भारतीय प्रौद्योगिकी संस्थान दिल्ली

Indian Institute of Technology Delhi

CERTIFICATE PROGRAMME IN

DATA SCIENCE & MACHINE LEARNING

Technical Orientation June 30, 2024

6 Months | Live Online Sessions

BATCH 8

Programme offered by Continuing Education Programme (CEP), IIT Delhi

PROGRAMME OVERVIEW

As machine learning adoption continues to grow rapidly across industries, DSML is evolving from just focusing on predictive models, toward a more democratized, dynamic and data-centric discipline. The Data Science and Machine Learning market size is expected to show an annual growth rate (CAGR 2024-2030) of 17.15%, resulting in a market volume of US$528.10bn by 2030. Source: Statista 2024.

In FY23, the public funding for the digital India mission increased by 67% to reach US$ 1.29 billion (Rs. 10,676 crore). This mission involves a plan for the effective utilization of Data Science and AI to promote financial inclusion, supplement the education sector, and transform the urban infrastructure. Source: IBEF 2023

The Indian Institute of Technology Delhi (IIT Delhi) presents a comprehensive six-month online Certificate Programme in Data Science & Machine Learning. This industry-oriented program equips you with the expertise to transform data into actionable insights and build powerful predictive models. Master the sought-after skills in data manipulation, analysis, and machine learning algorithms, including Python programming, statistics, deep learning, and data visualisation. Whether you're a working professional seeking to upskill, a graduate aiming to stand out, or an individual passionate about data analysis, this program is designed for you.

The Indian analytics industry is predicted to escalate to USD 98 billion in 2025 and nearly USD 119 billion in 2026. Currently, the demand for data scientists is at an all-time high in India. Analysts have predicted around 11 million job openings in data science by 2026 in India alone.

According to Analytics Insights, India will capture 32% of the big data market worldwide and generate USD 20 billion by 2026.

AIM Research suggests that India has contributed 9.4% of total global analytics job openings, rising from 7.2% in January 2020.

WHO IS THIS PROGRAMME FOR?

Early and mid-career professionals seeking a dynamic edge in Data Science and ML to propel their careers forward with precision.

High potential professionals hungry for insights, equipped with a passion for harnessing data science and machine learning to steer strategic decisions and ignite business expansion.

PROGRAMME HIGHLIGHTS

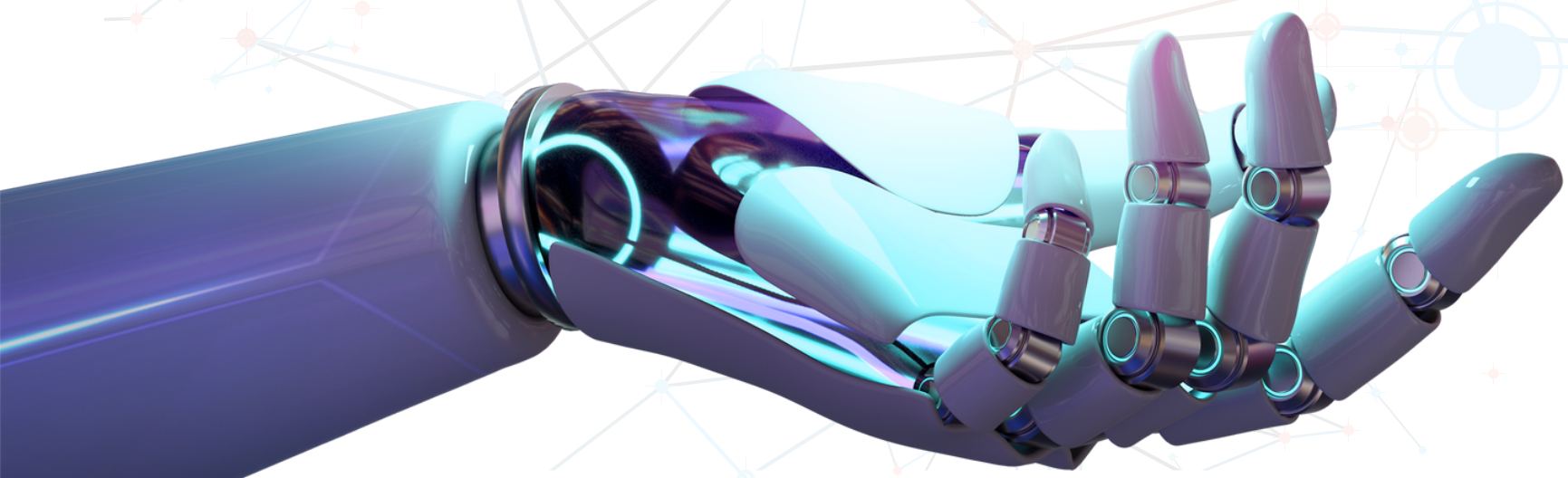
1 Learn from the faculty of IIT Delhi, one of India's Leading Engineering School

