Stat-313 Time Series Analysis

100 Marks: 03 Credits

Number of Class: 35-40

Introduction: Meaning and objectives of Time series, the different component of time series, measurement of secular trend, seasonal, cyclical and irregular component, elimination of the seasonal, cyclical and irregular components, simple time series models, stationary models,

Stationary Processes

Basic properties, linear processes, ARMA processes, properties of sample mean and autocorrelation function, forecasting stationary time series, world Decomposition problems.

ARMA Models: ARMA (p,q) process, ACF and PACF of ARMA (p, q) process, Preliminary estimation, maximum likelihood estimation, diagnostic checking, forecasting order selection, problems.

Spectral Analysis: Spectral Densities, periodogram, time invariant linear filters, spectral density of ARMA process problems.

Non-stationary and seasonal time series models: ARIMA models for non-stationary time series, identification techniques, unit roots in time series models, forecasting ARIMA models seasonal ARIMA (SARIMA) models, regression with ARMA errors.

Multivariate time series: Second order properties, mean and covariance function, multivariate ARAMA (MARMA) models, best linear predictors, modeling and forecasting with MAR or VAR Process. VAR Models, unit root models error correction model, cointegration analysis.

State-Space Models: State-space representation, basic structural mode, state-space representation of ARIMA models, Kalman recursions, estimation for state-space models, state-space models with missing observations, EM algorithm, generalized state-space models.

Text

1. Brockwell,P. J. and Davis, R. A. (2002): *Introduction to Time Series and Forecasting*; Springer New York.
2. Box, G., Jenkins, G. M. and Reinsel, G. (2008): *Time Series Analysis: Forecasting and Control*, 3rd edition, Wiley, New York.

References

1. Chris Chatfield: *The Analysis of Time Series,* 6th Ed, CRC PressTaylor & Francis Group
2. Cooray, T.M.J.A.: *Applied Time Series, Analysis and Forecasting*, Narosa Publishing House Pvt Ltd.
3. Gujrati,D. (2003): *Basic Econometrics* 4th Ed, McGraw-Hill, New York.
4. Hamilton, J. D. (1994): *Time Series Analysis*, Princeton University Press, New Jersy
5. Harris, R. and Robert, S. (2003): *Applied Time Series*, ReplicaPress Pvt, Ltd
6. Makridakis, S., Whellwright, S. C. and Hyndman ,R. J. (1998): *Forecasting Methods and Applications*, 3rd Edition, John Wiley and Sons, New York

Montogomery, D.C, Johnston, L. A., Gardiner, J. S.:*Forecasting and Time Series Analysis* ,2nd Ed.