<p style="text-align:center">**Part time**</p>

Post Graduate Diploma in Data Science (PGCDS)

<p style="text-align:center">(Jointly offered by Department of Economics (Autonomous), University of Mumbai and NISM)</p>

About PGCDS

The Post Graduate Certificate in Data Science (PGCDS) is one of a kind course in India, because of the blend of two colossal educational pillar of this country. The two colossal educational pillars are NISM is an educational initiative by Securities and Exchange Board of India, and Department of Economics (DOE) of The University of Mumbai (Est. 1857). PGCDS is nourished with academic contributions DOE and practicing experience from NISM already established Faculty. This course main aim is to create practitioners in the field of Data Science (Big Data), mainly for India and the Indian sub-continent, however empowering the students with the current methods practice in western countries.

PGCDS is a six month part-time Post-Graduate certificate aimed at creating the next generation Analyst and Data Scientist. For students interested in analytics, technology firms, regulators, consulting and universities across the globe. PGCDS is an extremely unique opportunity to obtain first-hand knowledge, both theoretical and practical, from an institute established by SEBI, the market regulator and prestigious Department of Economics (Autonomous), University of Mumbai. The faculty, consisting of academicians and practitioners, has the capability to deliver a high-quality and cutting-edge programme to the students looking for knowledge and skill-sets as a solid foundation.

Data Science and Big Data Analytics are exciting new areas that combine scientific inquiry, statistical knowledge, substantive expertise, and computer programming. One of the main challenges for businesses and policy makers when using big data is to find people with the appropriate skills. Good data science requires experts that combine substantive knowledge with data analytical skills, which makes it a prime area for social scientists with an interest in quantitative methods. This course integrates prior training in quantitative methods (statistics) and coding with substantive expertise and introduces the fundamental concepts and techniques of Data Science and Big Data Analytics.

Typical students will be from any field requiring the fundamentals of data science or working with typically large datasets and databases. Practitioners from industry, government, or research organizations with some basic training in quantitative analysis or computer programming are also welcome. Because this course surveys diverse techniques and methods, it makes an ideal foundation for more advanced or more specific training. Our applications are drawn from social, political, economic, legal, and business and marketing fields, rather than engineering or other sciences.

Informal estimates indicate that the Industry would require about 6,000 professionals every year. The required skill-sets could be grouped as follows: (1) Financial Analytics, (2) Data Analyst, (3) Marketing: Managers, Market Research Analyst and Specialist, (4) Research Scientist.

Course benefits

This course provides participants with:

- an understanding of the structure of datasets and databases, including "big data"
- the ability to work with datasets and databases
- an introduction to programming languages and basic skills in the R/ Python statistical program
- the ability to analyze data using statistical and machine learning methods.
- The ability to apply to analyze large financial data for decision making purpose

Course Structure

This course aims to provide an introduction to the data science approach to the quantitative analysis of data using the methods of statistical learning, an approach blending classical statistical methods with recent advances in computational and machine learning. We will cover the main analytical methods from this field with hands-on applications using example datasets, so that students gain experience with and confidence in using the methods we cover. We also cover data preparation and processing, including working with structured databases, key-value formatted data, and unstructured textual data. At the end of this course students will have a sound understanding of the field of data science, the ability to analyze data using some of its main methods, and a solid foundation for more advanced or more specialized study. The course is integrated in two trimesters (6 Months) with six core papers.

Trimester I (Conceptual)

DS101: Mathematics for Analytics (30 Hours)
DS102: Statistics for Analytics (30 Hours)
DS103: Applied Econometrics (30 Hours)

Trimester II (Applications)

DS201: Introduction to Machine Learning (30 Hours)
DS202: Behavioural Analytics for Business (30 Hours)
DS203: Financial Analytics (30 Hours)

Patrons of the Programme

Mr. Sandip Ghose, Director

Prior to joining NISM, Mr. Sandip Ghose was Head of Human Resource Management Department, Reserve Bank of India (RBI), overseeing the Strategic Management, Human Resource Development and Administrative Affairs of about 18,000 employees across the country.

A central banker by profession, Mr. Ghose has previously held positions such as Regional Director of the RBI, Delhi and Secretary to the Bank's Local Board of Directors in North India. Besides, he has also served as Chief General Manager and Principal of the College of Agricultural Banking in Pune, Chief of Staff and Advisor to three successive RBI Governors - Dr. C. Rangarajan, Dr. Bimal Jalan, and Dr. Y.V. Reddy - over a period of nine years, i.e.1996-2004.