2 Experience high-impact live-learning and appreciate real-world case studies

3 Gain structured industry-oriented insights and work on real-world data-sets

4 Participate in peer-to-peer learning and expand your professional network

5 Receive an industry-recognised Certificate from CEP, IIT Delhi



PROGRAMME MODULES

The programme is taught by IIT Delhi's renowned faculty in an immersive learning pedagogy that combines lectures, tutorials, and hands-on exercises. You will have the opportunity to interact with your peers and faculty in a collaborative online learning environment.

Module 1: Data Science Essentials

- Fundamentals of Python*
- Fundamentals of Mathematics - Linear Algebra/Probability
- Measures and Descriptors of Data, Distributions and Estimation
- Exploratory Data Analysis
- Hypothesis Testing and Evaluation
- **Self-learning Project:** Evaluating Channel effectiveness using Hypothesis

Module 2: Communicating Effectively with Data

- Data and Information Systems
- Storytelling with Data
- Designing Business Dashboards
- **Self-learning Project:** Visualising Mutual Funds and Stocks

Module 3: Optimisation for Machine Learning

- Optimisation Formulations
- Gradient and Search-Based Optimisation for Machine Learning
- Linear, Quadratic, and Nonlinear Programming
- Multi-objective and Multi-Criteria Decision-Making - Evolutionary Tools
- **Self-learning Project:** Multi Objective optimisation in Stock investments

Module 4: Machine Learning

- Regression and Derivatives
- Trees and Random Forests
- Support Vector Machines
- Clustering – Hierarchical K-means Clustering
- Dimensionality Reduction: PCA
- **Self-learning Project:** Predicting customer churn

Module 5: Deep Learning and Generative AI

- Deep Feedforward Neural Nets
- Convolutional Neural Nets
- Long Short-Term Memory (LSTM) Networks
- Large Language Models
- Explainable AI
- **Self Learning Project**: CNN Model for land use

Note:

- Modules/ topics are indicative only, and the suggested time and sequence may be dropped/ modified/ adapted to fit the total programme hours. Case studies, real world examples and numerical illustrations are an integral part of multiple modules included in the course.
- The primary mode of learning for this programme is via live online sessions with faculty members. Post session video recordings may or may not be made available, at the discretion of faculty members.
- Emeritus or the institute does not guarantee availability of any session recordings.
- Fundamentals of Python will be taught via recorded sessions. The faculty will be conducting Q/A on the same.

HANDS ON LEARNING

Capstone Project

A capstone project in Data Science and Machine Learning serves as the culmination of theoretical knowledge and practical skills acquired throughout the program. It typically involves solving a problem using data-driven techniques and advanced algorithms. Students engage in various stages of the project lifecycle, including exploratory data analysis, model selection and training, and evaluation. The project offers an opportunity to demonstrate proficiency in programming languages like Python, statistical analysis, machine learning algorithms, and data visualization techniques. This activity is carried out in groups and students pick one of the three four contexts given to them.

Tools Covered

PROGRAMME COORDINATORS

Dr Hariprasad Kodamana

Associate Professor
Department of Chemical Engineering
Joint Faculty, School of AI
Indian Institute of Technology Delhi

Dr Hariprasad Kodamana is a PhD from IIT Bombay, where he received the Institute Award for Excellence in PhD thesis. His research interests include machine learning, optimisation, model-based control, fault detection and diagnosis. His research work has been published in various notable international peer-reviewed journals and presented in leading conferences.

Dr Agam Gupta

Associate Professor
Department of Management Studies
Associate Faculty, School of AI
Indian Institute of Technology Delhi

Dr Agam Gupta is a fellow of the Indian Institute of Management Calcutta (IIM Calcutta). His research areas include platform ecosystems, digital marketing, computational social science, and complexity. He has taught various courses on data visualisation and data mining. His research work has featured in reputed international journals and conferences proceedings.

