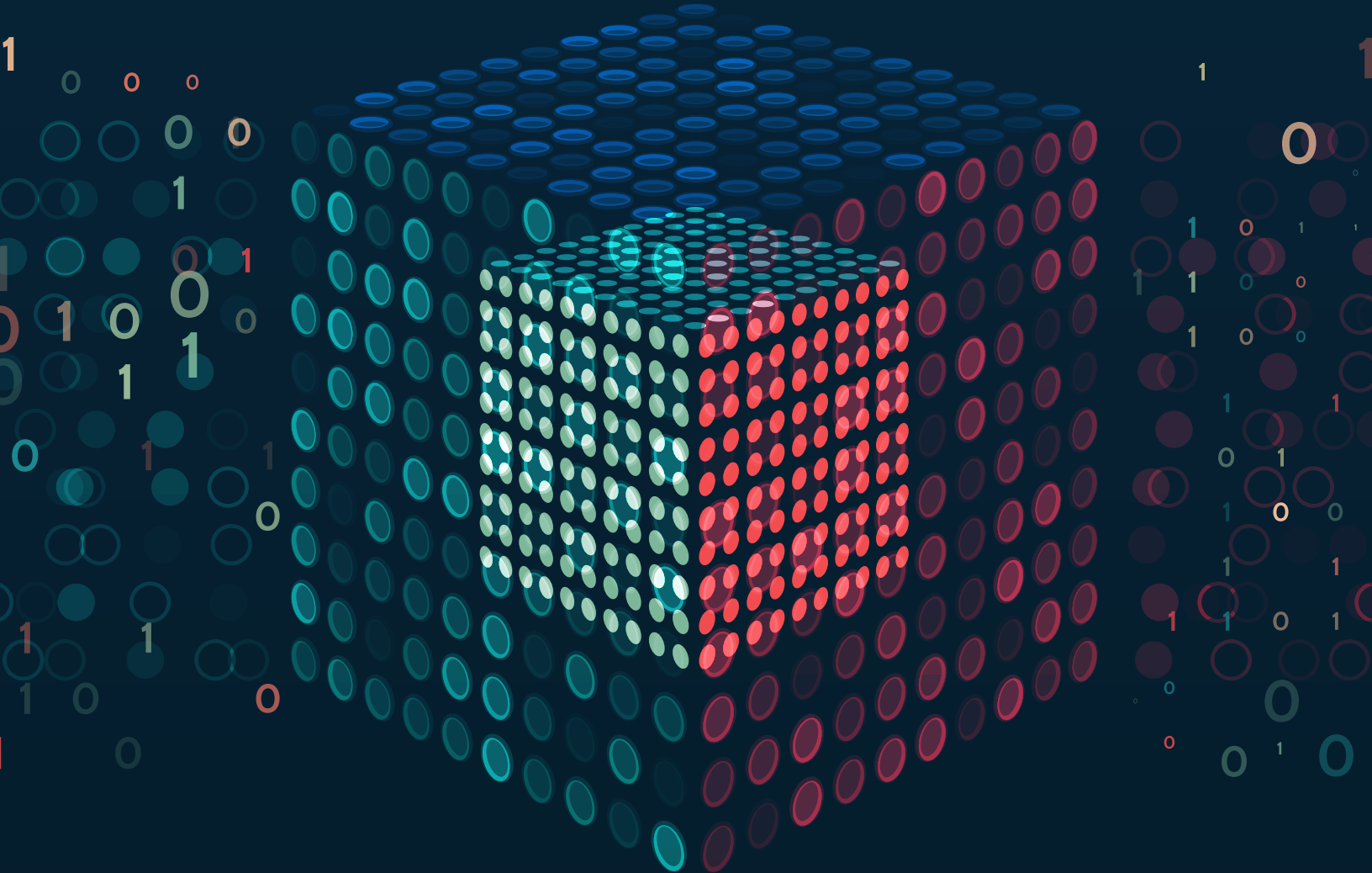




भारतीय प्रौद्योगिकी संस्थान दिल्ली  
Indian Institute of Technology Delhi

# CERTIFICATE PROGRAMME IN DATA SCIENCE & MACHINE LEARNING

Starts June 30, 2023 | 6 Months | Live Online Sessions  
(Technical Orientation)



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

# OVERVIEW

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From Netflix to Google, world-renowned companies have multiplied their business growth with Data Science and Machine Learning (ML) applications, guided by a data-driven approach to decision-making. According to Analytics Insight (2020), around 77% of devices that we presently use are utilising ML. To ensure business's future-readiness in today's digital era, organisations need skilled talent to leverage data science and ML's exponential potential for automation, effective decision-making, and competitive advantage.

