

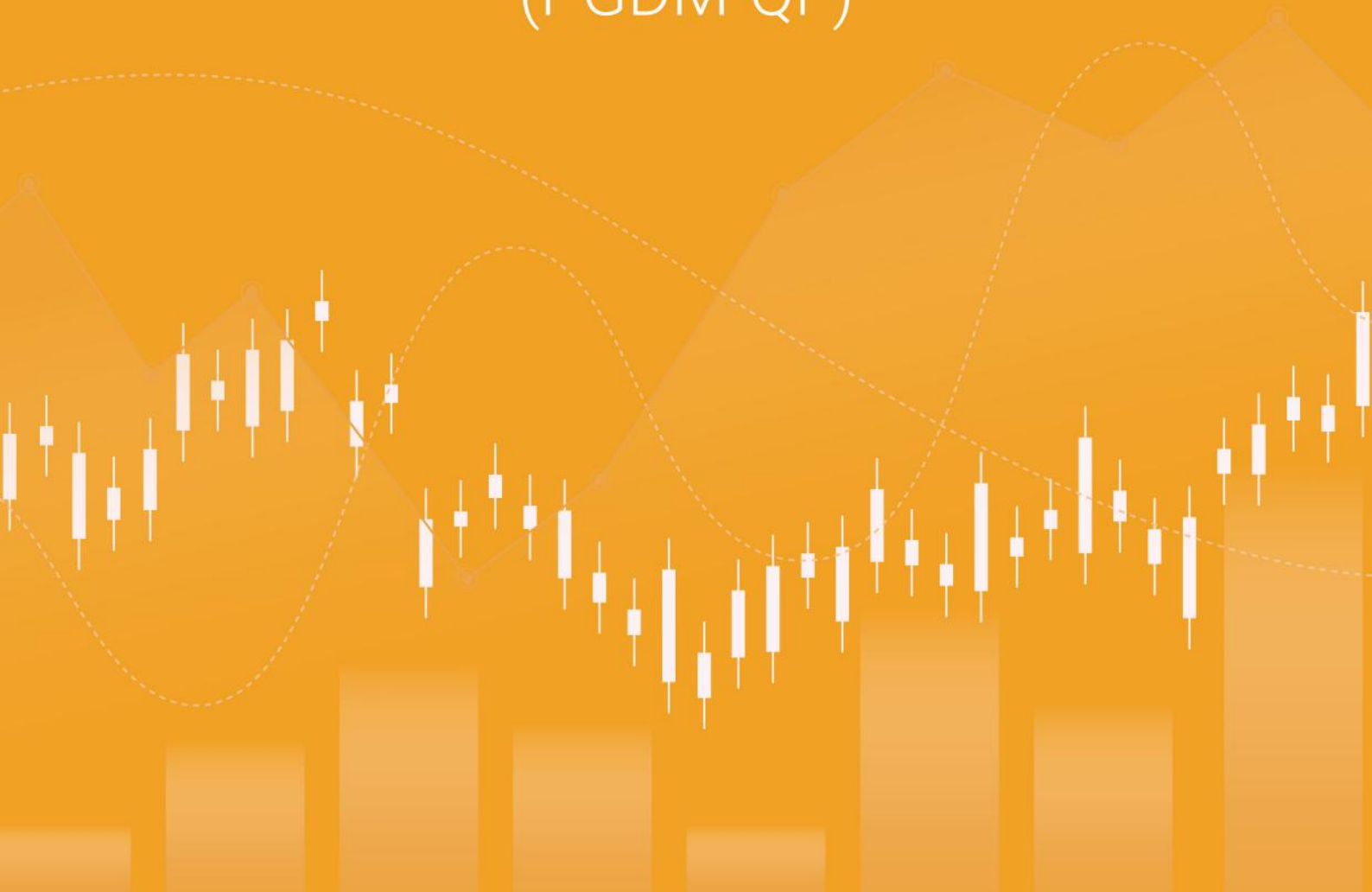


JAGSoM



Post
Graduate
Diploma In Management

Quantitative Finance
(PGDM-QF)





Highlights

- Two-year, full-time, residential, AICTE approved program.
- Limited 20 seats per academic year.
- First cohort starts in July 2024.
- Exclusively for the recent graduates of IITs, IIITs, BITs, NITs, ISIs, Chennai Mathematical Institute and other similar top institutions in India.
- Assured placement opportunity.
- Mandatory long-term (16-20 weeks) Industry Internship.
- Fully funded by JAGSoM: Covering tuition fee, boarding and lodging. Graduates repay a part of the cost (INR 5,00,000) in instalments to JAGSoM after they are employed.



