

Time Series Analysis & Forecasting (MSM4264)

Course Code	MSM4264								
Course Name	Time Series Analysis & Forecasting								
Credit Hour	4								
Prerequisite Course	Industrial Statistics (MSM4213)								
Contact Hours	Lecture:	3	units	(3 hour(s) per week)					
	Tutorial:	0	unit	(0 hour(s) per week)					
	Laboratory:	2	units	(2 hour(s) per week)					
Rationale for the inclusion	Regression analysis is the most commonly used statistical method and widely used to model time series data, particularly in business and economics fields. The time series data is a set of ordered data with respect to time and time series models are built to represent the serially correlated series. The time series can also exhibit features such as trends and seasonal effects. This course focuses on modelling, making inference and producing forecast data for future observations for the time series data.								
Course Objective	This course will expose students to time series modelling and forecasting. Students will learn the theoretical part of modelling and experience the practical aspects as they apply the basic method of time series analysis for various data series. Students will be able to apply the basic procedures of model building specifically for univariate time series which involve the model identification, parameter estimation, diagnostic checking and forecasting. The students will experience in using the available statistical packages to analyse time series data.								
Course Synopsis	This course presents theories and applications of linear time series for univariate data in economics and finance, sciences, engineering and quantitative data from social sciences. Emphasis is on investigating the pattern of trend of data series, identifying and developing the appropriate time series model, estimating model parameters, running the diagnostic checking and forecasting future values. The Box-Jenkins and GARCH models that are widely applied in linear time series and volatility model, respectively, will be discussed thoroughly. Appropriate statistical packages such as E-Views or R Language (open-source) shall be used to implement the theories in analysing and forecasting the industrial related data. Discussion on real life problems such as financial and investment trends, hydrology and climatology will be covered.								
Program Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	/	/	/						/
Soft Skills	Code		CTPS	CS	TS	LL	ES	EM	LS
	KIM		2						4
Course Outcomes	By the end of semester, students should be able to:								
	CO1	Relate the terminologies and concepts of time series.							
	CO2	Organise time series data to solve related problem in various fields using appropriate statistical techniques.							

	CO3	Adapt statistical software to solve problem in various fields using time series method.					
	CO4	Develop leadership and management skills through solving real industrial problems to meet industrial needs.					
Assessment Methods	Methods	Weighting	CO1	CO2	CO3	CO4	
	Test	30%	/	/	/		
	Assignment	30%		/	/	/	
	Final Exam	40%	/		/		
	Total	100%					
Learning References	1	Box, G.E.P., Jenkins, G.M. and Reinsel, G.C. Time Series Analysis: Forecasting and Control, Fifth Edition, Wiley Series in Probability and Statistics, 2015. (Main Reference)					
	2	Montgomery, D. C., Jennings, C. L., and Kulahci, M. Introduction to Time Series Analysis and Forecasting, Second Edition, Wiley Series in Probability and Statistics. 2015.					
	3	Wei, W. S. W. Time Series Analysis: Univariate and Multivariate Methods Second Edition. Pearson Addison Wesley. 2006. (latest version)					
	4	Tsay, R.S., An Introduction to Analysis of Financial Data with R, Wiley, 2013					
	5	Robert, H.S. and David, S.S. Time Series Analysis and Its Applications With R Examples, Springer Texts in Statistics, 2011. (latest version)					