



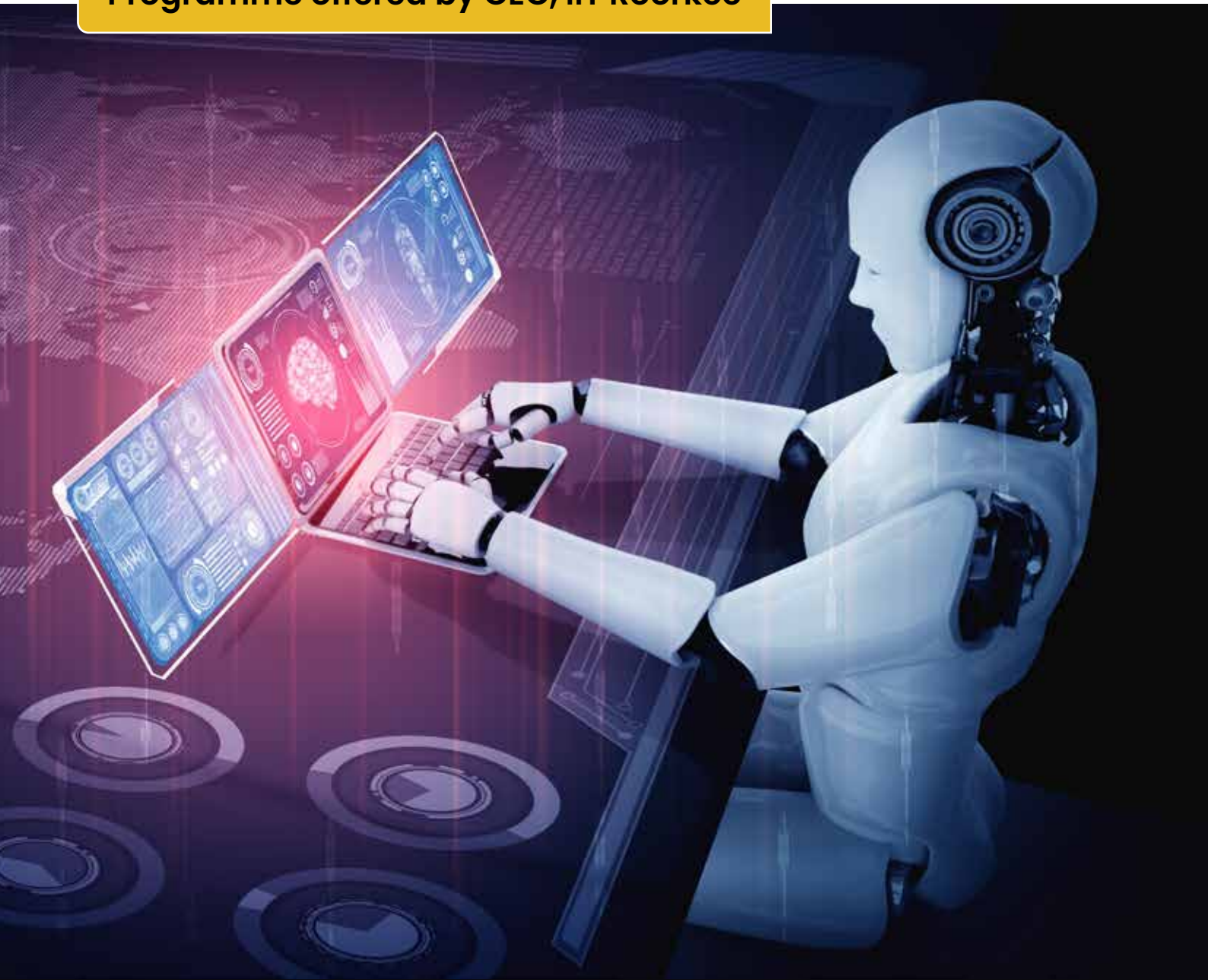
INDIAN INSTITUTE OF
TECHNOLOGY ROORKEE

Batch
04

Revolutionise your Strategy with Data Science and AI

POST GRADUATE CERTIFICATE PROGRAMME IN
APPLIED DATA SCIENCE & AI

Programme offered by CEC, IIT Roorkee



Marketing Partner

jaro education



It is my pleasure to introduce you to this executive programme. Over the years, the use of data science and artificial intelligence has been growing in almost all industries. Whether to perform analytics related tasks or to monitor and evaluate analytics-based reports, it has become necessary for working professionals to learn the essential concepts and techniques of data science and artificial intelligence. To help executives in this direction, we are offering a comprehensive and carefully planned learning path. The curriculum is also updated to include recent industry developments like Generative AI and others. Apart from concepts and techniques, the curriculum includes real-world applications in several business and industry areas. Live interactive sessions will be delivered online by IIT Roorkee faculty and there are two campus immersions to have an engaging learning experience. Faculty members in this programme have received excellent feedbacks from participants in previous programmes.