Overview

The Post Graduate Diploma in Management (PGDM) specializing in Quantitative Finance (QF) at Jagdish Sheth School of Management (JAGSoM), Bangalore, is designed to equip select 20 students of top-tier engineering, science, mathematics, or statistics institutes in India who wish to amplify their career prospects with the advanced skills and knowledge required to excel in the dynamic field of Financial Mathematics, Financial Engineering and Financial Analytics.

This program integrates rigorous mathematical models, stochastic processes, computational techniques, machine learning techniques and cutting edge financial theories to prepare graduates for successful careers in finance, risk management, quantitative trading, and investment analysis.



Program Objectives

Comprehensive Understanding:

To provide a thorough understanding of quantitative finance, integrating theory with practical applications.

Leadership Preparation:

To prepare students for leadership roles in finance.

Global Perspective:

To offer a global perspective on financial instruments used by investment banks and hedge funds.

FinTech in India:

To prepare students for the flourishing and promising rise of FinTech in India.



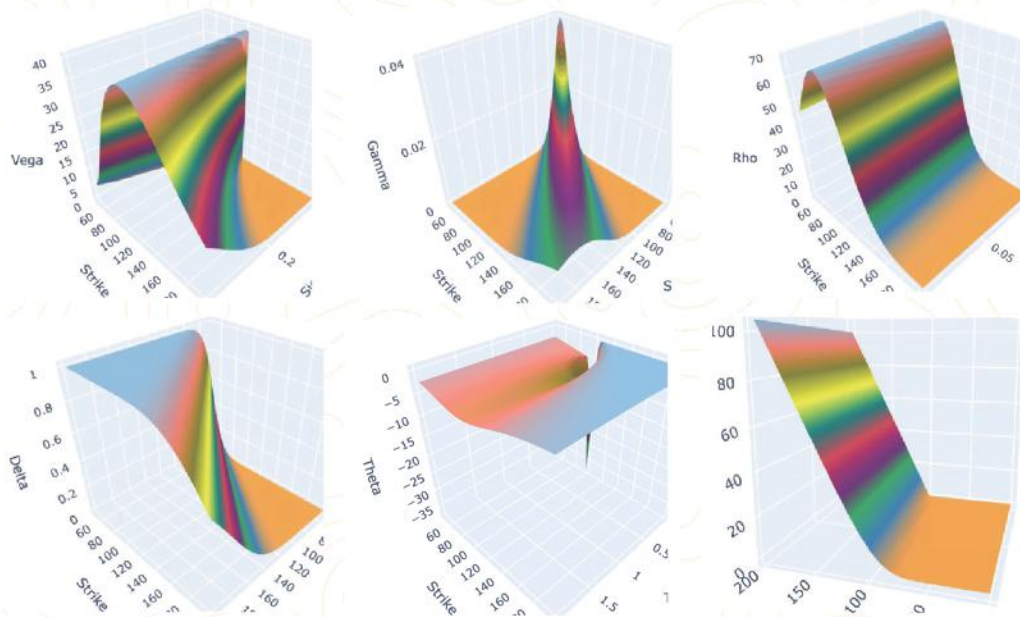
Program Structure & Curriculum

Term 1	Term 2	Term 3	
- Financial Accounting - Corporate Finance - Python and R Programming - Microeconomics - Calculus and Linear Algebra - Operations Management	- Macroeconomics - Probability and Statistics - C/C++ Programming - Fundamental of Derivatives - Time Series Analysis with Python	- Market Risk Modelling - Stochastic Calculus for Finance - Machine Learning for Finance - Technical Analysis - Quantitative Fixed Income Security	Year I
Term 4	Term 5	Term 6	
- Deep Learning for Finance - Advanced Derivatives - Optimization Methods in Finance - Credit Risk Modelling - Computational Methods in Finance	- Reinforcement Learning in Finance - Interest Rate Derivatives - Quantitative Trading Techniques - Stochastic Modelling - Portfolio Optimization	- Signal Processing for Machine Learning - Bond Portfolio and Term Structure - Exotic Options & Structured Products - Financial Risk Management	Year II
Capstone Project			



