

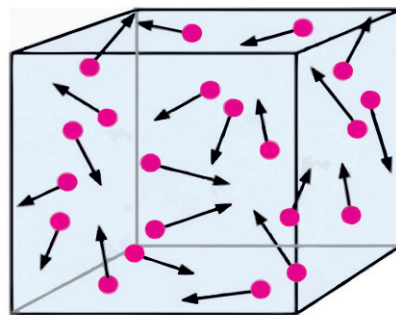
BOOTCAMP ON QUANT FINANCE

70+ hours

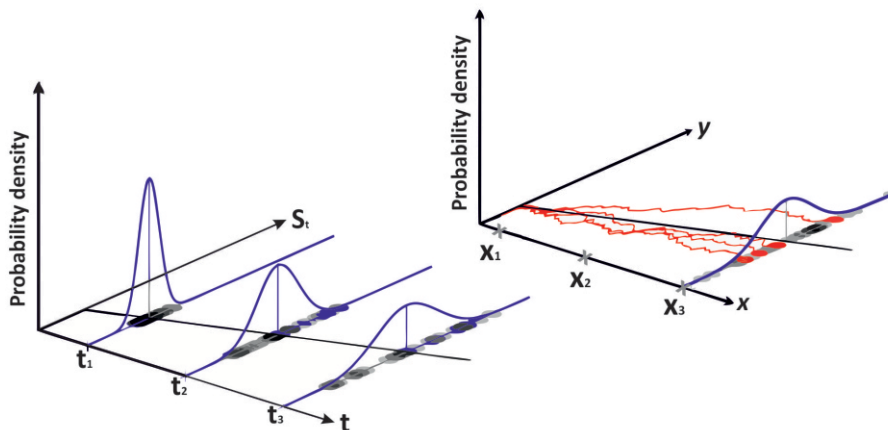
Case Study and Project- driven Methodology

Blended Learning Methodology

FINANCIAL ENGINEERING



Brownian Motion



PEAKS²TAILS



DETAILED CURRICULUM

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



DETAILED CURRICULUM

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



DETAILED CURRICULUM

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



DETAILED CURRICULUM

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
- Accruals 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 CVA in terms of Exposure and Monte Carlo simulation and the Libor Market Model
- Illustrate this Methodology as well as DVA, FVA and others



DETAILED CURRICULUM

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**

The screenshot displays three distinct financial models:

- Poisson Process Simulation:** A table with columns for time (t) and values, showing a series of random events over time. A graph below plots the cumulative count of events against time.
- Binomial Tree:** A tree structure representing stock price movements over time. The tree branches out from a single point at time 0, with nodes representing potential future prices. A graph shows the price path over time.
- Short Rates Interest Rate Model:** A table showing parameters for a short rate model, including a risk-neutral drift (r) and volatility (sigma). A graph plots the short rate over time, showing its stochastic fluctuations.

The screenshot displays three financial models:

- Markov Chain Transition Matrix:** A table with columns for states (AA, A, BBB, BB, B, CCC) and rows for transitions. It includes a 'Default' column and a 'Sum' column. A 'Path' section shows a sequence of states and their associated probabilities.
- 10 Dimensional Brownian Motion:** A graph showing multiple colored lines representing the paths of 10 different dimensions of Brownian motion over time. The paths are highly volatile and spread out.
- Call Option Pricing Model:** A table showing the parameters for a call option, including the strike price (K), the current stock price (S), and the option price (C). A graph plots the option price against the stock price, showing the characteristic payoff structure of a call option.

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



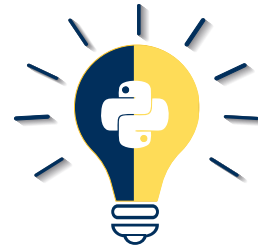
2



3



4



TRAINING



SOLUTIONING



CONSULTING



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