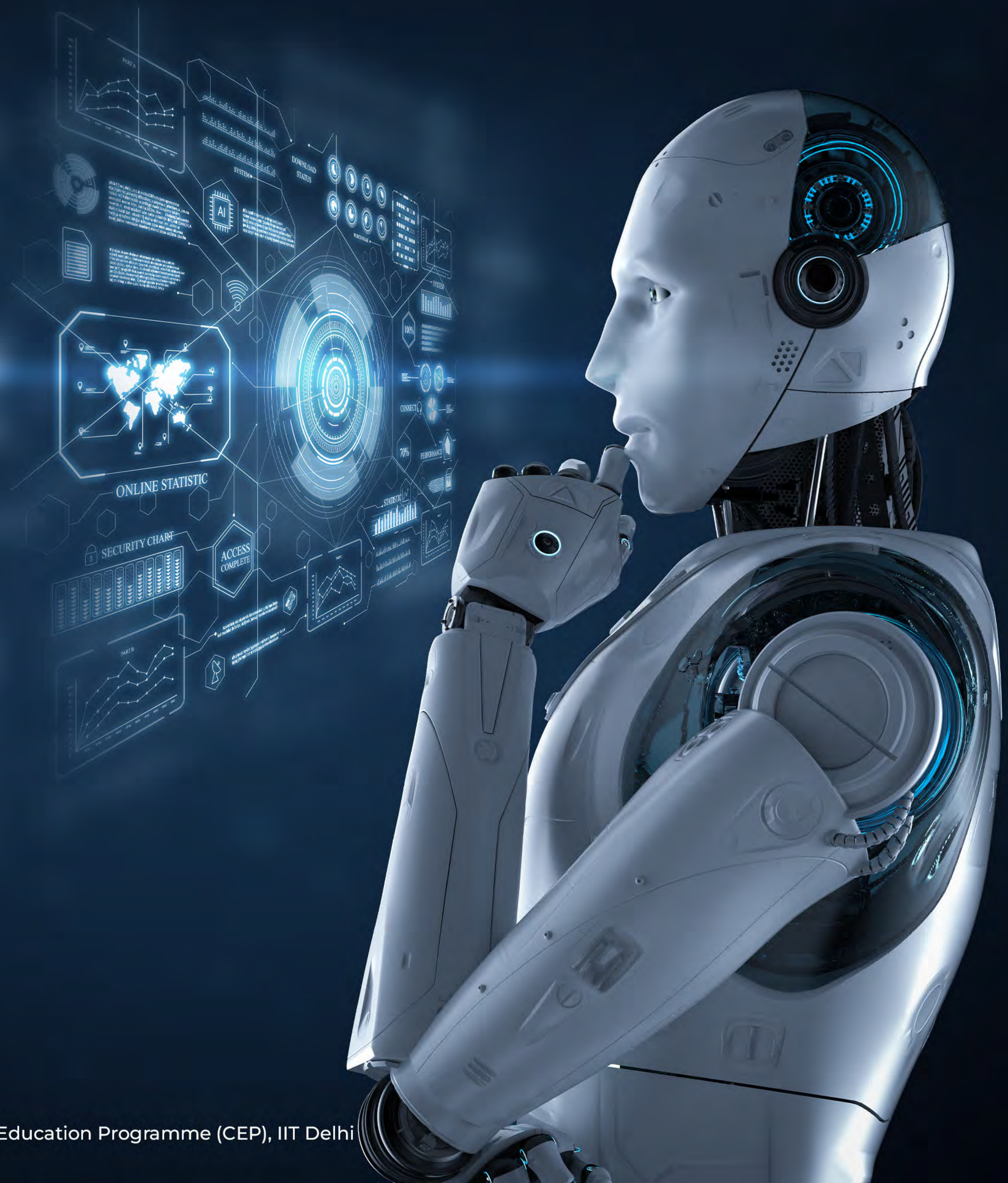




भारतीय प्रौद्योगिकी संस्थान दिल्ली
Indian Institute of Technology Delhi

Executive Programme in **Applied Data Science using Machine Learning & Artificial Intelligence**

