

Introduction to time series analysis in Python

Course overview

This hands-on data science course teaches the fundamentals of time series analysis and how to do this in Python. Whether you are trying to predict asset prices or understand the effects of air pollution over time, effective time series analysis can help you.

Key learning outcomes

At the end of the course, you will be comfortable applying the Python programming language to visualize and execute time series analysis to see if there is predictive power in your data.

What this course offers?

- An overview of core classification methods and how to use them to solve real-world problems
- Hands-on Python programming experience
- Course notes, certificate of completion, and post-seminar email support for 3 months
- An engaging and practical training approach with a qualified instructor with relevant technical, business, and educational experiences
- A Computer Science 101 pre-course webinar

Who is this course for?

This course is relevant for individuals working with or needing to understand times series. The most common participants are: investment professionals, traders, economists, biologists, chemists, physicists, entrepreneurs, consultants, and technology individuals.

Cognitir's Introduction to Data Science course or the equivalent is required.

CPD

This course is eligible for **6** CPD hours.

Programme

Overview of Time Series Analysis

- What is it, wide variety of use cases, time series analysis vs. time series forecasting, common statistical problems in time series (leptokurtic, heteroskedasticity, serial correlation) and common tests to test for these issues (look at error residuals and Durbin-Watson)

Organizing and Visualizing Time Series Data

- Exploring Your Time Series Data
- Start, end, frequency, number of data points
- Basic Time Series Plots
- Discrete vs. Continuous Data
- Sampling Frequency
- Missing Values
- How to do this in Python – with an example
- Organizing and Visualizing Time Series Coding Challenge

Time Series Predictions

- Trends
- Random or Not
- Stationary vs. Non-Stationary
- Unit/root test
- Removing variability trends through logarithmic transformation
- Differencing
- White Noise Model

- Random Walk Model
- How to do this in Python – with example
- Time Series Prediction Coding Challenge

Correlation and Autocorrelation

- Scatterplots
- Prices vs. Returns
- Financial Time Series
- Plotting Pairs of Data
- Correlation and Covariance
- Autocorrelation and Calculation
- Autocorrelation Function
- How to do this in Python
- Correlation and Autocorrelation Coding Challenge

Autoregression

- What is it?
- Persistence vs. Anti-Persistence
- Autocorrelation and Autoregression
- Random Walk vs. AR
- AR model Estimate and Forecasting
- Estimate AR Models
- Forecasts from AR Models
- How to do this in Python

AR Coding Challenge

- Simple Moving Averages
- What are they?
- Autocorrelation and simple moving averages
- MA model Estimate and Forecasting
- Estimate MA Models
- AR vs. MA models

Final Project