IIT-PATNA

Department of HSS

Course Proposed for B.Tech. Students (3 year)

Couse Name- Financial Analytics **3-0-0-6**

Course Code- HS 30*

Prerequisite- None. However Financial Economics-HS301 is preferred

Objective: Basic objective of this course is to introduce students to the fundamental techniques to deal with financial data. Growing demand for expertise in the domain of finance, both professional as well as academics, will be served at preliminary level through this course.

Syllabus

Module 1: Notion of Ensemble and realization in financial time series. Convergence and parsimony of a financial variable and its transformation for cleansing of data. Distributions and statistical properties of financial variables. Concept of fat tail and irregularities in financial data.

Module 2: Statistical analysis of univariate model with Box-Jenkin's approach and prediction of out-of-sample forecasting of stock prices. Seasonality (additive and multiplicative form) of financial data. Trend (linear and noon-linear) analysis of stock price. Techniques to deseasonalize and detrend the data. Analyzing financial cycle and structural change and event analysis.

Module 3: Concept of financial contagion across countries and spillover effect. Multivariate analysis for analyzing contagion. Intervention analysis for multi-country financial index and it implication. Dynamic forecasting of contagion and impulse through intervention analysis and its time series variants. Modeling market integration and error correction mechanicsm.

Module 4: Modeling volatility and risk of financial indices. Autoregressive Conditional Heterscedasticity model and its variants like GARCH, EGARCH, TARCH, IGARCH etc. Dynamic and constant conditional correlation GARCH model. Volatility smile and implication of Greek letters in financial market.

Module 5: Brief introduction to Option and Derivative market, trading strategies involving options like spread (Bull and Bear spread, Box, Butterfly, Calendar and Diagonal spread) and combination (straddle, strips, straps and strangle) etc. Notion of Random Walk, Geometric Brownian motion and their application to financial variables. Black Schole Mertom model's financial implication.

Reference Books:

Options, Future and other Derivatives: John C. Hull (Pearson Education)

Analysis of Financial Time Series: Ruey S. Tsay (John Wiley and Sons, Inc)