Curriculum At A Glance

The PGDM - Quantitative Finance program at JAGSoM offers a comprehensive curriculum designed to equip students with the necessary skills and knowledge to excel in the competitive field of quantitative finance. Through a combination of rigorous coursework, practical experience, and industry engagement, the program prepares graduates for successful careers in different domains of Quantitative Finance.



Brief Description of Courses:

Financial Accounting:

Introduction to Financial Accounting, The Accounting Equation and Financial Statements, Accrual Accounting Concepts, Revenue Recognition and Matching Principles, Cash and Receivables, Inventory and Cost of Goods Sold, Long-Term Assets: Property, Plant, and Equipment, Liabilities and Equity, Financial Statement Analysis, IFRS vs. GAAP.

Corporate Finance:

Time Value of Money (TVM), Mergers and Acquisitions (M&A), Risk & Return, Capital Asset Pricing Model (CAPM), Multi-factor Model, Risk Decomposition, Project Appraisal, Capital Budgeting: Average Economic Value (AEV), Internal Rate of Return (IRR), Modified Internal Rate of Return (MIRR), Extended Internal Rate of Return (XIRR), Decision Trees, Net Present Value (NPV), Expected NPV (ENPV), Real Options, Capital Structure Theories, Dividend Decision Theories.

Microeconomics:

Introduction to Microeconomics, Supply and Demand, Consumer Choice Theory, Production and Costs, Market Structures: Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition, Market Failures and Externalities, Income Distribution and Poverty, Labor Markets and Wage Determination, Government Intervention in Markets, Game Theory and Strategic Behaviour.

Macroeconomics:

Introduction to Macroeconomics, Measurement of Economic Performance (GDP, CPI, Unemployment Rate), Aggregate Demand and Aggregate Supply, Keynesian Economics, Fiscal Policy, Monetary Policy, Inflation and Deflation, Economic Growth, Exchange Rates and Balance of Payments, International Trade, The Phillips Curve, Business Cycles and Stabilization Policies, Macroeconomic Models, Economic Development and Growth Theory.

Fundamentals of Derivatives:

Introduction to Derivative Instruments, Option Pricing Models (Black-Scholes Model, Binomial Option Pricing Model, CRR), Put-Call Parity and Option Strategies, Properties of Options (Delta, Gamma, Theta, Vega), Implied Volatility and Volatility Smile, Risk Management and Hedging with Derivatives, Case Studies and Use Cases in Financial Markets.

Machine Learning for Finance:

Mathematics of Ordinary Least Squares (OLS), Lasso, Ridge, and Elastic-Net Regression, Logistic Regression, Decision Trees, Support Vector Machines (SVM), Ensemble Learning, Imbalanced Classification, Principal Component Analysis (PCA), Self-Organizing Map, Clustering, Feature Engineering, Hyperparameter Tuning and Model Optimization, Cross Validation, Pipeline Development, Application in Finance such as Forecasting, Trading, and Fraud & Anomaly Detection, and Implementation in Python.

Quantitative Fixed Income Securities:

Bond Valuation, Bond Price Sensitivities, Bond Immunization, Hedging, AssetLiabilities Management, Fixed Income Instruments: Yield Curve Strategies, Swaps, Forward Rate Agreements (FRAs), Securitization and their Valuation.

Time Series Analysis with Python:

Ordinary Least Squares (OLS) Regression and Assumptions, Autoregressive (AR), Moving Average (MA), and Autoregressive Integrated Moving Average (ARIMA) Processes, Cointegrated Processes, Vector Autoregression (VAR), Generalized Autoregressive Conditional Heteroskedasticity (GARCH), Practical Implementation in Python.

