

Subject Description Form

Subject Code	AMA515A
Subject Title	Forecasting and Applied Time Series Analysis
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	To enable students to understand the modelling of time series and apply its use in forecasting, as well as perform empirical analysis using statistical packages.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) Use simple techniques to determine the trend and seasonality of a time series. (b) Identify an appropriate ARMA model for a set of time series data. (c) Determine a time series is stationary or non-stationary. (d) Obtain forecasts based on exponential smoothing models and ARMA models. (e) Describe and apply random walk and GARCH family models.
Subject Synopsis/ Indicative Syllabus	<p>Descriptive techniques and smoothing models: Stationarity; trend; seasonality; autocorrelation; exponential smoothing methods of forecasting.</p> <p>Probability models for time series: Discrete and continuous time series models; autoregressive and moving-average processes; identification, estimation and diagnostic checking of ARMA models; forecasting with ARMA models.</p> <p>Financial time series models: Random walk; ARCH and GARCH modelling.</p>
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to solving problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	e
	1. Assignments	12%	✓	✓	✓	✓	✓
2. Mid-term test	28%	✓	✓	✓	✓		
3. Examination	60%	✓	✓	✓	✓	✓	
Total	100 %						
Continuous Assessment comprises of assignments/ project and a mid-term test. A written examination is held at the end of the semester.							
Student Study Effort Required	Class contact:						
	▪ Lecture		26 Hrs.				
	▪ Tutorial		13 Hrs.				
	Other student study effort:						
	▪ Assignment/Mini-project		30 Hrs.				
	▪ Laboratory		15 Hrs.				
	▪ Self-study		53 Hrs.				
	Total student study effort		137 Hrs.				
Reading List and References	Robert S. Pindyck and Daniel L. Rubinfeld	Econometric Models and Economic Forecasts, 4th Edition	Irwin / McGraw-Hill, 1998				
	Box, G., Jenkins, G. and Reinsel, G.	Time Series Analysis: Forecasting and Control, 4th Edition	John Wiley, 2008				
	Brockwell, P. and Davies, R.	Time Series: Theory and Methods, 2nd Edition	Springer-Verlag, 1991				
	Montgomery, D., Johnson, A. and Gardiner, J.	Forecasting and Time Series Analysis, 2nd Edition	McGraw-Hill, 1990				
	Cryer, J.D. and Chan K.S.	Time Series Analysis with Applications in R, 2nd Edition	Springer, 2008				
	Ruey S. Tsay	An Introduction to Analysis of Financial Data with R	John Wiley, 2013				