

## [L4-TS] Introduction to Times Series Analysis - Online

| Session 1                             |   |
|---------------------------------------|---|
| What are Time Series Predictions?     | What is Time Series Analysis?<br>Use Cases for Time Series Analysis<br>Univariate vs Multivariate Time Series Analysis  |
| Data Cleaning and Data Transformation | Missing value imputation<br>Aggregations on different time scales   |
| Time Series Visualization             | Time Plots on different scales for seasonality patterns<br>Seasonal Box Plot<br>Lag Plots   |
| Session 2                             |   |
| Descriptive Analysis                  | Stationarity, Trend, and Seasonality<br>ACF/PACF and Cross-Correlation Functions<br>1 <sup>st</sup> , 2 <sup>nd</sup> , N order differences as non-stationarity removal<br>Techniques for seasonality removal |
| Scoring Metrics                       | Error Metrics ( $R^2$ , RMSE, MAPE, MAE, ...)   |
| Session 3                             |   |
| Basic Prediction Models               | Naïve Forecasting   |
| ARIMA Models                          | AR, ARMA, ARIMA<br>Residual Analysis  |
| Session 4                             |   |
| Machine Learning Models               | AR Via ML Models (also on Spark)<br>Parameter Optimization  |
| Deploying a Model                     | Predictor Nodes<br>Predicting the future with a Recursive Loop  |
| Overview of LSTM Models               | Deep Learning for Time Series; Short Intro  |
| Session 5                             |   |
| Review and Q&A                        | Final exercise review and Questions   |