



## NATIONAL INSTITUTE OF INDUSTRIAL ENGINEERING, MUMBAI ( NITIE)

(AN AUTONOMOUS BODY UNDER MOE, GOVT OF INDIA)

# Financial Time Series Modeling using Python



**Dr. Ajaya Kumar Panda**  
Finance.

Management Development Program  
Participation Fees - 8260/- INR (Including 18% GST)

25 June 21 Fri 4 PM - 7 PM  
26 June 21 Sat 11 AM - 1 PM  
26 June 21 Sat 3 PM - 5 PM  
02 July 21 Fri 4 PM - 7 PM  
03 July 21 Sat 11 AM - 1 PM  
03 July 21 Sat 3 PM - 6 PM



**Prof. Rakesh Verma.**  
Analytics & Data Sciences.

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TEAMS

### **Introduction:**

The field of financial econometrics using advanced tools and techniques has emerged over the last decade. The intention of this course is to help practitioners cut through the vast literature on financial time series models, focusing on the most important and useful empirical concepts. This course is expected to develop a sound background in quantitative analysis of financial time series. It offers a guide to analyse and model time series properties of financial data using machine learning approach through Python. The course is designed for researchers and practitioners in the finance industry. Our aim is to provide a road map from academic perspective to the research issues that are important for researchers and practitioners.

### **Objectives:**

This short course aims to discuss a broader aspect of time series modelling on financial data with advanced tools and techniques. It covers applied econometric tools relating to financial time series models using Python. The course aims to develop insights of financial modelling to analyse real world financial and business time series.

### **Course Content:**

1. Fundamentals of Financial Time series
  - a) Visualization of Time series data
  - b) Analysis of trend and seasonality in financial data.
  - c) Autocorrelation functions and testing of stationarity of financial data
  - d) Moving averages and time series smoothers
2. Univariate Time series modeling
  - a) Introduction to ARIMA
  - b) Building ARIMA model and forecasting market returns
  - c) Modeling using ARIMAX
3. Modeling return volatility
  - a) Autoregressive Conditional Heteroskedasticity (ARCH) modeling of market return.
  - b) Generalized Autoregressive Conditional Heteroskedasticity (GARCH) modeling of market return.
4. Introduction to multivariate Time series Models
  - a) Granger Causality Test
  - b) Vector Autoregressive Model (VAR)

### **Prerequisites**

- Personal computer with Python (we will be using Google Colab.)
- Basic knowledge of statistics and time series is expected
- Basic understanding of Python is expected to install packages/library
- However, the course is design in such a way that participants with little knowledge in statistics and zero knowledge in computer language like Python can easily manage to learn financial time series modelling in this course.

### **Course Coordinators:**

**Dr. Ajaya Kumar Panda**  
Assistant Professor (Finance)  
(Finance and Economics Area)

**Prof. Rakesh Verma**  
Associate Professor  
(Analytics and Data Science Area)

