INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Stochastic Processes and Time Series Analysis
2.	Course Number	MA5210
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Mathematics
8.	To take effect from	July 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	**Course Objective:** To introduce discrete and continuous time stochastic processes such as Markov chains, random walks, Poisson process, branching process, and different time series processes. To make Statistical models using these Stochastic Processes and implement the methods for analyzing data.	
12.	**Course Content:** Stochastic Process Definitions, Discrete-Time Markov Chain, Limiting Stationary Distributions, Poisson and Pure Birth Processes, Renewal Process, Branching Process. Linear Models (Auto Regression Moving Average (ARMA), Seasonal Auto Regression Integrated Moving Average (SARIMA) etc.), Nonlinear Models (Threshold Auto-Regressive (TAR), Smooth Transition AutoRegressive (STAR) etc.), Conditional Models (AutoRegressive Conditional Heteroskedasticity (ARCH), Generalized ARCH (GARCH), Exponential GARCH etc.), Multivariate Models (Vector AutoRegressive (VAR), Vector Moving Average (VMA) etc.), Long Memory Models (Auto Regression Fractionally Integrated Moving Average (ARFIMA)), State Space Models, Forecasting.	
13.	Text book(s): 1. S. Karlin, H. M. Taylor, *First Course in Stochastic Processes,* Academic Press, (1975). 2. R. Shumway, D. Stoffer, *Time Series Analysis and its application,* Springer, (2000).	
14.	Reference(s): 1. S. M. Ross, *Stochastic Processes,* JohnWiley, (1983). 2. R. T. Say, *Analysis of financial Time series,* Wiley, (2001).	