

## Subject Description Form

<b>Subject Code</b>	AMA4650
<b>Subject Title</b>	Forecasting and Applied Time Series Analysis
<b>Credit Value</b>	3
<b>Level</b>	4
<b>Pre-requisite</b>	Applied Linear Models for Finance Analytics (AMA2602) or Applied Linear Models (AMA3602) or Statistical Inference (AMA364/AMA3640) or Statistical Modeling for Discovery (AMA4001/AMA4601) or equivalent
<b>Exclusion</b>	Forecasting and Applied Time Series Analysis (AMA465)
<b>Objectives</b>	This subject is to introduce to students basic concepts and techniques of time series and forecasting. An applied approach will be emphasized.
<b>Intended Learning Outcomes</b>	Upon satisfactory completion of the subject, students should be able to: <ul style="list-style-type: none"> <li>a. state the basic theory of time series analysis and forecasting approaches;</li> <li>b. synthesize the relevant statistical knowledge and techniques for forecasting;</li> <li>c. identify, define and formulate forecasting problem, and use procedures in popular statistical software for the analysis of time series and forecasting;</li> <li>d. interpret analysis results and make recommendations for the choice of forecasting methods;</li> <li>e. produce and evaluate forecasts for given time series;</li> <li>f. present analysis results of forecasting problems.</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><i>Introduction to forecasting and smoothing models (5 hours)</i> Forecasting and time series, forecasting methods and errors, choosing a forecasting technique, simple exponential smoothing and double exponential smoothing.</p> <p><i>Nonseasonal Box-Jenkins models and their identification (11 hours)</i> Stationary and nonstationary time series, sample autocorrelation and partial autocorrelation function, tentative identification of ARMA models.</p> <p><i>Estimation, diagnostic checking, and forecasting for nonseasonal Box-Jenkins Models (14 hours)</i> Estimation, diagnostic checking, forecasting and case study.</p> <p><i>Conditional heteroscedastic time series models (9 hours)</i> ARCH and GARCH models, estimation and testing.</p>
<b>Teaching/Learning Methodology</b>	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce the concepts of forecasting and applied time series analysis in the syllabus, which are then reinforced by learning activities involving

	demonstration, tutorial exercise and assignments/mini-project.							
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d	e	f
	1. Assignments/ Mini-project	20%	✓	✓	✓	✓	✓	✓
	2. Tests	20%	✓	✓		✓	✓	
	3. Examination	60%	✓	✓		✓	✓	✓
Total	100 %							
	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>The subject focuses on knowledge, skill and understanding of <b>Forecasting and Applied Time Series Analysis</b>, thus, <b>Exam-based assessment</b> is the most appropriate assessment method, including 20% test and 60% examination. Moreover, 20% worth of assignments /mini-project are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and/or mini-project, and tests. A written examination is held at the end of the semester.</p>							
<b>Student Study Effort Expected</b>	Class contact:							
	• Lecture							26 Hrs.
	• Tutorial							13 Hrs.
	Other student study effort:							
	• Assignment/mini-project/laboratory							30 Hrs.
	• Self-study							36 Hrs.
	Total student study effort							105 Hrs.
<b>Reading List and References</b>	<u>Textbook:</u>							
	Chatfield, C. & Xing, H.	The Analysis of Time Series: An Introduction with R 7 <sup>th</sup> edition	Chapman and Hall 2019					
	<u>References:</u>							
	Tsay, R.S.	Analysis of Financial Time Series 3 <sup>rd</sup> edition	Wiley-Interscience 2010					
Cryer, J.D. & Chan, K.S.	Time Series Analysis with Applications in R 2 <sup>nd</sup> edition	Springer-Verlag 2008						