6 Months | Live Online | Starts on- 21st January 2024





Elevating AI & ML Strategies through Data Science Lens

\$15.7 trillion

Potential contribution to the global economy by 2030 from AI

*PWC

+26%

Up to 26% boost in GDP for local economies from AI by 2030

*PWC

300 AI

use cases identified and rated are captured in our AI Impact Index

*PWC

\$302.62 billion

Expected total global economic impact of ML in the period to 2030

*GlobalNewsWire

\$695.0 billion

Estimated reach in Data Science Platform Market Size by 2030,
Growing at 27.6% CAGR Annually

*PRNewsWire



Overview

In the current data-driven landscape, organisations demand individuals skilled in data science, machine learning, and artificial intelligence. The Executive Programme in Applied Data Science using Machine Learning & Artificial Intelligence by CEP, IIT Delhi caters to this need by empowering executives and professionals with the required expertise. Through this programme, participants gain a thorough comprehension of data science principles, machine learning algorithms, and AI techniques, while also honing their practical application in real-world contexts. This programme serves as a catalyst for driving business growth and fostering innovation, enabling professionals to leverage the power of these technologies effectively in their respective industries.

Programme Objectives

- ◆ Provide participants with a solid foundation in data science, ML, and AI, enabling them to make informed decisions and solve complex business problems.
- ◆ Enhance participants' analytical and mathematical skills to extract valuable insights from large and diverse datasets.
- ◆ Develop expertise in applying machine learning algorithms and AI techniques to develop predictive models and automate decision-making processes.



Programme Highlights



Key Learning Outcomes

- ▶ Data Science Concepts: Exploration, Preprocessing, Engineering, Model Evaluation
- ▶ Applied Machine Learning Skills: Regression, Classification, Clustering, Reinforcement learning and Deep learning
- ▶ AI Techniques Mastery: Develop Intelligent Systems for Different Applications
- ▶ Ability to Design and Implement End-to-End Data Science Projects: Preprocessing, Model Building and Deployment

Who can Attend?

- Individuals with backgrounds in Science, Technology, Engineering, and Mathematics, including fields like computer science, physics, mathematics, statistics, and engineering.
- Professionals working in the IT industry, software development, programming, and related fields who want to specialise in data science and AI.
- Professionals involved in business analysis, market research, and strategic planning who wish to develop expertise in data-driven decision-making.
- Early to mid-career level professionals looking to grow in the field of Data Science & AI.



Projected Career Growth

The Executive Programme in Applied Data Science using Machine Learning & Artificial Intelligence will significantly contribute to participants' career growth by opening up various opportunities in the data science and AI domain. Some projected career growth prospects include:

- **Data Scientist:** Participants can pursue roles as data scientists, responsible for extracting insights from data, building predictive models, and developing data-driven strategies.
- **Machine Learning Engineer:** With expertise in machine learning algorithms, participants can take on roles that involve designing, implementing, and optimising machine learning systems.
- **AI Specialist:** Participants can explore career paths as AI specialists, focusing on the development and deployment of intelligent systems using techniques like natural language processing and computer vision.
- **Business Analyst:** The program will equip participants with analytical skills and the ability to communicate data insights effectively, making them valuable assets in business analysis and strategy development.
- **Managerial Roles:** Participants will gain a holistic understanding of data science and AI, enabling them to lead data-driven initiatives and make informed decisions at managerial levels.