To meet this demand, the Indian Institute of Technology Delhi (IIT Delhi) has designed the six-month live online **Certificate Programme in Data Science & Machine Learning**. This high-impact programme will help you draw on the expertise of IIT Delhi's renowned faculty in an immersive industry-oriented learning pedagogy to build robust predictive and prescriptive models with hands-on experience in ML algorithms and statistical models. Become industry-ready with an in-depth understanding of in-demand data science and machine learning tools and techniques with Python.

## THE IIT DELHI ADVANAGE

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**#48**

in the Engineering and Technology Category

*QS World University Ranking, 2023*

**#4**

in the Overall Category

*NIRF, 2022*

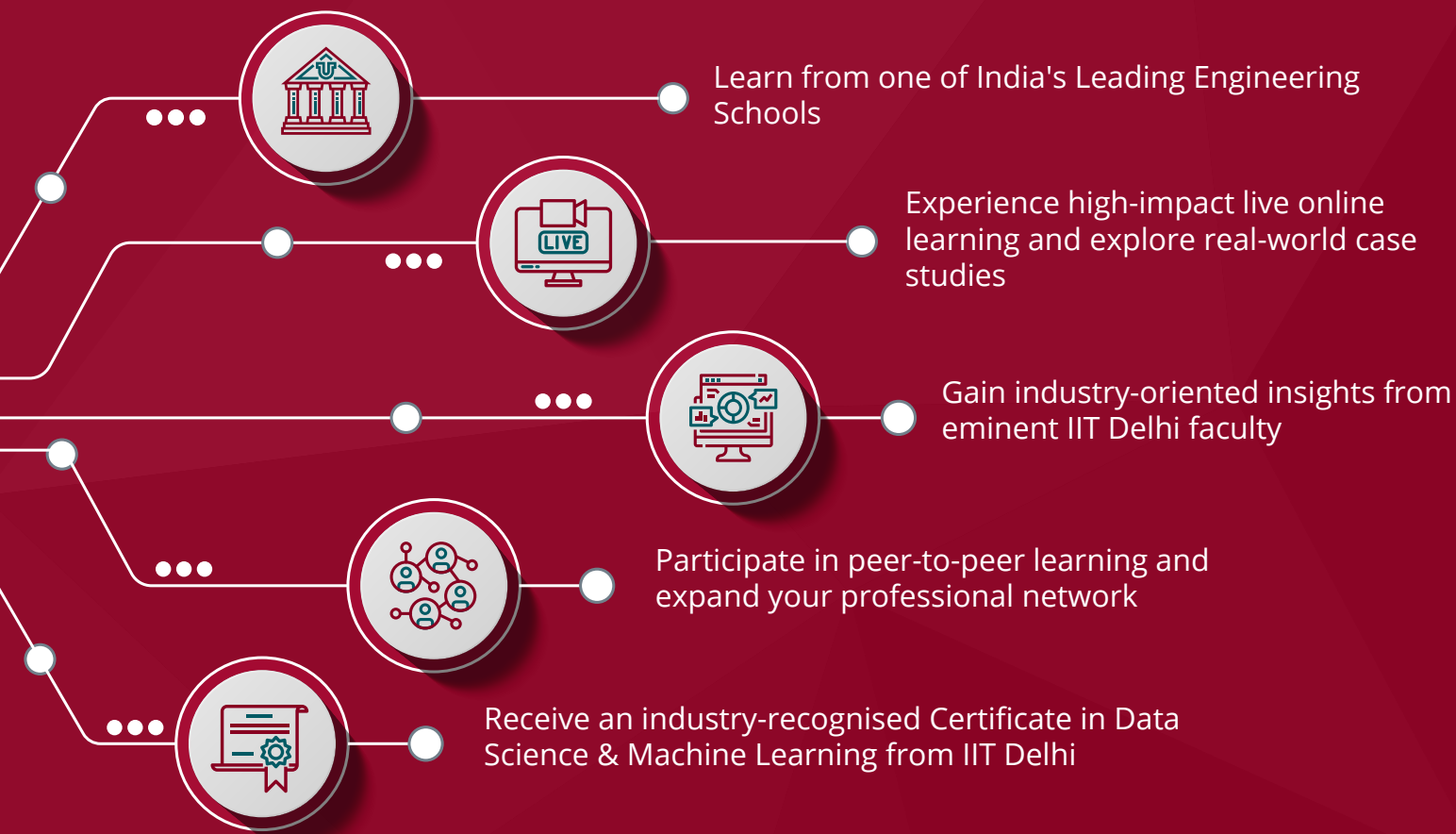


### WHO IS THIS PROGRAMME FOR?

This programme is best suited for:

