

MT-532	Time Series Analysis and Forecasting
	<p><u>Introduction:</u> Time series analysis, Objectives of time series analysis, Components of time series, Time series plots, Time series and stochastic processes, Special features of time series data, Mean, Variance, Auto-covariance function (ACVF), Auto-correlation function (ACF), Partial auto-correlation function (PACF) for sample time series data.</p> <p><u>Simple Descriptive Techniques:</u> Stationary time series, Transformations, Secular trend, Filtering, Differencing, Seasonal variations, Cyclical variations, Irregular variations, Auto-correlation (correlogram) and other tests of randomness.</p> <p><u>Probability Models for Time Series:</u> <i>Stochastic processes and stationary processes, Purely random process, Random walk, Moving average process, Stationary and inevitability of moving average models, Auto-regressive process, Duality between moving average and auto-regressive models, Recursion rule for ACVF and ACF of auto-regressive process, Yule-Walker equations for auto-regressive process, Mixed ARMA models, Models for non-stationary Time series, Stationary through differencing and other transformations.</i></p> <p><u>Model Building and Estimation:</u> Various stages of model building, Identification of model from sample time series, Steps for model identification, Estimating the auto-covariance, Auto-correlation function and partial auto-correlation function, Pattern of theoretical ACF and PACF as a tool of model identification and Control theory.</p> <p><u>Forecasting:</u> Univariate procedures, Minimum mean square estimate of forecast, Forecasted weights, Mean, Variance and limits for forecast, Forecast error, Minimum mean square forecast error, Structure of minimum mean square forecast error, Multivariate procedures, Comparison of forecasting procedures, Prediction theory.</p> <p><u>Reference Books:</u></p> <ol style="list-style-type: none"> 1. Tsay R.S, <i>Analysis of Financial Time Series</i>, John Wiley & Sons, Inc., Publication, 2009. 2. Chatfield C, <i>The Analysis of Time Series an Introduction</i>, 6th Edition, Chapman & Hall & CRC, London, 2004. 3. Rockwell P.J and Davis R.A, <i>Introduction to Time Series and Forecasting</i>, 2nd Edition, Springer, New York, 2002. 4. Chan N.H, <i>Time Series Applications to Finance with R and S-Plus</i>, 2nd Edition, John Wiley & Sons, 2010. 5. Box G.E.P, Jenkins G.M and Reinsel G.C, <i>Time Series Analysis Forecasting and Control</i>, John Wiley & Sons, 2008.