Programme Content

➤ Overview of Artificial Intelligence and Machine Learning

➤ Data types and Pre-processing

- Different Data types
- Data cleaning

➤ Data Analysis with Python

➤ Mathematics for AI

- Linear Algebra, concept of matrices, Eigenvalues, Eigen vectors and their properties
- Spectral decomposition and Principal component analysis

➤ Advanced Statistics

- Concept of Probability, different distributions: Bernoulli, Binomial, Geometric, Hypergeometric, Negative Binomial
- Normal, Exponential, Chi-square and their properties: mean variance
- Covariance and correlation and some mathematical properties
- Concept of Parametric Estimation and Testing of Hypothesis

➤ Regression

- Bivariate regression, properties of the regression coefficients
- Extension to multivariate regression

➤ Logic and Knowledge Representation

- Propositional Logic, First Order Predicate Logic, Well-formed formulas

➤ Project I

➤ Supervised Learning Techniques

- Difference between Regression and Classification
- Data Normalization
- Data transformation
- Naïve Bayes Classifier
- Logistic regression
- Decision trees ID3, C5, SLIQ
- PCA, Feature Selection
- Applications
- Practice with Scikit learn and Keras

Programme Content

➤ Advanced Classification Techniques

- Random forest
- Neural Networks Perceptron model, Multi layered feedforward Neural Network
- Activation functions
- Applications
- Practice with Scikit learn and Keras
- Applications of clustering

➤ Unsupervised Learning – Clustering

- Clustering
- What is clustering?
- Difference between classification and clustering
- Clustering techniques
- Practice with Scikit learn and Keras

➤ Project II

➤ Deep Learning with Tensorflow and Keras

- DNN, LSTM, CNN
- Practice with Keras and Tensorflow

➤ Natural Language Processing

- Machine Translation
- Text Summarization
- Concept of Word Vectors

➤ Optimization Techniques

- Linear programming
- Integer programming
- Convex optimization

➤ Reinforcement Learning

Programme Content

> Campus Immersion Module

> Recommender System

- Classic and recent approaches for different recommender systems
- Product recommendation, Movie recommendation

> Chat GPT + LLM + Generative AI

> Conversational Systems + Applications of AI/ML and Future Scope + Discussion

Real time applications in the area of:

- Stock Market Prediction
- Credit Card Fraud Detection
- Crime Analytics
- Goods and Services Tax
- Bioinformatics

Note: This is an indicative list of course topics and is subject to change as per IIT Delhi's discretion.

Libraries of Tools and Techniques Taught

Tools & Languages



Pedagogy

Lectures

Tutorials

Solving
Real-time
Business
Problems

Case
Discussions

Simulations

Programme Details

Duration	<ul style="list-style-type: none">• 6 Months
Delivery	<ul style="list-style-type: none">• Live Online Sessions
Schedule	<ul style="list-style-type: none">• Session Timings: 10.00 am to 01.00 pm• Commencement Date: 21st January 2024• Application Closure Date: 15th January 2024
Eligibility	<ul style="list-style-type: none">• Graduate/Diploma holder (10+2+3) in the discipline of Science, Engineering, Mathematics or Statistics with a minimum of 1 year of experience.• Documents required:<ul style="list-style-type: none">• Graduation Mark sheet/ certificate• SOP• Work Experience
Screening & Selection	<ul style="list-style-type: none">• Screening and selection will be done by IIT Delhi.
Assessment Criteria	<ul style="list-style-type: none">• Assessment will be conducted via projects.
Attendance	<ul style="list-style-type: none">• Minimum of 70% attendance is mandatory.

Note: Lectures won't be held during Public Holidays and festivals.



Programme Fee Details

Fee Structure	
Particulars	Amount
Total Programme Fee	INR 1,30,000/- + 18% GST

Instalment Pattern		
Particulars	Amount	Payment Schedule
Instalment 1	INR 80,000/- + 18% GST	7 days from the release of the offer letter
Instalment 2	INR 50,000/- +18% GST	On or before On or before December 2023

Easy EMI Options Available

•Note:

•Payment of fees should be submitted in the IIT Delhi CEP account only and the receipt will be issued by the IIT Delhi CEP account for your records. Loan and EMI Options are services offered by Jaro Education. IIT Delhi is not responsible for the same.



Programme Certification

- Participants who meet the evaluation criteria, which includes successfully completing the projects conducted by the faculty, and fulfil the necessary attendance criteria, specifically a minimum requirement of 70%, will receive a 'Certification of Completion.'
- Participants who do not meet the evaluation criteria but meet the attendance requirements will be presented with a 'Participation Certificate.'