Dr Manojkumar Ramteke

Professor
Department of Chemical Engineering
Associate Faculty, School of AI
Indian Institute of Technology Delhi

Dr Manojkumar Ramteke is a PhD from the Department of Chemical Engineering, IIT Kanpur. He has also worked as a scientist at the Institute of Chemical and Engineering Sciences (ASTAR), Singapore. His research work is focused on multi objective optimisation of process applications, scheduling and planning of chemical processes, control of chemical processes, novel meta-heuristic and Machine Learning algorithms, and DNA computing and bio-sensors.

Note: Programme Coordinators might change due to unavoidable circumstances, and revised details will be provided closer to the programme start date.

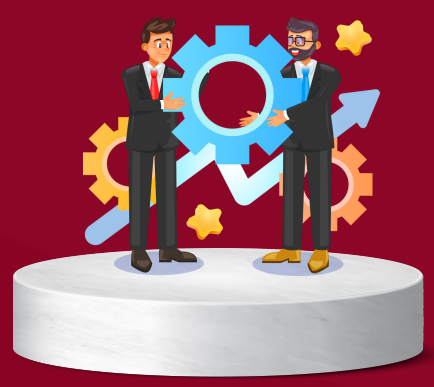
KEY PROGRAMME TAKEAWAYS

Build predictive models using neural networks and time series data forecasting models

Develop an in-depth understanding of industry best practices for regression, clustering, decision trees and deep learning

Hone optimization techniques to minimize errors and forge precise models, mastering data science excellence.

Gain hands-on experience in machine learning algorithms, the statistical models behind them and the applications of ML



PROGRAMME CERTIFICATE

Participants will be awarded a successful completion certificate from IIT Delhi on scoring at least 50% marks on aggregate in any two out of three quizzes, need to satisfactorily complete a group project, and maintaining a minimum attendance of 70%. Participants who are unable to maintain 50% marks in the evaluation components, but have a minimum attendance of 90% shall be awarded a participation certificate.

Note: All certificate images are for illustrative purposes only and may be subject to change at the discretion of IIT Delhi. The organising department of this programme is IIT Delhi Yardi School of Artificial Intelligence. Sample e-certificate to be issued by CEP IIT Delhi are shown above.

Programme Code: .....

Indian Institute of Technology Delhi

HAUZ KHAS, NEW DELHI- 110016

Department/Centre/School of .....

Continuing Education Programme

On

Title of the Programme

This is to certify that

Mr./Ms. Name Of The Participant

has successfully completed the online certificate programme on "**Title of the Programme**" held from ..... to ..... by the Indian Institute of Technology Delhi.

Prof.
Programme Coordinator

Prof.
Head of the Department

Prof.
Head/Associate Head, QIP/CEP

An initiative under eVIDYA@IITD (ई-विद्या@IITD)

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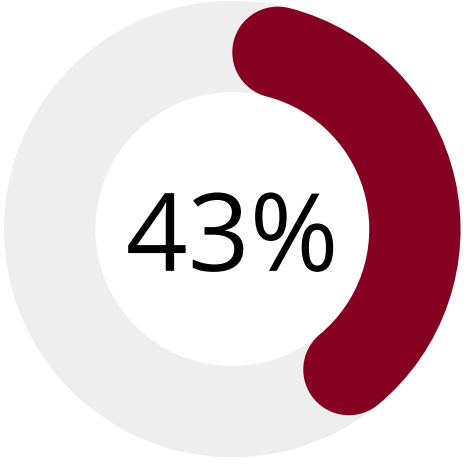
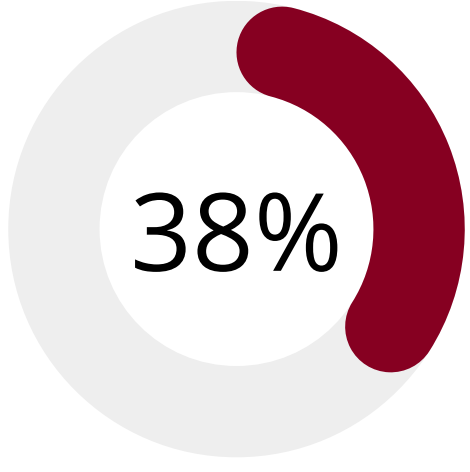
PAST PARTICIPANT PROFILES

