

## TIME SERIES ANALYSIS AND FORECASTING WITH FINANCIAL APPLICATIONS

**Level suitable for:** M.Sc. or Ph.D. preliminary

**Instructor:** Visiting Professor Shelton Peiris (The University of Sydney, Australia)

**Duration:** Four weeks

### **1 Objectives:**

Establish some advanced methods of modelling and analysing of time series data. A particular attention is given to the theoretical development of a number of popular financial time series models. Various methods and applications related to the following topics will be covered:

### **2 Course Outline:**

- (i) Linear Time Series Models (ARMA and ARIMA) and their Properties (3 hrs)
- (ii) Seasonal ARIMA Models (2 hrs)
- (iii) Forecasting methods (2 hrs)
- (iv) Analysis and Applications of Long Memory Time Series (4 hrs)
- (v) Analysis of Financial Time Series (ARCH, GARCH and ACD Models) (5 hrs)

### **3 Assumed Knowledge:**

Topics in mathematical statistics at senior (3rd year) level

### **4 Method of Teaching and Learning:**

**Lectures:** 4 hrs a week

**Tutorials:** 1.5 hrs a week

**Computer:** 1.5 hrs a week

#### **Assessments:**

- 2 Assignments - 30% (15% each)
- 1 Technical Report \* - 10%
- Examination - 60%

*\*Note: This report must include the analysis of a real time series (data set) using standard time series techniques and available computer package.*

### **5 References:**

- (a) Spectral Analysis and Time Series. PRIESTLEY, M.B. (Academic Press - 1981).
- (b) The Analysis of Financial Time Series, Tsay, R.S. (John Wiley - 2001).
- (c) Modelling Financial Time Series with SPlus, Zivot, E. and Wang, J. (Springer, New York - 2003).