- Early and mid-level Professionals interested in gaining a relevant and cutting-edge perspective on data science and ML for better career prospects
- Professionals who oversee software development and machine learning projects with a keen interest in developing a data-driven decision-making approach and those looking to apply data science and ML to enhance their business growth

# PROGRAMME HIGHLIGHTS



## PROGRAMME MODULES

The programme's industry-oriented curriculum will give you exposure to statistics for data science, optimisation formulations with ML, deep learning, and storytelling with data. Experience immersive live online learning to gain actionable insights through a mix of lectures, tutorials using data, hands-on experience with tools like Python, and real-world case study discussions.

### 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

### Module 2 Communicating Effectively with Data

- Data and Information Systems
- Story Telling with Data
- Designing Business Dashboards

### 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

### Module 4 Machine Learning

- Regression and Derivatives
- Trees and Random Forests
- Support Vector Machines
- Clustering – Hierarchical K-means Clustering
- Dimensionality Reduction: PCA

### Module 5 Deep Learning

- Deep feedforward neural nets
- Convolutional neural nets
- Long short-term memory (LSTM) networks
- Introduction to GAN, Reinforcement Learning and ML Ops and AI and Governance

### Project

- Integrative Exercise
- Project Presentations

*Note:*

*- Modules/ topics are indicative only, and the suggested time and sequence may be dropped/ modified/ adapted to fit the total programme hours.*

*\*Fundamentals of Python will be taught via recorded sessions. The faculty will be conducting Q/A on the same.*

