

School of Mathematics

Course 370S — Multivariate Linear Analysis and Applied Forecasting 2001-02
(JS & SS Mathematics, SS Two-Subject Moderatorship Mathematics)

Lecturer: Dr. M. O'Regan and Dr. S. Wilson

Requirements/prerequisites: 251

Duration: 24 weeks

Number of lectures per week: 3

Assessment:

End-of-year Examination:

Description: This course is divided into two modules - Multivariate Linear Analysis (MLA) and Applied Forecasting(AP). Each module runs for 12 weeks.

In the first module the classical multivariate techniques of discriminant analysis, principal component analysis, clustering and logistic regression are included. There is a strong emphasis on the use and interpretation of the techniques. More modern techniques, some of which address the same issues, are covered in the SS course Data Mining.

In the second semester two key methods of forecasting will be examined: exponential smoothing and the Holt-Winters developments of this idea; and regression based methods with seasonal extensions and the use of lagged variables. The course will be practical and will involve every student in extensive analysis of case study material and of a variety of time series.

Assessment is based on compulsory course assignments, worth 40% of the final mark, and a 3 hour examination worth 60%. The assignment marks will be divided equally with 20% from each module. The examination paper will consist of two sections corresponding to the two modules with 3 questions per section. Students will be required to complete 2 questions from each section.

CONTENT

Exploratory Data Analysis

Classical multivariate techniques including discriminant analysis, principal component analysis, clustering and logistic regression

Introduction to forecasting; data and objectives; good forecasts and good methods.

Forecasting via (auto) regression; 1- and k-step ahead prediction intervals; diagnostics.

Forecasting via Exponential Smoothing methods; choice of smoothing parameters.

Use of transformations and differences.

October 11, 2001