  **Indian Institute of Technology Delhi** 
HAUZ KHAS, NEW DELHI- 110016

Programme Code:

Department/Centre/School of

Continuing Education Programme
On
Title of the Programme

This is to certify that

Mr./Ms. Name Of The Participant

has participated in 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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- The above e-certificate is for illustrative purposes only and the format of the certificate may be changed at the discretion of IIT Delhi.
- Only e-certificate will be provided and it will be issued by CEP, IIT Delhi.
- The organising department of this programme is the Department of Mathematics, IIT Delhi.



Dr. Niladri Chatterjee

Soumitra Dutta Chair Professor of Artificial Intelligence
Prof. (HAG) Department of Mathematics, School of IT, Yardi School of AI
Indian Institute of Technology Delhi

Dr. Niladri Chatterjee is a Professor of Computer Science & Statistics in the Department of Mathematics, IIT Delhi. His primary research areas are Artificial Intelligence, Natural Language Processing, Machine Learning, Data Science, Statistical Modeling, Mathematical Reasoning, Rough Sets. His association with IIT Delhi is of 22 years. Before that, he had worked as a Lecturer in the Dept. of Computer Science, University of London, and a Computer Engineer (Software) at Indian Statistical Institute, Calcutta. In between he has been a Visiting Professor in Dipartimento di Informatica (Department of Informatics) University of Pisa, Italy. He possesses B.Stat and M.Stat degrees from Indian Statistical Institute, Calcutta. He also did his M.Tech in Computer science from the same institute and Ph.D. in Computer Science from the University of London. He has written more than 100 papers in international and national journals and conferences. He received the "Best Paper" award in CICLING-conference, Haifa, Israel; and also received the "Best Paper" award and the Raizada memorial shield by the Computer Society of India. He is also the recipient of a UNDP scholarship for month-long training in INRIA France. He is also the recipient of a Commonwealth Scholarship of the British Council.





Dr. B. Chandra

Adjunct Professor, School of IT,
Indian Institute of Technology Delhi

Dr. B. Chandra is currently an Adjunct Professor at the School of IT, Indian Institute of Technology Delhi. She served the computer Science Group of the Department of Maths, IIT Delhi as a senior professor. During her tenure she was the Head of the Department for three years. Her specialization areas include Machine Learning, Data Mining, Deep Learning, Neural Networks and Databases. She was the chief data scientist at the multinational company Sprinklr Solns from August 2016- Dec 2017 and subsequently as a consultant in machine learning in an AI company till 2020. She has guided a number of Ph.D. students in these areas at IIT Delhi. She has published more than 150 research papers in reputed International journals in the areas mentioned above. She has authored three books. She is a senior member of IEEE Computer society. She has been a Visiting Professor for a year with the Graduate School of Business, University of Pittsburgh, Pittsburgh, USA and for a year at Penn State University, University Park, USA. She has also been a Visiting Scientist at NIST, Maryland and INRIA, France. She has delivered talk in several universities in USA, Canada, Korea, France, UK, Singapore. She has been the chief Investigator for several projects funded by Department of Science and Technology, Department of Biotechnology and Defence. She was granted the patent with the Defence in October 2020 as an inventor for the work on 'Neural Networks for cryptosystem Identification'. She has been the chief consultant for Stock Market Company and Social Media Company. She is the author of 5 books.



