

STAT-808 Time Series and Forecasting (3 Credit Hours)

1. Objectives

This course aims to teach students the time series data structure, its modeling and forecasting.

2. Course Contents

Definition of time series, stationary and non-stationary time series, how model arises, meaning and estimation of ACF and PACF. Linear stationary and non-stationary models. Autoregressive form of ARMA model. Model-identification. Minimum mean squares forecasts. Forecasting using the state-space model and use of the Kalman filter series model. Estimation of models smoothing, reliability analysis of forecast error. Transfer function, intervention analysis and Spectral analysis. Related applications/computations with R.

3. Recommended Books

- i. Box, G.E.P. and Jenkins, G.M. Time Analysis, Forecasting and Control, 2nd Edition., Holden Day, San Francisco (2008).
- ii. Chatfield, C., The analysis of Time Series: An Introduction, Chapman and Hal (2016).
- iii. Kendall, M. and Ord, J.K ., Time Series, 2nd Edition, Hafner, New York (1990).
- iv. Madsen, H., Time Series Analysis, CRC, Press. (2007).
- v. Andersen, T.W., The Statistical Analysis of Time Series. John Willey and Sons. (2011).

4. Outcomes

On successful completion of this course, students will be able to study the properties of time series data, will be able to model and decompose the time series for analysis and forecasting.