

Semester	FIVE
Paper Number	HSTCR5112T & HSTCR5112P
Paper Title	Stochastic Process and Time Series
No. of Credits	6
Theory/Composite	Composite
No. of periods assigned	Th: 4 Pr: 3
Module	Single
Course description/objective	<p><i>At the end of the course a student should be able to</i></p> <ul style="list-style-type: none"> ○ Identify a time series as a sequence of correlated random variables. ○ Understand the difference between time series and time series data. ○ Cite some real life examples of time series arising from different fields. ○ Decompose time series data into classical components. ○ Analyse for stationarity for an actual insight into the probability model underlying the series. ○ Use the basics of forecasting for a time series.
Syllabus	<p>UNIT 1: Stochastic Process: Introduction and Stationary Process. Markov Chains: Definition of Markov Chain, transition probability matrix, order of markov chain, Markov chain as graphs, higher transition probabilities. [8L]</p> <p>UNIT 2: Time Series as a Stochastic Process. Time Series data. Application of time series from various fields. Components of a times series, Decomposition of time series. Estimation of trend by free hand curve method, method of semi averages, fitting mathematical curves, and growth curves. Method of moving averages. [16L]</p> <p>UNIT 3: Estimation of seasonal component by Method of simple averages, Ratio to Trend, Ratio to Moving Averages and Link Relative method. Harmonic Analysis. Variate component method. [12L]</p> <p>UNIT 4: Stationary Time series: Weak stationarity, autocorrelation function and correlogram. Some Special Processes: Moving-average (MA) process and Autoregressive (AR) process of orders one and two, Estimation of the parameters of AR (1) and AR (2) – Yule-Walker equations. Simple Exponential smoothing. [16L]</p>
List of Practical	<ol style="list-style-type: none"> 1. Determination of trend by curve fitting 2. Determination of trend by moving averages 3. Determination of seasonal indices by method of averages

	4. Harmonic Analysis 5. Correlogram Analysis 6. Fitting of AR 1 and AR 2 models 7. Simple Exponential Smoothing	
Reading/Reference Lists	1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol 2, 8 th edition, The world Press, Kolkata 2. Cooray, TMJA(2008) Applied Time Series, Analysis and forecasting, Narosa Publishing house 3. Chatfield, C. (2004) Analysis of Time Series, Chapman & Hall	
Evaluation	Theory CIA: 10 End-Sem: 50 Total: 60	Practical Continuous assessment: 40
Paper Structure for End Sem Theory	Short questions (5 marks each)	Long questions (15 marks each)
	4 out of 6	2 out of 3