



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

(An Autonomous body under the Ministry of Education , Govt. of INDIA)

## Online MDP MARKET RISK ANALYTICS

### Objective:

The MDP aims to discuss empirical aspects of market risk analytics using python. It covers a wide range of topics including univariate and multi variate techniques of modeling market risk, techniques of option pricing and simulation techniques of risk modeling. Empirical evaluation of market risk with advanced econometric techniques using PYTHON makes the program contemporary in the present time.

### Who Should Attend?

Professionals working in manufacturing, trading and service organizations, including banks and NBFCs. The graduates who wish to advance their careers in the fields of supply chain management can also enroll.

### Prerequisite:

- Personal computer with Python (we prefer to use colab).
- Basic knowledge of finance, 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 can easily manage to learn this course.

### Dates :

1st October to 3rd October 2021  
( Friday-afternoon, Saturday and Sunday)

### Participation Fees:

8260/- (INR including 18 % GST)

Live on Zoom / MS Teams.

### Program Coordinators:



Prof. Ajaya Kumar  
Panda.



Prof. M. Venkateshwarlu



To Register :- <https://forms.office.com/r/4TSVGF0srN>

## **Introduction:**

Identifying, quantifying, and analyzing the amount of risk involved in investments is an important process in Risk Management. The focus of this program is on presenting the state of art quantitative methods used for analysis of market risk. The first module of the program deals with analyzing asset price volatility and explain the volatility using ARCH and GARCH models. This is followed module on risk models, Value at Risk, Conditional Value at Risk, Monte Carlo Simulation and Historical Simulation. The last module deals with pricing of options and analyzing the impact of volatility on option prices.

## **Scope of the Program:**

- Introduction to financial markets and market prices
- Asset returns: volatility clusters, fat tails, and nonlinear dependence
- Explaining return volatility using ARCH and GARCH model.
  - Condition mean Model
  - Conditional Volatility Model

*(Workout: Estimating ARCH, GARCH models with real life data using python and analyzing estimates and its implications)*

- Explaining return volatility using Multiple Univariate Conditional Volatility models
  - Constant Conditional GARCH (CCC-GARCH Model)

*(Workout: Estimating CCC-GARCH models with real life data using python and analyzing estimates and its implications)*

- Introduction to Black-Scholes Model
  - Simulating Stock Price Dynamics using Geometric Brownian Motion

*(Workout: Simulating Stock Price Dynamics with real life data using python and analyzing estimates and its implications)*

- Pricing European Option using Simulation

*(Workout: Price European Option using Monte Carlo Simulation using python)*

- Pricing American Option using Simulation

*(Workout: Price American Option using Least Squares Monte Carlo Simulation in python)*

- Estimating VaR Using Monte Carlo Simulation

*(Workout: Estimating VaR using Monte Carlo Simulation in python)*