*We will be more than happy to help you in your upskilling journey.
My best wishes to everyone.*

Prof. Kaushik Ghosh,
Coordinator, Continuing Education Centre (CEC),
IIT Roorkee.

TRANSFORMATIVE TRENDS AND PROJECTIONS IN DATA SCIENCE AND AI



56% of businesses are using AI to enhance and optimize their operations.

*Forbes Advisor Survey

There could be up to **1.4 MILLION** new jobs created in data science and data analytics between 2023 and 2027.

*World Economic Forum

A whopping **83%** of companies claim that using AI in their business strategies is a top priority.

*Forbes

PROGRAMME OVERVIEW

Applied data science and artificial intelligence help in analysing various types of real-world datasets to produce actionable insights for applications in business, economy, and society. In recent years, these skills have become highly valuable for all organizations. IIT Roorkee's Post Graduate Certificate Programme in Applied Data Science & AI (PGCP DSAI) is designed to upskill working professionals to understand the fundamentals of data science and AI, develop practical proficiency in related software technologies, and enhance their ability to prescribe the best course of action in various application contexts.

PROGRAMME OVERVIEW

LEARNING OUTCOMES

01

Gain clarity and hands-on experience in concepts related to data science and artificial intelligence

02

Master the analytics workflow: data management, model building, and reporting results

03

Handle and process big data efficiently

04

Delve into several in-demand software technologies

05

Understand the applications of data science and AI in various real-world contexts

THIS PROGRAMME IS CURATED FOR:

- Working professionals in scientific or technical roles who want to upskill with a conceptual understanding, practical implementation, and applications of data science and artificial intelligence.
- Working professionals in managerial positions who want to upskill by learning the concepts of data science and artificial intelligence in a practical-oriented manner, and to understand how these concepts can be applied in different business and industry contexts.

SKILLS AT A GLANCE



01

Statistics



02

Machine Learning



03

Deep Learning



04

Generative AI



05

Visualization



06

Big Data



07

Time Series & Networks



08

Natural Language Processing



09

Python and R



10

SQL and NoSQL



11

Dashboards & Web Apps



12

Cloud Analytics



CAREER IN DATA SCIENCE AND AI

The integration of data analysis and artificial intelligence has given rise to the dynamic and expanding fields of Data Science and AI. Professionals entering these domains have numerous opportunities to embark on diverse and fulfilling career paths.

ROLES IN DATA SCIENCE AND AI:

- **Data Analyst:** Interpret complex data sets to inform business decisions
- **Data Scientist:** Develop algorithms and predictive models
- **Machine Learning Engineer:** Design and implement machine learning models
- **AI Specialist:** Create AI systems for various applications
- **Data Engineer:** Build and maintain data pipelines
- **Business Intelligence Analyst:** Transform data into actionable business insights
- **AI Research Scientist:** Conduct advanced AI research and development

INDUSTRIES REQUIRING ROLES IN DATA SCIENCE AND AI:

- **Technology and IT:** Innovate and manage AI solutions
- **Healthcare:** Implement AI in diagnostics and patient care

- **Finance:** Enhance financial models and fraud detection
- **Retail and E-commerce:** Optimize supply chain and customer analytics
- **Manufacturing:** Improve production processes and predictive maintenance
- **Telecommunications:** Analyze network data and customer behavior

DOMAINS IN DATA SCIENCE AND AI:

- **Model Development:** Create and refine predictive models
- **Big Data Management:** Handle large datasets and storage solutions
- **Natural Language Processing (NLP):** Develop language understanding systems
- **Computer Vision:** Implement image and video analysis algorithms
- **AI Research:** Conduct cutting-edge research in AI methodologies
- **Data Visualization:** Present data insights through visual representation
- **Ethics and Compliance:** Ensure ethical use and compliance of AI technologies

**Disclaimer - The highlighted list is partial.*

PROGRAMME HIGHLIGHTS

PRACTICAL-ORIENTED LEARNING EXPERIENCE

- In-demand conceptual skills and software tools
- Hands-on experience with datasets and software
- Minimal usage of mathematical jargon

