

LTCC Basic Course

Title: Time Series Analysis

Basic Details:

Core Audience: First year, statistics

Course Format: extended, 5 x 2hr lectures

Course Description:

The aim of this course is to introduce students to the statistical analysis of time series data and simple models, and showcase what time series analysis can be useful for. Topics include: autocorrelation, stationarity, trend removal and seasonal adjustment, basic time series models (e.g. ARMA) and their estimation, introduction to financial time series and the GARCH models. R demonstrations will also be included.

Key words: ARMA, GARCH, stationarity, univariate time series

Syllabus:

- (1) Introduction to time series analysis
- (2) Autocorrelation and Stationarity
- (3) ARMA models
- (4) GARCH models
- (5) [If time permits] Spectral analysis
- (6) [If time permits] Introduction to change-point analysis

Recommended reading:

- Peter J. Brockwell and Richard A. Davis, Introduction to Time Series and Forecasting
- Robert H. Shumway, David S. Stoffer, Time Series Analysis and Its Applications: With R Examples
- Christian Francq and Jean-Michel Zakoian, GARCH Models: Structure, Statistical Inference and Financial Applications

Additional or optional reading:

Prerequisites:

Background in Statistics and Probability

Format:

- Number of discussion/problem sheets: 4
- Electronic lecture notes: yes
- Necessary software: R
- Lecture/computer session/tutorial/discussion split (hours of each): [tentative] 8 hours of lectures and 2 hours of computer session

Lecturer Details:

- Lecturer: Yining Chen
- Lecturer home institution: London School of Economics and Political Science
- Lecturer e-mail: y.chen101@lse.ac.uk
- Lecturer telephone number: +44 (0)20 7107 5416 [To our department office; FYI, LSE has cancelled most of its faculty members' phone numbers since the pandemic started.]