Lecturer: Anthony C. Brooms  
http://www.bbk.ac.uk/ms/brooms/acb.htm  
Office Hours: I am very happy to meet with students outside the normal lecture sessions by appointment - this can be arranged via email.

This course forms part of the provision for the *M.Sc. Applied Statistics programmes*.

**Teaching**

Mondays between 6 and 9p.m.  
• Weeks 1-5 and 7-11: Mondays between 6 and 9 p.m. - UCL Christopher Ingold, Ramsay LT Room G21.

**Outline of Topics to be covered:**

1. Introduction to Markov Chains  
2. Stationary processes and autocorrelations  
3. The properties of AR(1) and MA processes  
4. General autoregressive processes  
5. ARMA and ARIMA processes  
6. Fitting an ARIMA model  
7. Diagnostic checking  
8. Forecasting

**Examination Methods**

4 Section B questions on Paper 1 of the written examination in the summer  
+ 2 assignments (altogether worth 10% of the Probability and Stochastic Modelling module): one to be handed out during week 5 of term and the other during week 11. Both assignments are equally weighted.

**Lectures**

A set of notes will be provided at the start of each lecture, or at the start of each major topic. Notes will be written up on the board to emphasize particular points. 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.
Recommended Texts
Later editions of these may be available from bookstores, however, those listed below should suffice.

Markov Chains


Time Series


The S+ statistical package


Statistical Tables

We will use the following statistical tables:
D. V. Lindley & W. F. Scott *New Cambridge Statistical Tables.*
These are the ones that will be available at examination.
Statistical Computing with S+

The main statistical package for use on this module will be S+.
S+ for Windows is available for use on College workstations. As a registered Birkbeck student, you may also obtain a CD with this software from IT Services.

Using S+ on a workstation

The College workstation rooms in the Birkbeck College Main Building are similar in layout. Relevant ITS documentation may be obtained from the ITS Reception and Helpdesk on the Ground floor. After you have logged on, you may open S+ via the Start button in the bottom left hand corner of the screen:

Start>Programs>Statistical Applications>

then search for SPOTFIRE S+.

In the workstation sessions, you will be able to get to grips with S+ at your own pace. There is a very good help facility within the package: individual commands can be looked up on Help>Available Help>Language Reference>

for example. One approach to learning to use S+ is to start working through the book by KRAUSE & OLSON The Basics of S-PLUS. You should also work through the exercises provided.

The Commands window (accessible from the Window menu in S+) may be used for typing in the S+ commands, and in the lecture notes that is the way in which things will be presented. You also have the easier option of using the GUI (graphical user interface) with its windows, menus, and toolbars. However, for more advanced S+ features and programming, knowledge of the command language will be necessary. One aspect of the GUI that is particularly useful is the Data Set window, in which data may be entered and edited conveniently.

• If you are a new user of the Birkbeck workstations, note that you must use the N: drive for storing personal files; if you are using a temporary account, you will need to save your work on portable media such as a data stick.

• Useful functions in S+ include:
  objects() which gives a listing of the objects on your workspace;
  rm may be used to remove objects that are no longer required;
  help(...) will provide information on the specified function or topic;
  read.table may be used to read a data file and create an S+ data frame from it. However, you will probably find it easier to use the Import Data item from the File Menu in the GUI.