Mr. Ghose was instrumental in setting up the Human Resources Department in RBI in the year 1995, and went on to head the same, between 2004 and 2007, where he oversaw recruitment, training and development, performance and talent management, as also compensation, welfare and industrial relations. During this time, he was also the Principal, Bankers' Training College, Mumbai (now known as the Centre for Advanced Financial Learning) where he was responsible for grooming and capacity building of the top management of the commercial banks in India.

During his career, Mr. Ghose has received several prestigious awards. Among them are the Jagdeep Khandpur Award for Outstanding HR Leadership, Pride of HR Profession Award by the Institute Of Public Enterprises and HR Leader of the Year Award by the Asia Pacific HRM Congress. For his contribution to the field of HR and the Society at large, he has been conferred with an Honorary Doctoral Degree by the Eastern Institute of Integrated Learning and Management, Sikkim University.

Mr. Ghose holds a postgraduate degree in History and has had exposure to executive education at the top business schools in India and abroad. He continues to serve as Director/Member on the boards of national and international training institutions and business schools.

Mr. G. P. Garg, Registrar

Mr. Garg has held several assignments in SEBI since 1994. He has been closely associated with SEBI and Government of India initiatives on Financial Literacy and Investor Education in the country. He initiated several investor protection and educational activities in SEBI such as launching of SCORES, Toll Free Helpline and Financial Education through Resource Persons. He has worked as the SEBI nominee on Advisory Committee on NISM campus and Technical Group on Financial Inclusion & Financial Literacy under FSDC.

He has been actively associated with establishment of National Institute of Securities Markets (NISM) by SEBI. Mr. Garg also Heads National Centre for Financial Education

(NCFE), a joint initiative by all Financial Sector regulators comprising of RBI, SEBI, IRDA, PFRDA and FMC to implement National Strategy for Financial Education (NSFE).

Mr. Garg is Chief General Manager with SEBI and presently on deputation with NISM. Mr. Garg holds Bachelor degree in Engineering and Law and Masters in Business Administration.

NISM Faculty

Prof. Sunder Ram Korivi,

Dean & Chair Professor -NISM

Prof. Sunder Ram Korivi is an MA (Economics & Political Science) and PhD (Business Policy & Administration) from the University of Mumbai. He is a CA Rank-holder and Fellow of the Institute of Chartered Accountants of India. Additionally, he is also an Associate member of the Institute of Cost & Management Accountants of India and the Insurance Institute of India. He was a full-time faculty member at SP Jain Institute of Management, and later, a Professor at NMIMS University, where he also served as the Head of the Departments of Finance and Economics. His interests are in the fields of Financial Institutions & Markets and Fixed Income Securities. He has been nominated to the Board of Advanced Studies, ICMAI and as a subject expert at LNJP Institute of Criminology and Forensic Science and the Board of Studies – Finance at the University of Kashmir. He has conducted policy-oriented research for the Central and State Governments and for SEBI. An adjunct faculty at IIM Kozhikode, he has also lectured at IIT Bombay, NIBM, NIA, NITIE, BSE and other institutes of national importance. He has been with NISM since 2008. He has prior work experience with Business India as a Corporate Researcher, Tata Industrial Finance Corporation as a Merchant Banker and also with Axiomé as a Merchant Banker.

Dr. Latha Chari

Chair Professor - NISM

Dr. Latha S Chari is a doctorate in Finance from BITS Pilani, Post Graduate in commerce and a FCMA (Fellow member of the Institute for Cost Accountants of India). She has a total experience of about two decades of which is equally divided between academia and Industry. She started her academic career as a Fellow with IILM, New Delhi. Before joining NISM, she has worked with Institute for Technology and Management and ITM Institute of Financial Markets for more than a decade. She joined ITM as lecturer and grew up the hierarchy to become the Deputy Director, heading ITM Institute of Financial Markets. During her academic tenure she has published papers in various national and international journals and has conducted MDP's in the areas of financial asset valuation, strategic cost management , trading and operations in equity markets, performance evaluation of mutual funds and the like. Her areas of research interests include strategic cost management, corporate valuations, shareholder value enhancement and similar studies. She has special

interests in establishing finance labs and design, development and delivery of lab based courses in the areas of banking and financial markets.

Mr. Akhlaque Ahmad

Lecturer and Program Director

Mr. Akhlaque Ahmad is pursuing his Ph.D from the Department of Economics (Centre of Advance Studies), on the evolving topic of Complex Adaptive Systems in financial Markets. He is trained in the field of Mathematics with his Masters in Philosophy in Cryptography from the prestigious Department of Mathematics, University of Mumbai. He completed his Master is Mathematics and Post Graduate Diploma in Financial Engineering. He was awarded research fellow form the Ministry of Science and Technology, Government of India, New Delhi.

