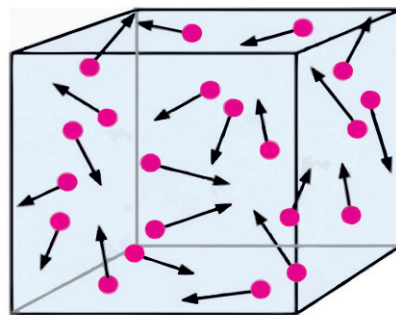# BOOTCAMP ON QUANT FINANCE

70+ hours
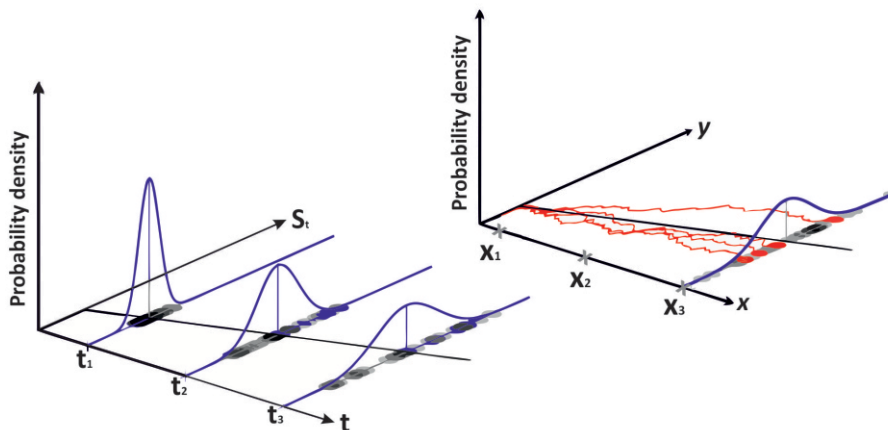Case Study and Project- driven Methodology
Blended Learning Methodology

FINANCIAL ENGINEERING

Brownian Motion

PEAKS2TAILS

MODULE 1 : PRIMER   5 + 3 = 8 HOURS

ELEMENTARY CALCULUS

- Function and Limits
- Derivatives & Integration
- Differential Equations
- Taylor Series

PROBABILITY & STATISTICS

- Discrete and Continuous Random Variables
- Discrete and Continuous distributions
- Expectation and Variance
- Deep dive into Normal and Log normal distributions

MODULE 2 : PROBABILITY THEORIES   2 HOURS

ADVANCED PROBABILITY THEORY AND EXPECTATION ALGEBRA

- Finite Probability Spaces
- Sets, - algebra, Filtration
- Conditional Expectation
- Martingales

MODULE 3 : BINOMIAL MODEL EQUITY DERIVATIVES   2.5 + 2.5 = 5 HOURS

BINOMIAL TREE

- Real World vs Risk Neutral Probabilities
- Martingale Measure
- Arbitrage Pricing
- Pricing European and American options
- Stopping Time and Stopped Process
- Radon-Nikodym Derivative

TRANSITIONING TO CONTINUOUS MODELS FROM BINOMIAL TREE

- Infinite Probability Space
- Simple Symmetric Random Walk
- Scaled Symmetric Random Walk
- Brownian Motion and its properties
- Arriving at Stock price process

MODULE 4 : STOCHASTIC CALCULUS   2 + 1 = 3 HOURS

ITO'S CALCULUS

- Functions of Stochastic Variables
- Ito's Lemma
- Ito Integral
- Popular Stochastic Differential Equation

PROBABILITY TRANSITION DENSITIES

- Kolmogorov equations
- Steady state distributions

MODULE 5 : BLACK SCHOLES EQUATION   6 HOURS

DERIVATION PRICING AND GREEKS

- Delta Hedging and derivation of Black-Scholes PDE
- Greeks
- Pricing using Numerical approximation methods for vanilla and exotic options
- Pricing using Monte Carlo Methods for vanilla and exotics

MODULE 6 : OPTION PRICING   4 HOURS

MARTINGALES APPLICATION TO OPTION PRICING

- Fundamental Asset Pricing Formula
- Girsanov theorem
- Solution to BSM using Change of Measure
- Feynmann Kac formula

MODULE 7 : FIXED INCOME   3 + 6 + 1 = 10 HOURS

RATES AND RATE PRODUCTS

- Spot, Par, Swap, forward, short and long rates
- Bond pricing
- Duration and Convexity
- FRAs and IRS

STOCHASTIC INTEREST RATES AND TERM STRUCTURE MODELS

- Short rate models (Vasicek and CIR)
- Calibration of short rate models
- No Arbitrage vs Equilibrium Models
- Ho Lee Model
- Hull White Model
- HJM Framework

FUNDAMENTAL THEOREM OF ASSET PRICING

- Change of Numeraire
- T-forward Measure

MODULE 8 : STOCHASTIC VOLATILITY MODELS — 2 HOURS

SABR AND HESTON

- SABR
- Heston

MODULE 9 : CREDIT RISK — 6 HOURS

CREDIT DEFAULT SWAPS

- An Introduction to CDS
- Default Modelling Toolkit. Inhomogenous Poission Process
- CDS Pricing: Basic and Advanced Models
- Bootstrapping Intensity from CDS Market Quotes
- Accurals and Upfront premium in CDS Pricing

MODULE 10 : X VALUATION ADJUSTMENT — 6 HOURS

COUNTERPARTY CREDIT RISK

- Historical Development of OTC Derivatives and Xva
- Credit and Debt Value Adjustment (CVA and DVA)
- Funding Value Adjustment (FVA)
- Margin and Capital Value Adjustments (MVA and KVA)
- Current Market Practice and Application
- Implementation of Counterparty Credit Valuation Adjustment(CVA)
- Review the Numerical Methodologies Currently Used to Quantify CVAin terms of Exposure and Monte Carlo simulation and the Libor Market Model
- Illustrate this Methodology as well as DVA, FVA and others

MODULE 11 : MARKET RISK THEORY   2 + 2 + 2 + 2 = 8 HOURS

VALUE AT RISK

- Historical, Parametric and Monte Carlo
- Expected Shortfall
- Extreme Value Theory and VaR and ES
- Sensitivity based VaR

DEMO MODELS

DURING THE PROGRAM YOU WILL LEARN TO CREATE EXCEL MODELS LIKE SHOWN BELOW

FREQUENTLY ASKED QUESTIONS

PREREQUISITE

Knowledge of Basic Excel, Basic Statistics, Calculus and Financial Products is must.

CERTIFICATE

Silver Certificate on successful completion of projects .
Gold Certification on passing a 2 hours MCQ based exam.

FEES

Rs. 40000
(50% off for SSEI students)

DURATION

70+ hours

DATES

From: 14th June
(every Friday, Saturday and Sunday)

TIMING

Sat - Sun: 6pm to 9pm
Fri : 7am to 9am

ABOUT THE TRAINER

Satya is an IIT and IIM alumni with 8+ years of total work experience spanning across Financial Risk consulting and project management and strategy. Worked as SME and Lead in Various finance, risk, regulatory engagements and complex data migration project. Adept in BASEL, FRTB capital calculations, model development and machine learning.
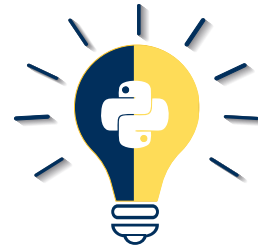
OUR TRAINEES WORK IN

OUR SERVICES

1 **2** **3** **4**

Artificial Intelligence and Machine Learning

Risk Management

Academics

Finance

TRAINING

SOLUTIONING

CONSULTING

98 74 98 74 98