

Subject Description Form

Subject Code	AMA515
Subject Title	Forecasting and Applied Time Series Analysis
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<p>Enables students to understand the modelling of time series and apply its use in forecasting.</p> <p>Computer packages such as SAS and MINITAB will be extensively used. Emphasis will be placed on the Box-Jenkins approach.</p>
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> (a) Use simple techniques to determine the trend and seasonality of a time series. (b) Apply exponential smoothing models for forecasting. (c) Determine a time series is stationary or non-stationary. (d) Identify an appropriate ARMA model for a set of time series data. (e) Obtain forecasts based on ARMA models.
Subject Synopsis/ Indicative Syllabus	<p>Descriptive techniques and smoothing models: Trend, seasonality, and autocorrelation; exponential smoothing and Holt-Winter's methods of forecasting.</p> <p>Probability models for time series: Autoregressive and moving-average processes; identification, estimation and diagnostic checking of ARMA models; forecasting with ARMA models; introduction to spectral analysis.</p> <p>Multivariate time series: Cross-covariance and cross-correlation; transfer function modelling; introduction to multivariate ARMA processes.</p>
Teaching/Learning Methodology	<p>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.</p>

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/Project	20%	✓	✓	✓	✓	✓
2. Mid-term test	20%	✓	✓	✓	✓		
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		28 Hrs.				
	▪ Laboratory		14 Hrs.				
	▪ Self-study		56 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					
Wei, W.W.S	Time Series Analysis: Univariate and Multivariate Methods, 2nd Edition	Pearson/Addison Wesley, 2006					
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					

	Chatfield, C.	The Analysis of Time Series: an Introduction, 6th Edition	Chapman & Hall/CRC, 2003
	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