Prior to joining NISM, he was associated with the undergraduate programme of the London School of Economics & Political Sciences conducted at Mumbai. He has delivered talks and presented papers at University of Oxford, UK, National University Singapore, Singapore, Royal Flemish Society of Belgium, Belgium, Bradley University, Boston University, USA, National Research University, St. Petersburg, Steklov Mathematical Institute, Moscow State University (Russia), University of Zurich, ETH Zurich, Switzerland, IIT Bombay, IISc Banglore and University of Mumbai, India. He has published work in the area of financial engineering, financial economics and derivatives. Also, he teaches executive programs and SEBI Induction Program. His areas of interest include Financial Engineering, Financial Cryptography, Mathematical Finance and Financial Derivative. He is visiting faculty at NITIE, and various B-Schools of University of Mumbai and India. He has industrial experience as consultant with financial software companies and advertising companies. He teaches Mathematical Finance, Computational Finance and Financial Engineering related subjects at NISM. He extensively uses R- Language, Matlab, and Excel-VBA for computational and modelling purpose.

Dr Rachana Baid

Adjunct Associate Professor

Dr. Rachana Baid is an M.Com (Gold medallist) and PhD. She specializes in Financial Systems and Regulatory Policy. She has undertaken consulting assignments with multilateral agencies such as the World Bank and has been a visiting faculty at IIM Indore and SP Jain Institute of Management. She has also served as an Assistant Professor at the UTI Institute of Capital Markets, Mumbai for about a decade.

Visiting Faculty

Mr. G. Mahalingam

Mr Mahalingam is Executive Director and former regional director of Reserve Bank of India. He is associated with RBI from last 30 years with various roles as Inspecting officer, Chief Forex dealer, Chief Investment Dealer, Head of Internal Debt Management Department. He was also advisor to Central Bank of Oman for monetary operations. Currently, he is involved with RBI in monitoring and surveillance of money/Forex/G-Sec/Derivative Markets Intervention Operations and conduct of Liquidity Operations, Forex Intervention Operations and Open Market Operations. Moreover, he was six years faculty in Reserve Bank Officers Training College. He is M.Sc. in Statistics and Operations research from IIT, Kanpur and an MBA in International Banking and Finance from Birmigham Business School, UK. He teaches various financial engineering and risk management issues in Indian Market context.

Prof. Neeraj Hatekar

Prof. Neearaj, M.A. and Ph.D., is a Professor at Department of Economics (Autonomous), Centre of Advance Studies, University of Mumbai. His area of interest is Econometrics, Game Theory and Experimental Economics. He has been visiting fellow at University of Cambridge and University of Ulster, UK. He has several publications in the journals of international repute. He teaches Game Theoretic Applications in Financial Engineering and Applied Financial Econometrics at NISM.

Mr. Suneel Sarswat

Mr. Suneel Sarswat is an MSc in Statistics and Informatics from the Department of Mathematics, IIT Bombay. Before joining NISM, he worked on Financial Analytics at Bank of America (now BoFA Merrill Lynch). He has keen interest in Mathematics, Computational Finance and Financial Computing. He has done vital projects such as the application of neural networks in financial analysis, credit ratings and trading algorithms involving pattern recognition. He has participated in national and international workshops and conferences. Currently, he is pursuing his doctorate in Computer Science from TIFR. He teaches Computational Finance at NISM.

Dr. Sushil. Torne

He is a Ph.D in economics with specialization in Infrastructure finance, Financial Economics, Urban Economics, Quantitative Economics, Econometrics, having research interest in Structured Financial Products and Machine Learning. He was a Fellow in the Department of Economics, University of Mumbai. His recent research flows in the topics on Machine learning techniques for Big Data application. Prior to his Ph.D he has three years experience in Commodity and FOREX markets on the advisory panel for the trading room.

Mr. Harjeet Singh,

He is CFA, FRM, PRM, CAIA, CMT and M.S. (Financial Mathematics) from Stanford University, USA and PGDBM (Finance & Economics), XLRI School of Business. He is

currently working with Nomura Securities, as Associate, Global Markets & Risk Management Group – Fixed Income. He has over 5 years of industry experience. Previously he had worked as Associate, Global Risk - Model Validation Group with Nomura Securities, Dealer, Global Markets – Treasury, Corporate Sales with Standard Chartered Bank.

Mr. Sanjoy Choudhury

He is Principal – Radiant Consulting spearheading its Treasury and Risk Consulting, Training and Research business including product and services offering to clients across all asset classes. He is an experienced financial market professional in the Banking & Financial Services Industry with over 16 years of experience spread across various organizations. He is a multi-skilled OTC Derivatives and Financial Risk professional with extensive knowledge and experience of Pricing, Valuation, Financial Derivatives Modelling, Hedging and Risk of Interest Rate, FX, Equity and Credit Derivatives including financial research, analysis and training. He teaches Risk Management at NISM.