Stochastic Calculus for Finance:

Introduction to Stochastic Processes, Brownian Motion and Wiener Processes, Ito's Lemma and its Applications, Stochastic Differential Equations (SDEs), Martingale Theory and Martingale Representation Theorem, Girsanov's Theorem and Change of Measure, Stochastic Integration, Feynman-Kac Formula, BlackScholes Equation and its Derivation, Risk-Neutral Pricing and the Fundamental Theorem of Asset Pricing, Applications of Stochastic Calculus in Option Pricing, as well as other area within Finance.

Deep Learning for Finance:

Introduction to Deep Learning Concepts, Multilayer Perceptron (MLP) Architecture, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) Networks, Gated Recurrent Unit (GRU) Networks, Autoencoders and Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), Application of Deep Learning in Financial Forecasting, Time Series Prediction, Algorithmic Trading, Sentiment Analysis, Fraud Detection, Implementation in Keras and TensorFlow.

Advanced Derivatives:

Local Volatility Models, Stochastic Volatility Models, Stochastic Integration, Credit Derivatives, Gaussian Copula, Variance Swaps, Currency Derivatives.

Portfolio Optimization:

Introduction to Portfolio Theory, Markowitz Mean-Variance Optimization, Efficient Frontier Analysis, Capital Allocation Line (CAL), Sharpe Ratio Maximization, Modern Portfolio Theory (MPT), Black-Litterman Model, Factor Models and Smart Beta Strategies, Risk Budgeting Portfolio, Risk Parity Portfolios, Minimum Variance Portfolios, Mean-Semivariance Optimization, Mean-Downside Risk Optimization, Mean-Variance-Skewness Optimization, Mean-Variance-Skewness-Kurtosis Optimization, Mean-VaR Optimization, Mean-Conditional VaR Optimization, Mean-Marginal VaR Optimization, Mean-Max Drawdown Optimization, Mean-Avg Drawdown Optimization, Multi-Period Portfolio Optimization, Dynamic Asset Allocation Strategies, Performance Measurement and Attribution, Monte Carlo Simulation for Portfolio Optimization, and other Optimization Techniques.

Computational Methods in Finance:

Generating Random Numbers: Inverse Transform Approach, Acceptance Rejection Approach, Polar Method, Box-Muller Approach, Rational Approximation Method; Variance Reduction Method, Monte-Carlo Simulations for Option Pricing, Finite Difference Method: Explicit, Implicit, Crank-Nicolson for Option Pricing, Euler Discretization, Cholesky Decomposition, LU Decomposition, Simulation of Financial Processes, Implementation in Python.

Market Risk Modelling:

Historical VaR, Parametric VaR, Monte Carlo VaR, VaR Mapping, Backtesting VaR, Expected Shortfall, Coherent Risk Measure, Stress Testing, Scenario Analysis, Sensitivity Analysis, Risk Aggregation, Liquidity Risk, Tail Risk, Volatility Modelling, Term Structure Models, Regulatory Frameworks.

Credit Risk Modelling:

Credit Analysis, Default Risk, Credit Scoring Models, Expected and Unexpected Loss, Probability of Default (PD), Loss Given Default (LGD), Exposure at Default (EAD), Counterparty Risk, Credit Valuation Adjustment (CVA), Wrong Way Risk, Right Way Risk, Credit Risk Mitigation Techniques, Credit Derivatives, Stress Testing, Credit Portfolio Management, Loan Loss Provisions, Rating Agencies.

Financial Risk Management:

Portfolio Risk, Risk Budgeting, Component VaR, Incremental VaR, Marginal VaR, Currency Risk, Interest Rate Risk, Liquidity Risk, Operational Risk, Risk Identification and Assessment, Risk Measurement and Metrics, Risk Reporting and Monitoring, Basel Accords (Basel I, II, III), Enterprise Risk Management (ERM), Capital Adequacy, Hedging Strategies, Internal Controls and Audits, Economic Capital, Risk Transfer Mechanisms, Risk Mitigation Techniques, Emerging Risks.