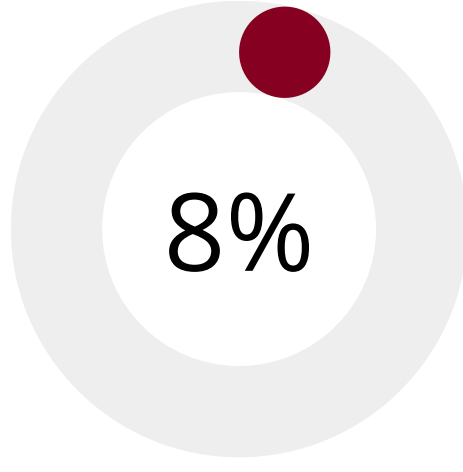
Work Experience



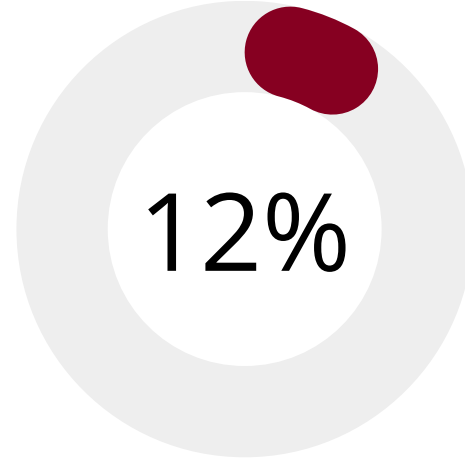
0 to 10 Years



10 to 20 Years



20 to 30 Years



30+ Years

Industries

27%
IT Services

21%
BFSI

4%
Consulting

0.8%
Manufacturing

1%
Financial Services

49%
Others*

*Others include Bioinformatics, Education, Infrastructure, Healthcare, Renewable Energy, and Travel, amongst others.

PARTICIPANT TESTIMONIALS

BATCH 2

The focus on concepts from the ground up was the best part which enables to build a strong foundation for understanding complex scenarios.

Siddharth Sahany

BATCH 2

The technicalities of the subject was covered in detail and adequate implementation and theoretical background was covered. This helped me in appreciating the machine learning algorithms better.

Mudit Sharma

BATCH 3

Good introduction to the world of machine learning, it has given me confidence to explore machine learning and its applications to my field.

Anisha Chaudhary

BATCH 4

The course curriculum is very good and the content more real time so it is really useful for any students to become expertise in the field of Data Science and Machine Learning.

Niranjan Nidadavolu

BATCH 4

Concept of data science and machine learning is described thoroughly. It helped me to get an insight into the topic.

Bharati Sinha

BATCH 4

The lessons delivery by professors were really very good. Sessions were interactive and helped understand complex topics. Also, many real life cases included has helped to connect the course.

Ajay Ganjoo

PROGRAMME DETAILS

Work Experience

Duration	**6 Months**
Technical Orientation	**June 30, 2024**
Academic Orientation	**July 13, 2024**
Live Online Sessions	**July 20, 2024** **3 hours/Saturday** **12:15 PM - 3:15 PM**

Eligibility*

- Graduates (10+2+3) or Diploma Holders (only 10+2+3) from a recognised university (UGC/AICTE/DEC/AIU/State Government/recognised international universities) in any discipline as on the Programme Start date i.e., June 30, 2024.
- Participants are expected to have a background 12th grade mathematics or completed at least a course of statistics/mathematics/data science in UG/PG level. Exceptions can be allowed if the participants have sufficient work experience in the data science field.

Selection Process:

- Screening and selection will be done by IIT Delhi.

Evaluation

- At the faculty's discretion, three assessments consisting of an hour-long online quiz will be conducted.
- In addition to passing in quizzes the students need to satisfactorily complete a group project.

PAYMENT SCHEDULE

Programme Fee **INR 1,35,000 + GST**

	Instalment 1	Instalment 2	Instalment 3	Instalment 4
Remarks	**Within 5 days post selection**	**July 07, 2024**	**August 16, 2024**	**Sept 30, 2024**
Amount	**INR 13,500 + GST**	**INR 33,800 + GST**	**INR 47,200 + GST**	**INR 40,500 + GST**

Note:
- The actual programme schedule will be announced closer to the programme start.
- GST (currently @ 18%) will be charged extra on these components.
- Postage charges for books and study materials sent to locations outside of India will be paid for by the student.
- Loan and EMI services are provided by Eruditus Learning Solutions Pte Ltd, and IIT Delhi is not responsible for the same.

Last Date to Apply	**June 27, 2024**
Shortlisted Candidates Will Be Informed by	**July 03, 2024**
Last Date to Submit the Fee	**Within 5 Days Post Selection**

Note: Applications will be reviewed based on eligibility and subsequent shortlisting process as laid down by the Programme Coordinators.