Mr. Chandresh Shah

He has more than 15 years of experience in Banks and Financial Institutions. He is currently working with Aviva as the Head of Risk Management. His past assignments include Risk Management and Compliance role with Tata Capital, Standard Chartered, HSBC and SEBI. He is a qualified accountant and a post graduate in management from the University of Mumbai. He also holds CFA charter and FRM designation. He teaches Risk Management at NISM.

Mr. Kalyan Roy,

He is Master of Statistics Indian Statistical Institute, Kolkata, Bachelor of Statistics Indian Statistical Institute, Kolkata. He is the Head of Quantitative Analytics at Capital Metrics & Risk Solutions. He is a vastly experienced professional. In a career spanning over sixteen years he has held various positions in the industry. Previously he worked as a Quantitative Analyst with Deep Value Technology, an innovative firm specializing in high-performance algorithmic trading strategy vehicles where he was involved in studying stochastic models of equity market microstructure, developing ultra high frequency trading algorithms, statistical modelling, estimation of volatility based on ultra high frequency data, building factor models for the S&P500 stocks, statistical modelling of market and limit order arrival times and cancellation times and ultra high frequency equity price time series.

Prior to that he had worked as Statistical Consultant with Indiana University, U.S.A. where he was involved in modelling for researchers in physical, biomedical and social sciences. He had worked as Statistical Analyst with CITIBANK, Chicago, U.S.A. where he worked on consumer response modelling. He worked as Statistical Analyst with BANK ONE, Delaware, U.S.A. where he worked on consumer credit risk modelling. He had worked as Statistical Modeller with IMS America, Pennsylvania, U.S.A. He had been a Lead Consultant with Symphony Services, Bangalore, India and Market Research Director with IMRB International, New Delhi.

Awards and Sponsorships

Certificate Awards

The Post graduate certificate will be awarded jointly with NISM and Department of Economics (Autonomous), University of Mumbai.

Scholarships

Sponsored candidates are those whose application forms are forwarded to NISM through their respective employers, being eligible organizations, as described in the next paragraph. The employer should furnish an undertaking to grant study leave to the said candidates and also undertake to bear all the fees. Eligible organizations would include

1. Government Departments/ Public Sector Undertakings

2. Public companies or Trusts registered with SEBI

3. Banks/NBFCs recognized by RBI

4. Insurance Companies/Intermediaries recognized by IRDA.

A maximum of five seats are reserved for sponsored candidates. However, the sponsored candidates have to participate in the admission processes as applicable to other candidates. If the number of sponsored candidates is inadequate then the seats reserved for the sponsored candidates may be offered to other candidates. Sponsored candidates are not allowed to participate in campus placement process.

Admission Procedure

Eligibility Criteria

Minimum qualification

A bachelor's degree from a recognised Indian university or equivalent with a minimum of 50% in aggregate

Age

There is no age limit for the programme.

Personal Interview

Candidates will be shortlisted on the basis of profile for a personal interview. The shortlisted candidates will be intimated through email and/or through NISM website. Personal interviews are likely to be held at Mumbai direct/telephonic in July 2015. NISM will intimate the exact date, time and venue of the personal interview to the shortlisted candidates.

All expenses related to appearing for personal interview shall be borne by the candidate. The Institute will not bear or reimburse any expenditure in this regard. The Institute reserves the right to postpone or cancel the dates of personal interview. Candidates are also advised to visit the Institute's website for any updates and other information. The maximum class strength will be 30 students. NISM reserves the right to increase or decrease the number , depending on the quality of the applications received for consideration. Hostel accommodation may be offered depending upon availability. Preference will be given to outstation and lady candidates as may be decided by the Institute.

Announcement of Selected Candidates

The list of selected candidates will be displayed on the Institute's website on July-August, 2015. Selected candidates would be required to pay the first instalment of fees (see table of fees) on or before July 30th 2015. Provisional admission offered to selected candidates who do not pay the fees on or before the stipulated date would automatically stand cancelled.

Fee Structure

NO.	PARTICULARS	FEE AMOUNT `
01	Tuition Fee[1]	70,000
02	Examination Fee	5,000
03	Library Fee[2]	5,000

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[1] These fees are tentative and subject to change
[2] Refundable

Commencement of online registration	**June 1, 2015**
Last date for online registration	**July 15, 2015**
Announcement of selected candidates for interview	**July 20, 2015**
*Personal interviews	**July 25 – 26, 2015**
Announcement of list of selected candidates	**July 30, 2015**
Last date for payment of term I fees	**August 7, 2015**
Programme commencement and orientation	**August 10, 2015**