

TSF Course Outline

Learning Outcomes:

After completing this course, you will be able to:

- Transform the data to be suitable for Time Series analysis.
- EDA for Time Series components
- Selection of forecasting model
- Evaluate the performance of the model
- Deploy model for real forecasting

Pedagogy:

The course is a mixture of online lectures, assignments and project presentations. Jupyter notebook will be the platform of coding in python.

Course Content

Session-1: Time Series - Basics

- Why forecast?
- How to forecast?
- What is a time series?
- Revisiting Regression
- Examples of Time series
- Special features of TS data
- Scope of the session
- EDA
- Components of TS
- Time Series Decomposition
- Moving average

Session-2: Smoothing Techniques

- Building forecasting model
- Model validation
- Measure of forecast accuracy
- Simple and Moving Average Forecast
- Exponential smoothing (ES)
- Simple ES
- Double Exponential
- Holt-Winters model

Session-3: Modeling and Forecasting with ARMA Processes

- Lag values in Time Series
- Autocorrelation Function and Partial Autocorrelation Function
- What is a Stationary Process?
- Properties of Stationary time series
- How to find Stationarity? Dicky Fuller test
- Time Series Differencing

TSF Course Outline

- AR Processes
- MA Processes
- ARMA (p, q) Processes
- Forecasting stationary time series
- Parameter Estimation
- Case study - Stock Price Data

Session-4: Nonstationary and Seasonal Time Series Models

- ARIMA Models for Nonstationary Time Series
- Akaike Information Criterion
- Forecasting ARIMA Models
- Limitations of ARIMA Model
- Seasonal ARIMA Models (SARIMA)
- Case study – CO2 emission data

Session-5: Case study