All fee should be submitted in the IIT Delhi CEP account only, and the receipt will be issued by IIT Delhi CEP account for your records.

* 6 month duration is counted from first academic session i.e. (July 20, 2024) and the same date will also be mentioned on the certificate as the starting date of the programme. The mentioned minimum eligibility criteria is not a guaranteed for selection. Selection cut-off for this programme can be altered on the discretion of IIT Delhi.

APPLICATION REQUIREMENTS

Graduation and Post-Graduation Education:

- Consolidated Graduation Marksheet (All Semester)
- Final year students may submit the marksheets up to the previous semester

Experience Documents (If Applicable):

- For Previous Organisation(s): Relieving letters
- For Current Organisation: Current Salary Slip or Bonafide Certificate from the HR department on company letterhead

ID Proof:

- Any Government-issued photo ID (PAN Card/ Driving License/ Passport, etc).
- Submission of passport-size photo during application is mandatory

SYSTEM REQUIREMENTS

This programme includes online learning classes conducted on Zoom. To attend a online learning class you will need to have a PC/ Laptop/ Mac with:

- Speakers and microphone: built-in or a USB plug-in or wireless Bluetooth
- Webcam: built-in or USB plug-in
- Processor: with Dual Core 2Ghz or higher (i3/ i5/ i7 or AMD equivalent)
- RAM: 4 GB or higher
- OS: Either MacOS 10.7 or higher OR Windows 8 or higher
- An internet connection: Minimum bandwidth of 3.0 Mbps (up/ down)
- Browser: IE 11+, Edge 12+, Firefox 27+, Chrome 30+
- Zoom software client installed on your PC/ Laptop/ Mac

We use the Zoom software application to conduct online learning classes. Zoom works on a variety of PCs/ Laptops/ Mac systems and also on phones and tablets.

You can join your online learning class from a phone or tablet if it supports the Zoom client.

We recommend that you attend classes from a PCs/ Laptops/ Mac.

ABOUT IIT DELHI

The Indian Institute of Technology Delhi (IIT Delhi) is one of the 5 initial IITs established for training, research and development in science, engineering and technology in India. Established as College of Engineering in 1961, the Institute was later declared as an Institution of National Importance under the “Institutes of Technology (Amendment) Act, 1963” and was renamed as “Indian Institute of Technology Delhi”. It was then accorded the status of a Deemed University with powers to decide its own academic policy, to conduct its own examinations, and to award its own degrees.

Since its inception, over 48000 have graduated from IIT Delhi in various disciplines including Engineering, Physical Sciences, Management and Humanities & Social Sciences. Of these, nearly 5070 received PhD degrees. The rest obtained a Master’s Degree in Engineering, Sciences and Business Administration. These alumni today work as scientists, technologists, business managers and entrepreneurs. There are several alumni who have moved away from their original disciplines and have taken to administrative services, active politics or are with NGOs. In doing so, they have contributed significantly to the building of this nation, and to industrialisation around the world. For more details, please visit: www.iitd.ac.in

ABOUT CONTINUING EDUCATION PROGRAMME (CEP)

Executive Education is a vital need for the organisations to build a culture that promotes newer technologies and solutions and builds a workforce that stays abreast of the rapidly transforming needs to the technological, business and regulatory landscape. Committed to the cause of making quality education accessible to all, IIT Delhi has launched Online Certificate Programmes under eVIDYA@IITD (ई-विद्या@IITD): enabling Virtual & Interactive-learning for Driving Youth Advancement@IITD for Indian as well as international participants. These outreach programmes offered by the Indian Institute of Technology Delhi (IIT Delhi) are designed to cater to the training and development needs of various organisations, industries, society and individual participants at national and international level with a vision to empower thousands of young learners by imparting high-quality Online Certificate Programmes in cutting-edge areas for their career advancement in different domains of engineering, technology, science, humanities and management. For more details, please visit: http://cepqip.iitd.ac.in

APPLY NOW

For registration and any other information, please get in touch with us at iitd.execed@emeritus.org

For any feedback, please write to CEP IIT Delhi at contactcep@admin.iitd.ac.in

WhatsApp an Advisor On +91 86570 38243*

***This number does not accept any calls. Please message your queries.**

service provider
EMERITUS

Online Certificate Programmes are offered by the Indian Institute of Technology Delhi under the aegis of Continuing Education Programme (CEP) so that the Institute can realise its vision of serving as a valuable resource for industry and society, and fulfil its mission to develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

Programme offered by Continuing Education Programme (CEP), IIT Delhi