## Top Business Applications of Machine Learning



### eCommerce

Customer Support,  
Product Recommendation



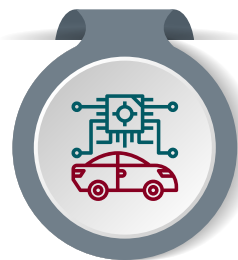
### Healthcare

Drug Discovery,  
Disease Diagnosis



### BFSI

Algorithmic Trading,  
Portfolio Management



### Transport

Safety Monitoring,  
Air Traffic Control



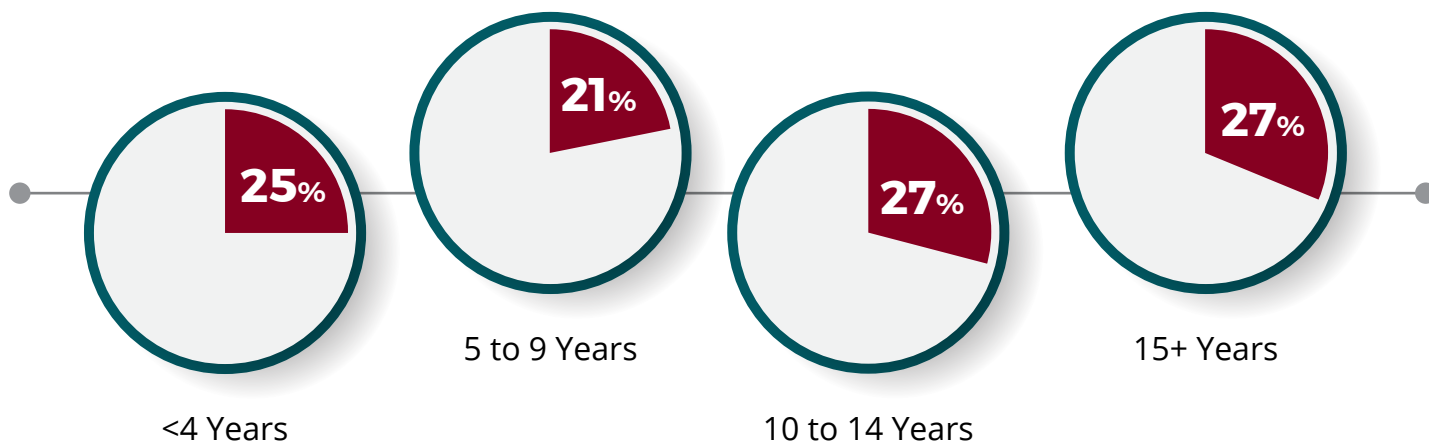
### Heavy Engineering

Industry 4.0,  
Predictive Machine Analytics

*Source: SAS, 2020*

# PAST PARTICIPANT PROFILES

## Work Experience



## Industries



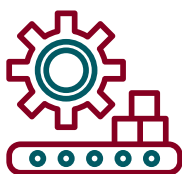
**33%**  
IT Services



**11%**  
BFSI



**6%**  
Consulting



**5%**  
Manufacturing



**1%**  
FMCG



**44%**  
Others\*

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

# PARTICIPANT TESTIMONIALS

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“

It feels great to announce that I earned a certification in Data Science & Machine Learning from IIT Delhi. This course has given me a new perspective and knowledge to leverage ERP data to help businesses improve and optimise their processes and support decision-making - Demand Management, Procuring to Pay, Plan to Produce, Inventory Management, Order to Cash, among other things.

**Vikash Thakur**

Principal Business Consultant, Harman Connected Services | Batch 1

”

“

I'm so delighted to announce that I've completed my Data Science and Machine Learning certification from IIT Delhi. I had started this journey of transitioning to Data science a year ago. Managing it with work was a challenge at times. Very satisfied to have completed this. It will give me more confidence in going ahead and working on projects in data science. For beginners wanting to do this course, my advice would be to learn at least the basics of data science like Python fundamentals, Engineering Mathematics, Statistics to make full use of the course as this is in-depth.

**Upasna**

Consultant, Capgemini | Batch 1

”

“

I am happy to announce that I have successfully completed this 6-month course from IIT Delhi in Data Science & Machine Learning. The great learning experience from the IIT Delhi faculty. Thank you, Prof. Agam Gupta, Prof. Hariprasad Kodamana and Prof. Manojkumar Ramteke for sharing immense knowledge with us. Looking forward to doing some exciting projects in this area to strengthen my learning.

**Ishwar Jindal**

Vice President, Royal Bank of Scotland | Batch 1

”

“

The lessons delivery by professors were really very good. Sessions were really interactive, it helped understand complex topics. Also, many real life use cases helped the course.

**Ajay Ganjoo**

Vice President Information Systems, Initiative Media India Ltd | Batch 4

”

# PARTICIPANT TESTIMONIALS

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“

The course provides a clear insight of the concept of data science and ML, which would help anyone to excel further based on these fundamental concepts.

**Lakshminarayanan Gunasekaran**

Chief System Analyst, RTA, Dubai | Batch 4

”

“

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

**Niranjan Nidadavolu**

ASSOCIATE VICE PRESIDENT, NSPIRA MANAGEMENT SERVICES PVT LTD | Batch 4

”

“

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 3

”

“

In the starting, I wanted to move my career to this field but I had no idea to how to start, what topics to be covered, which concept will be more effective, etc. So, this course helped to explain everything which I was looking for. I have covered maths and stats topics which I haven't revised in very long time. I have learnt lots of new things like machine learning concept, deep learning concept, etc. Now, I only need to brush up my skills in Python and some other coding language and then I am ready to switch my career to data science.

**Nisha Gidwani**

Senior Analyst, Ernst & Young LLP | Batch 3

”

“

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**

Deputy Vice President, Star Union Dai Ichi Life Insurance | Batch 3

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# PROGRAMME COORDINATORS

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## **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**

Assistant 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 multiobjective 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.