Quantitative Trading Techniques:

Development and Implementation of Trading Strategies, Statistical Arbitrage, Pairs Trading, Momentum Trading, Mean Reversion Strategies, High-Frequency Trading (HFT), Algorithmic Trading, Machine Learning Techniques for Trading, Backtesting and Simulation of Trading Strategies, Risk Management in Quantitative Trading, Execution Strategies and Market Microstructure, Signal Processing, Optimization Techniques for Strategy Enhancement, Sentiment Analysis, News Analytics, Technical Analysis Integration, Transaction Cost Analysis (TCA), Performance Measurement and Attribution, Regulatory Considerations and Compliance in Algorithmic Trading, Strategy Evaluation and Improvement, Market Impact Models, Liquidity Provision and Market Making, Implementation in Python.

Stochastic Modelling:

Maximum Likelihood Estimation, Monte Carlo Simulation, Cox-Ingersoll-Ross Model (CIR), Vasicek Model, Ho-Lee Model, Hull-White Model, Heston Model, SABR Model, Simulation-Based Pricing and Valuation, Stochastic Differential Jagdish Sheth School of Management (JAGSoM) Electronic City Phase I, Bangalore, India 8 Equations (SDEs), Calibration Techniques, Volatility Surface Modelling, Interest Rate Models, Application in Derivatives Pricing, Risk Management, and Hedging Strategies.

Interest Rate Derivatives:

Swaps, Forward Rate Agreements (FRAs), Interest Rate Futures, Interest Rate Options, Cross Currency Swaps, Cross Currency Basis Swaps, Swaptions, Swaption Collar, Interest Rate Caps and Floors, Interest Rate Exotics, Credit Default Swaps (CDS), Credit-Linked Note.

Reinforcement Learning in Finance:

Introduction to Reinforcement Learning (RL) Concepts, Markov Decision Processes (MDPs) and Dynamic Programming, Exploration-Exploitation Tradeoffs, Value Function Approximation Techniques, Q-Learning, Deep Q-Networks (DQN), Policy Gradient Methods, Actor-Critic Architectures, Model-based RL Approaches, Reinforcement Learning for Portfolio Management, Risk Optimization, Algorithmic Trading Strategies, Market Making and Liquidity Provision, Optimal Execution Strategies, Portfolio Rebalancing, Derivative Pricing and Hedging, Automated Trading Systems, Risk Management Applications, Realworld Challenges and Considerations, Ethical and Regulatory Implications, Case Studies and Applications in Financial Markets.

Optimization Methods in Finance:

Linear Programming, Asset/Liability Modelling, Nonlinear Programming, Quadratic Programming, Conic Optimization, Integer Programming, Dynamic Programming, Stochastic Programming, Monte Carlo Simulation Optimization, Genetic Algorithms, Simulated Annealing, Particle Swarm Optimization, Evolutionary Strategies, Metaheuristic Algorithms, Application in Finance.



Practical Experience

1. Internships:

Opportunities to work with leading financial institutions, gaining hands-on experience in quantitative finance.

2. Capstone Projects:

Real-world projects involving the development and testing of quantitative models under the guidance of faculty and industry experts. Development and implementation of trading strategies on actual capital funded by JAGSoM.

3. Research Seminars:

Exposure to the latest research and developments in quantitative finance through seminars and workshops.



Certifications (Optional)

1. MSc in Financial Engineering from World Quant University, USA – Free of cost.

2. FRM from GARP, USA – Cost: USD 1600.

3. CQF from CQF Institute, Fitch Learning, London – Cost: USD 8,495.





Faculty

JAGSoM faculty is an eclectic mix of academicians and industry veterans. Many faculty are alumni of prestigious educational institutes in India and abroad such as Stanford, IIMs, IITs, and FT100 colleges. The industry veterans are people with wide and varied experience at CXO levels.

The PGDM-QF program is taught by a distinguished faculty comprising academicians and industry professionals with extensive experience in quantitative finance. Guest lectures and workshops by industry experts further enrich the learning experience.

There are 12 faculty members dedicated the Finance area, of which the following five are notable for their specialization in Quantitative Finance and related field.



