

Module Code:	STAT-413
Module Title:	Time Series Analysis-II (Theory) – 3 Credit Hours
Name of Scheme:	BS Statistics (Specialization)

Course Outline

1. Model Building, 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.
2. Estimating the parameters of an auto-regressive model, estimating the parameters of moving average, Back casting, dual estimation, mixed ARMA model and integrated model. The Box-Jenkins seasonal model. Model diagnostics; Residual analysis, over fitting and parameter redundancy, portmanteau tests. Model selection criteria, AIC, BIC.
3. Forecasting: Univariate procedures, Minimum mean square estimate of forecast, forecast weights, mean, variance and forecast 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.

Books Recommended

1. Chatfield, C. (2003). *The analysis of time series: An introduction* (6th ed.). Chapman & Hall: London.
2. Wei, W. (1990). *Time series analysis: Univariate and multivariate methods*. Addison-Wesley publishing company, Inc.
3. Box, G.E.P., Jenkins, G.M. & Reinsel, G.C. (2004). *Time series analysis: Forecasting and control* (3rd ed.). Holden-dayk: San Francisco.
4. Brockwell, P.J., & Davis, R.A. (2002). *Introduction to time series and forecasting*. (2nd ed.). Springer: New York.

Reference Books

1. Gottman, J.M. (1981). *Time series analysis*, University Press: Cambridge.
2. Gyer, J.D. (1990). *Time series analysis*. Duxbury Press: Boston.
3. Montgomery, D.C. (1990). *Forecasting and time series analysis* (2nd ed.). McGraw Hill Book Company: New York.
4. Anderson, T.W. (1994). *Statistical analysis of time series*. Wiley: New York.
5. Janacek & Gareth. (2001). *Practical time series*. Arnold Co.: UK.
6. Akaike, H. & Kitagawa, G. (1999). *The practice of time series analysis*. Springer: New York.
7. Hamilton, & James, D. (1994). *Time series analysis*. Princeton University Press: New Jersey.
8. Chatfield, C. (2000). *Time series forecasting*. Chapman & Hill/CRC: New York.