# INDIAN INSTITUTE OF FOREST MANAGEMENT, BHOPAL

प्रगतेः मूलं प्रकृतिः


Information Brochure

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## Six Months
## Certificate Course in Quantitative Finance (Online)

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## Course Introduction

The Online Certificate Course in Quantitative Finance is designed to bridge the gap between traditional financial theory and modern data-driven practice. Over three months, the course introduces participants to the analytical foundations and computational techniques used in financial modeling, portfolio optimization, and risk management. Through a blend of quantitative methods, programming applications, and case-based learning, participants will learn how to apply mathematical and statistical tools to real-world financial problems. The program emphasizes practical implementation using Python, preparing learners to interpret market data, construct robust financial models, and make informed investment and policy decisions in an increasingly technology-driven financial landscape.

## Course Description

**Duration: 6 Months**
**Delivery Mode**: Online + 1-week campus visit
**For whom**: Graduate/ Post Graduate students, finance professionals, analysts, and aspiring quants
**Prerequisites**: Basic +2 level mathematics
**Eligibility**: Candidates must have a minimum of 10+2+3 years of education. Final year students may also apply.
**Classes**: Online
**Pedagogy**: All modules will be delivered using lectures, cases and applications.
**Campus Visit**: There will be one mandatory campus visit for one week during the course. The participants will have to bear their travel cost. They will be provided with hostel accommodation without any charge. However, they need to bear the food charges during their stay at the campus. During this visit, the students will be provided additional hands on exercises on Bloomberg Terminals at the campus. The End Term Examination will also be conducted during this visit.

**Number of seats**: 30

## Course Objectives

1. To equip learners with advanced tools in quantitative finance.
2. To develop practical skills in modeling risk, pricing derivatives, and portfolio optimization.
3. To introduce algorithmic trading, financial econometrics, and machine learning in finance.

## Course Outcomes

1. Apply advanced quantitative methods such as stochastic calculus, probability theory, and optimization to model asset prices, portfolio risk, and derivative securities.
2. Implement computational models using statistical or programming tools to analyze pricing, hedging, and risk management problems.
3. Interpret and evaluate financial models within the framework of stochastic processes and measure theory, linking theoretical results to practical applications in portfolio construction and fixed income analysis.
4. Utilize data-driven and algorithmic approaches to enhance forecasting, valuation, and performance measurement in financial markets.
5. Demonstrate analytical and problem-solving competence through case-based assignments, simulations, and a capstone term paper integrating theory and computation.

## Professional Relevance and Skill Development

1. Builds essential competencies in quantitative modeling, financial analytics, and computational methods used in modern finance.
2. Participants gain hands-on experience with Python for portfolio optimization, derivative pricing, and risk assessment.
3. The program enhances analytical thinking and data-driven decision-making, preparing learners for roles such as Quantitative Analyst, Risk Manager, Financial Data Scientist, or Portfolio Strategist.

4. It is equally valuable for professionals in policy, banking, and academia seeking to integrate analytics into investment and sustainability decisions.

## Course Content

### MODULE-I: FOUNDATIONS OF QUANTITATIVE FINANCE

### 1 Measure Theory and Probability

- Probability and Measure
- $\sigma$-algebra and Filtrations
- Conditional Probability
- Moments of a Random Variable

### 2 Architecture of Financial Markets and Portfolio Theory

- Arrow-Debreau Securities
- Pareto Optimal allocations
- Martingale Measures and Duality
  Mean-Variance Analysis • Tobin's Separation Theorem

### 3 Fundamentals of Time Series Analysis

- Understanding distribution of financial time series
- White Noise and stationarity - concept and tests
- Univariate return modelling - ARIMA (p,d,q)
- Univariate volatility modelling - ARCH effect and GARCH based models

### MODULE-II: STOCHASTIC PROCESSES

### 4 The Binomial Options Pricing Model

- The coin flip universe
- The mluti-period binomial model
- Path Dependent Options

### 5 Weiner Process and Itˆo's Lemma

- The Markov Property
- Continuous Time Stochastic Processes

- Weiner Process and Generalized Weiner Process
- The process for a stock price
- Itˆo's Calculus and modelling of asset prices
- Modelling Jumps

## 6 Black and Scholes Model

- The Black and Scholes equation
- Dirac's $\delta$-function
- Girsanov's Theorem
- The Feynman-Kac formula
- Reimann and Lebesgue integral and applications for VaR, ES and option pricing

## MODULE-III: FIXED INCOME SECURITIES

## 7 Discrete and Continuous Time Modelling

- Black-Derman Model
- Ho-Lee Model
- Affine Models
- HJM Model

## 8 Term Structure Modelling

- Term structure - meaning and determinants
- The Nelson - Siegel Model
- The Nelson - Siegel - Svensson Model

### Award of Certificate

All successful candidates will be awarded "**Certificate in Quantitative Finance**" by Indian Institute of Forest Management, Bhopal

### Alumni Status

All candidates who successfully complete this course will be given status of Alumni of IIFM Bhopal.

## Application and Selection Process

Eligible candidates will be called for an ONLINE interaction with the faculty members of IIFM. Selections will be based on overall suitability of the candidates.

### Application Form

A non-refundable application fee of Rs 500 (Rs Five Hundred only) needs to be paid, without which the applications will not be considered for further processing.

Link: Apply Now

**Last Date to apply:** July 10, 2026

## Course Fee

The fee for the entire course is **Rs 125,000 (Rupees One Lakh Twenty-Five Thousand only)** which needs to be deposited in TWO equal installments. The first installment will have to be deposited at the time of registration for the course. The date for the second installment deposit will be separately communicated after the commencement of the course. Fee may be deposited online. The fee to be paid in the following account:

**Account Name: Director, IIFM**
**SBI Account number - 30662291254,**
**Branch: IIFM Bhopal**
**IFSC Code- SBIN0012194.**

**Commencement of Classes:** August 7, 2026

**CONTACT DETAILS**

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