About IIT Delhi



as per NIRF India
Engineering Rankings (2023)



as per ARIIA
Ranking (2021)

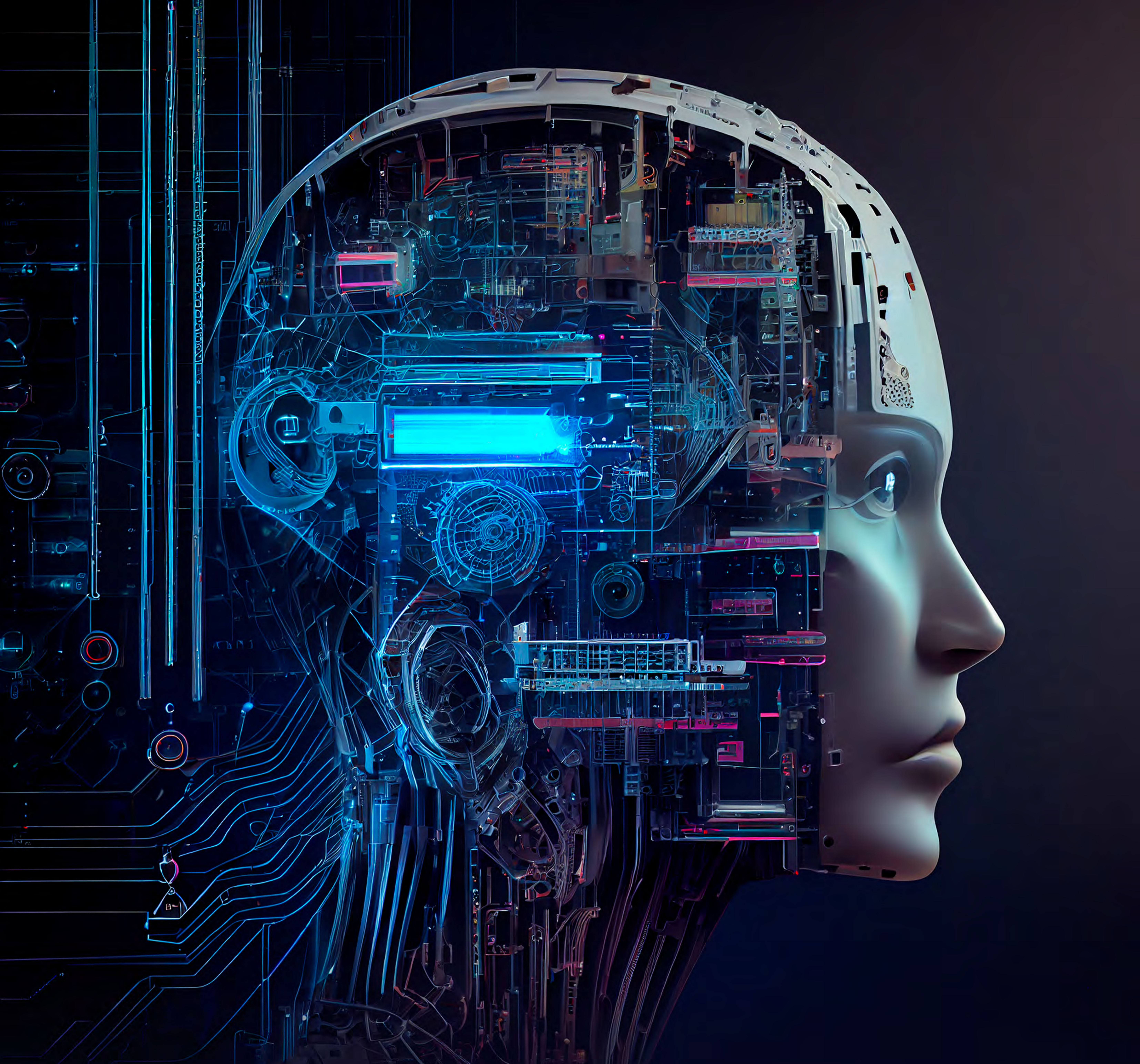
The Indian Institute of Technology Delhi (IIT Delhi) is one of the 5 initial IITs established for training, research and development in science, engineering and technology in India. Established as College of Engineering in 1961, the Institute was later declared as an Institution of National Importance 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 students have graduated from IIT Delhi in various disciplines, including Engineering, Physical Sciences, Management, Humanities and 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 significantly contributed to the building of this nation and to industrialization around the world.

About Continuing Education Programme (CEP)

Executive education is a vital need for 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.





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**Anand Krishnan
Jaro Programme Expert**

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

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.