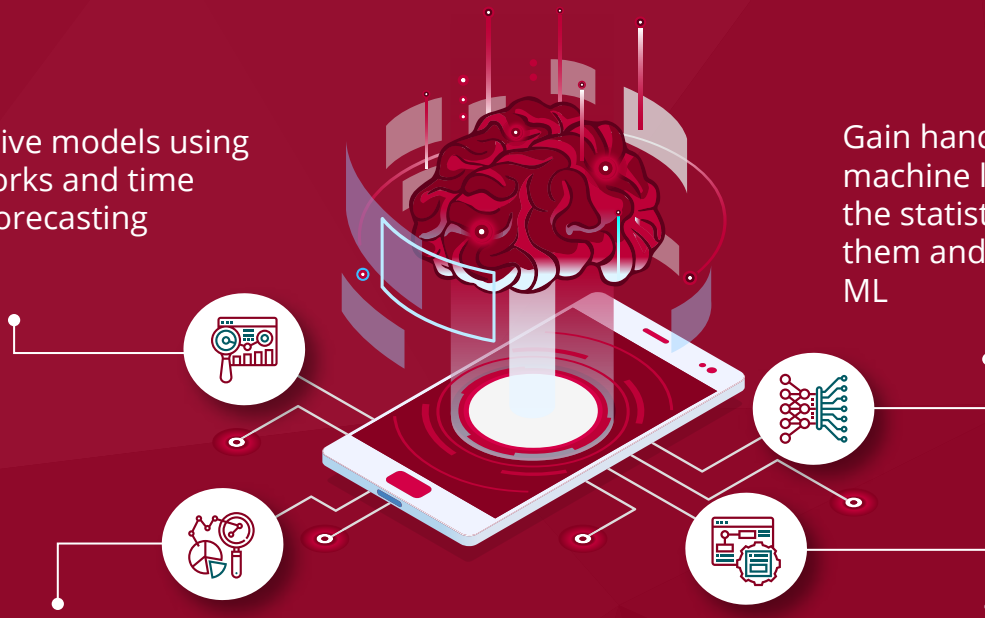
*Note: Programme Coordinators might change due to unavoidable circumstances, and revised details will be provided closer to the programme start date.*



# LEARNING OUTCOMES

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

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



Develop an in-depth understanding of popular methods like regression, clustering, decision trees and deep learning

Learn optimisation formulations to minimise errors and build accurate models

# 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 DETAILS

## Programme Schedule

<b>Duration</b>	6 Months*
<b>Technical Orientation</b>	June 30, 2023
<b>Academic Orientation</b>	Jul 16, 2023 6.00 PM -7:30 PM
<b>Live Online Sessions</b>	Jul 30, 2023 3 hours/ Sunday 12:15 PM - 3:15 PM
<b>Programme Application Link</b>	<a href="#">Click here</a> to apply to the programme

## Eligibility

- Graduates (10+2+3)/ Diploma Holders (only 10+2+3) from a recognised university in any discipline as on Jun 30, 2023
- **PREREQUISITE:** Participants with a background of 10+2 mathematics with a minimum of 50% marks or completed a course in Mathematics/ Statistics at the UG level with 50% marks are preferred. Exceptions can be allowed if the participants have sufficient work experience in the data science field. Basic programming skills preferably Python will be helpful.

## 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 Schedule

	Instalment 1	Instalment 2	Instalment 3	Instalment 4
<b>Remarks</b>	Within 5 days post selection	Jul 3, 2023	Aug 16, 2023	Oct 5, 2023
<b>Amount</b>	INR 13,500 + GST	INR 33,750 + GST	INR 47,250 + 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.

<b>Last Date to Apply</b>	June 21, 2023
<b>Shortlisted Candidates Will Be Informed by</b>	June 28, 2023
<b>Last Date to Submit the Fee</b>	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. (30 July 2023) and the same date will also be mentioned on the certificate as the starting date of the programme.

# APPLICATION REQUIREMENTS

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## **Education Document:**

- Higher Secondary (10+2) Marksheet
- Consolidated graduation mark-sheet
- Passing Certificate – Diploma/ Degree/ Doctorate

## **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 like PAN Card/ Driving License/ Passport, etc.
- Submission of passport-size photo during application is mandatory

# SYSTEM REQUIREMENTS

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This programme includes live online classes conducted on Zoom. To attend a live online 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 live online classes. Zoom works on a variety of PCs/ Laptops/ Mac systems and also on phones and tablets.

You can join your live online 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

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The Indian Institute of Technology Delhi (IIT Delhi) is one of the 23 IITs created to be Centres of Excellence 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 number of students who graduated with a B.Tech degree is over 15738. 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](http://www.iitd.ac.in)

# ABOUT CONTINUING EDUCATION PROGRAMME (CEP)

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Executive education is a vital need for the companies 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

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For registration and any other information,  
please get in touch with us at [iitd.execed@emeritus.org](mailto:iitd.execed@emeritus.org)

For any feedback, please write to CEP IIT Delhi  
at [contactcep@admin.iitd.ac.in](mailto:contactcep@admin.iitd.ac.in)

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 [WhatsApp an Advisor On +91 74120 81081\\*](https://wa.me/917412081081)

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

Service Provider



**Disclaimer:** 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