.00pm to 9.00pm.
– **Room 421** Malet St for all other Mondays, from 6.00pm to 9.00pm.
LECTURER: ANTHONY C. BROOMS (Room 750, Malet St.)
a.brooms@bbk.ac.uk

• **5 Computing Practical Sessions** using the course software R. Thursdays in **UCL Christopher Ingold G20** (Sessions from 6.00pm to 8.00pm, weeks 1-5 only.)

Aims:

To provide a solid grounding in the fundamental theory and practice of statistical modelling, and the analysis of observational and experimental data that can be assumed to be normally distributed (and therefore also continuous).

Outline of Topics to be covered

1. Review of Basic Statistical Concepts.
2. Multiple Linear Regression.
3. Inference for Linear Models.
4. Model Fitting and Diagnostics.
5. Regression using Dummy Variables.
6. One-way ANOVA and Treatment Effects.
7. The Comparison of Treatment Effects.
8. Factorial Models.
9. Blocking in Designs.
10. Nested Models.

A set of notes will be available from Moodle (http://moodle.bbk.ac.uk/). Students can read around the course by using one or more of the recommended texts, perhaps for extra clarification; however, the notes are intended to be fairly self-contained.

Assessment

The totality of the Statistical Analysis module, taught across both the Autumn and Spring Terms, is examined by two elements of assessment:
• coursework (worth 20%);
• written paper (worth 80%) - of which full marks *may* be obtained by correct and complete answers to two out of the three questions in Section A and two out of the three questions in Section B. The paper is taken in or around May/June.

The contribution that the Autumn term portion of the material makes to the above elements of assessment is as follows:

Coursework:-
One assignment (to be handed out at the end of term), *worth 10%*.
Written paper:-
3 questions in Section A of the *Statistical Analysis* paper.

Unassessed coursework

For each part of the syllabus exercises and solutions will be provided. These will include computing exercises which will require you to carry out analysis in `R` both in the computing practical sessions, and in your own time.

YOU SHOULD MAKE EVERY EFFORT TO KEEP UP WITH THE UNASSESSED COURSEWORK TO GIVE YOURSELF PLENTY OF PRACTICE IN BOTH APPLIED AND THEORETICAL EXAMPLES!!!

Recommended Texts

The following is a selection of recommended texts in the area of the course. However, there are many other books available in the library on these topics which may prove equally helpful.

Statistical Analysis and Design of Experiments:
• W. J. Krzanowski, *An Introduction to Statistical Modelling*, Wiley, 2010.
• D. C. Montgomery, *Design and Analysis of Experiments* (7th Edition), Wiley, 2012.

The following web resources provide excellent guides to the `R` language different levels:
• `http://cran.r-project.org/doc/contrib/Short-refcard.pdf` is a 4 page summary of key functions and functionality.
• `http://cran.r-project.org/doc/manuals/R-lang.html` is the main reference manual for the language.

The following statistical tables will be available in the examination:
• Lindley and Scott, *New Cambridge Statistical Tables* (2nd Edition), CUP.