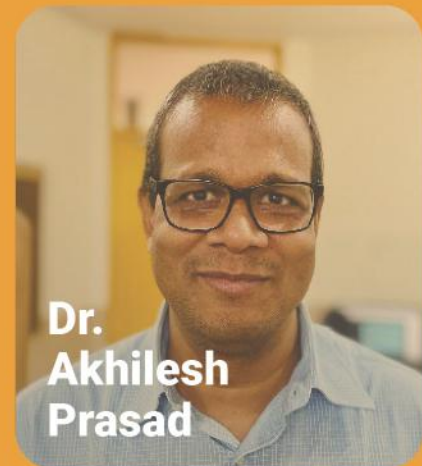
Program Leaders



**Dr.
Amit Ram
Puniyani**

**PhD, Stanford University, USA | B. Tech, IIT Bombay, India
Ex Lehman Brothers, Standard Chartered,
Nomura, Credit Suisse, Deutsche Bank**

Dr. Puniyani is a faculty member in finance area with 12 years of experience in the banking analytics domain, working in the quantitative risk management divisions of several top-tier international banks. He works in and teaches courses on derivatives, fixed income and credit valuation and financial analytics. Amit began his career working at Lehman Brothers, New York moving to Standard Chartered Bank Singapore and eventually to Nomura Mumbai which had been acquired from Lehman Brothers. He also worked in senior level positions at Credit Suisse, Mumbai and Deutsche Bank.



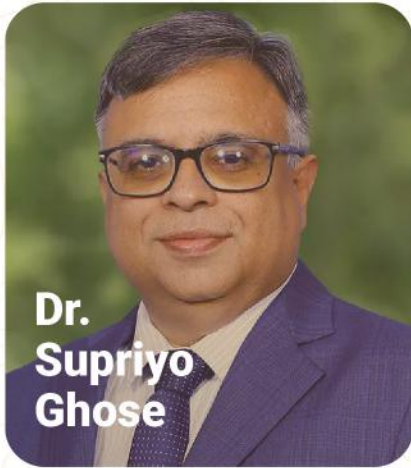
**Dr.
Akhilesh
Prasad**

**DBA, SP Jain School of Global Management, Australia
MBA, EDHEC Business School, France
B. Tech (H), IIT Kharagpur, India | Ex Oracle, IBM**

Dr. Akhilesh's professional journey spans over thirteen years in the software industry, starting as a Software Engineer and progressing to lead teams. Additionally, he has served as a finance tutor for three years, founded a venture for two years, and gained teaching experience over two years. In his academic roles, Dr. Prasad has instructed courses such as Corporate Finance, Computational Methods in Finance, Mathematics of Financial Derivatives, Machine Learning for Finance, Deep Learning with Python, Portfolio Optimization, and Financial Risk Analytics.



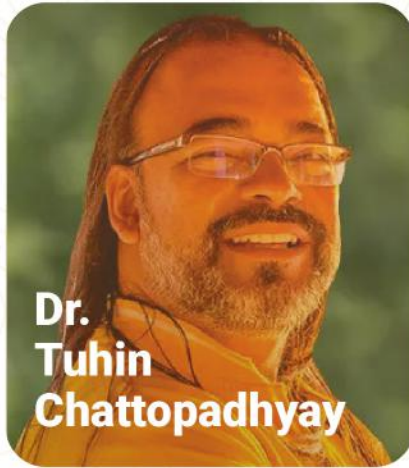
Other Key Faculty Members



**Dr.
Supriyo
Ghose**

**PhD, Indian Institute of Management
Calcutta, India**

**B.E. (Hons), Jadavpur
University,
Calcutta, India**



**Dr.
Tuhin
Chattopadhyay**

**Ph.D., Management
Studies, Dr. A.P.J.
Abdul Kalam Technical
University, India**

**CBA & Global CIO
Programme, Indian
School of Business
(ISB), Hyderabad**



**Dr.
Srijith
Mohanan**

**PhD, Indian Institute of
Management,
Bangalore, India**

**MBA, Indian Institute of
Management,
Bangalore, India**

**B. Tech., Indian
Institute of Technology,
Kharagpur, India**



Industry Collaborations

- **Guest Lectures and Workshops:**

Regular involvement of industry leaders to provide insights and practical knowledge.

- **Joint Research Projects:**

Collaboration with financial institutions & fintech companies for cutting-edge research and development projects.

