COURSE SPECIFICATION FORM

for new course proposals and course amendments

DEPARTMENT OF: Mathematics				**Academic Session: 2017-18**	
Course Code:	MT3340	**Course Value:**	0.5	**Status:** *(ie:Core, or Optional)*	Optional
Course Title:	Time Series Analysis			**Availability:** *(state which teaching terms)*	Term 1
Prerequisites:	MT1300 and MT2320			**Recommended:**	MT2300
Co-ordinator:					
Course Staff	**Dr. A. A. Koloydenko**				
Aims:	Time series are observations collected through time and there are correlations among successive observations. Time series data are collected in many fields: finance, economics, medicine, meteorology, agriculture etc. This course aims to introduce some of the descriptive methods and theoretical techniques that are used to analyse time series. The statistical computing package MINITAB is to be used as a data analysis, calculating and graphical aid.				
Learning Outcomes:	On completion of the course the students should be able to: • understand basic concepts and notions of time series analysis; • understand the standard theory around several prototype classes of time series models; • apply appropriate methods of times series analysis and forecasting to a given set of data using an appropriate statistical computing package; • appreciate inferential and associated algorithmic aspects of time-series modeling; • simulate time series based on several prototype classes and using an appropriate statistical computing package;				
Course Content:	Introduction and simple descriptive techniques: Some simple time series models; notions of trend and seasonality; linear filters; convolutions; local regression; estimation and elimination of trend and seasonal components; introduction to relevant functions of a suitable software package. Stationarity: Notions of weak and strict stationarity; autocovariance and autocorrelation functions; linear processes; modes of stochastic convergence ARMA modelling: AR(p), MA(p), and ARMA(p,q) models; characteristic polynomials; conditions for stationarity; causality; model identification and invertibility; Inference: parameter estimation; confidence intervals and tests of hypotheses; forecasting; prediction intervals; Bartlett's formula; Durbin-Levinson algorithm Non-stationary time series: ARIMA models; random walk; identification and forecasting. Further topics: state-space representation				
Teaching & Learning Methods:	33 hours of lectures and examples classes. 117 hours of private study, including work on problem sheets and examination preparation. This may include discussions with the course leader if the student wishes.				
Key Bibliography:	The Analysis of Time Series. An Introduction - C Chatfield (Chapman and Hall). *Library Ref. 518.3 CHA* An Introduction to Time Series and Forecasting -P J Brockwell and R A Davis (Springer Text in Statistics). *Library Ref. 518.3 BRO*				
Formative Assessment & Feedback:	8 problem sheets. The students will receive feedback as written comments on their attempts.				
Summative Assessment:	**Exam** (95%) Four questions out of five in a two-hour written paper. **Coursework** (5%) Ten five minute in-class tests. Best eight marks count 0.625% each. **Deadlines:** n/a				

Updated September 2017