- **Advisory Board:**

An advisory board consisting of prominent figures in the finance industry to provide guidance and ensure the curriculum remains relevant and up to date.



Career Opportunities

Graduates of the PGDM - Quantitative Finance program can pursue a wide range of career paths in various sectors, including the following prominent ones:

Quantitative Analyst

Role: Develop and implement complex models for trading and investment decisions.

Skills: Advanced mathematics, programming (Python, C++), statistical analysis (R, Matlab).

Risk Manager

Role: Analyse & manage financial risks using quantitative techniques like VaR & stress testing.

Skills: Risk modelling, statistical analysis, programming (SAS, Python).

Algorithmic Trader

Role: Design and execute automated trading strategies.

Skills: Programming, numerical methods, high-frequency trading knowledge.

Portfolio Manager

Role: Manage investment portfolios using quantitative methods for asset allocation and optimization.

Skills: Financial modelling, risk management, CFA certification.

Financial Engineer

Role: Develop new financial instruments and strategies using quantitative models.

Skills: Derivatives pricing, stochastic calculus, computational finance.

Data Scientist

Role: Apply machine learning and data analytics to financial data.

Skills: Data mining, predictive analytics, machine learning (Python, R).



Indicative Salaries (Mid-Career)

India: INR 35,00,000 to 50,00,000

Singapore/Hong Kong: INR 1,00,00,000

USA/UK: INR 1,25,00,000



Future Growth Prospects

Technological Advancements:

AI and Machine Learning:

Increasing integration of AI and machine learning into financial modelling and trading strategies.

Big Data Analytics:

Leveraging large datasets for enhanced decision-making and predictive analysis.

Regulatory Changes:

Compliance and Risk Management:

Growing need for sophisticated risk management models to comply with evolving regulations.

Market Demand:

Emerging Markets:

Expanding opportunities in emerging markets requiring innovative financial products and strategies.

Sustainability and ESG:

ESG Investing:

Incorporating environmental, social, and governance factors into quantitative models for sustainable investment strategies.



Admission Requirements

Mandatory:

Educational Background: A bachelor's degree in mathematics, engineering, computer science, or a related field from IITs, BITs, NITs, IISc, Chennai School of Mathematics or any other similar top institution in India.

Nationality: Indian

Desired:

Skills: Strong analytical and quantitative skills; proficiency in programming languages such as Python, R, or C++ is preferred.

Selection Process: Personal Interview with JAGSoM faculty.

Institutional History & Profile

Jagdish Sheth School of Management (JAGSoM), originally established as IFIM Business School in 1995, has a rich history of providing innovative and globally recognized business education. It was rebranded to honour the renowned scholar and thinker, Professor Jagdish Sheth. The institution is known for its strong emphasis on grooming T-shaped professionals equipped with both depth and breadth in their chosen areas of specialization through role-defined Career Tracks. Notably:

- JAGSoM is among only 12 business schools in India with an International Profile: AACSB accredited, and QS ranked.
- JAGSoM is led by a Global Board of Governors, having representation from across three Continents – Asia, Europe and America. The Board comprises Global scholars, Industry experts and Academicians from top Global Institutions.
- JAGSoM collaborates with several international institutions through Global Partnerships, providing students with global exposure. To name a few - University at Albany, State University of New York (SUNY) University of Texas @ Arlington, Robinson College of Business, Georgia State University, KEDGE Business School, France, ESDES School of Business and Management, France, HSLU, Lucerne University of Applied Sciences and Arts, Switzerland, ESDES School of Business and Management, France, Mays Business School, Texas A&M University, and ESC Rennes School of Business, France.
- Situated in Bangalore, India, a major Location for technology and finance.
- The institute enables Learner Success through its pedagogical interventions aligned to role-defined career tracks, such as 'Learning by Solving', 'Effective Execution' Design Thinking', Innovation Incubation and a 16-week long Industry Internship.



How To **Apply**

Interested candidates can apply online at
<https://bit.ly/PGDM-QF-JAGSoM>.



Contact Information

Visit jagsom.edu.in/pgdm-quant-finance/,
or email to: pgdm-qf@jagsom.edu.in,
or call: +91 80506 40562