ENGAGING LEARNING EXPERIENCE

- Live online teaching and discussions by IIT Roorkee faculty
- Regular quizzes for revision and personal growth
- Hackathons for boosting healthy competitive spirit
- Capstone project with customized topics and personalized guidance
- Proven and well-accepted learning path for executives

CERTIFICATION FROM IIT ROORKEE

- Certification exclusively from IIT Roorkee

CAMPUS IMMERSIONS

- Two campus immersions covering 8 days in total (optional modules)
 - Optional for all participants
 - Separate certification for campus immersion

LEARNING EXPERIENCE

The PGCP DSAI programme aims to provide executives from both technical and non-technical backgrounds with a comprehensive learning experience to upskill themselves in applied data science. Hands-on implementation of industry-relevant skills in data science methods (machine learning, NLP, big data, web apps, etc.) is the backbone of the DSAI learning experience. Intellectual growth happens through a well-curated mix of live sessions, self-readings, quizzes, workbooks, hackathons, and a capstone project.

Previous participants in similar programmes have truly cherished the availability of exclusive data-driven decision case studies. These cases have helped participants apply data science skills to real-world business contexts of operational and strategic importance. Our focus has always remained on maintaining a consistent quality of the learning experience.

One campus immersion has now been extended to include two campus immersions starting with this programme! This change is based on feedback from previous participants. Conducting extensive campus immersions showcases our commitment to personalized interactions and engaging learning activities.

The PGCP DSAI learning path has been designed for an effective, reliable, and comfortable upskilling experience for working executives in areas related to data science, artificial intelligence, and their applications. We look forward to seeing you in the upcoming batch! All the best.

CURRICULUM

Mode of Delivery: Online

CONCEPTUAL AND TECHNICAL FOUNDATIONS

This module covers basic requirements to understand concepts in data science and to do practical data science. Essential mathematics and statistics are covered in detail, forming a good foundation for all concepts in subsequent modules. This module also contains hands-on practice with two popular languages for data science: Python and R. Hands-on practice with writing SQL commands to retrieve information from databases is also included.

1. Basic Programming using Python & R
2. Data Handling using Python & R
3. Querying Database using SQL (& NoSQL)
4. Visualization using Python & R
5. Essential Mathematics and Statistics
6. Data Analytics Workflow
7. Bonus: Further Topics and References for Self-study

DATA MINING AND MACHINE LEARNING

Where do you begin with a new dataset in hand? Here, you will learn how to conduct such exploratory analysis. You will familiarize yourself with different techniques for data preprocessing, feature engineering, and advanced visualizations. The next part of the module covers various AI models (machine learning, deep learning, generative AI) for performing supervised tasks (predictions) and unsupervised tasks (finding hidden patterns in datasets). Recent years have seen a rise in the volume and velocity of data. Essential concepts and tools involved in handling AI models for massive datasets are also covered.

1. Exploratory Data Analytics
2. Basic AI Models: Machine Learning (Unsupervised and Supervised Learning)
3. Advanced AI Models Part 1: Deep Learning
4. Advanced AI Models Part 2: Generative AI
5. Automation of AI Modelling Workflow
6. Bonus: Scaling AI Models to handle Big Data using Apache Spark

ANALYTICS USING NLP, TIME SERIES, NETWORKS

Different types of data like time series, text, etc. require additional preprocessing steps and dedicated methods to perform various tasks (e.g., classification, forecasting, etc.). This module includes hands-on practice with such requirements. Applications are also included; examples include forecasting of stock price using time series analysis, understanding supply chain disruptions via network analysis, sentiment analysis using NLP, etc.

1. Natural Language Processing (Text Data)
2. Time Series Analysis and Forecasting
3. Network Analysis and Applications
4. Applications: Social Media, Fraud Detection, Recommender Systems, Web Analytics, etc.
5. Bonus: Computer Vision (Image Data)

DATA-DRIVEN WEB PRODUCTS

Many organizations nowadays prefer to see results over the web. For example, the government wishes to have a real-time dashboard through

which it can share actionable information to the public. This module covers hands-on practice with building such web apps for information provision and decision support. Doing data science on the cloud will also be discussed along with hands-on practice.

1. Introduction to Web
2. Big Data Management
3. Web Dashboards (Interactive Graphs and Tables)
4. Basic ML & AI-based Web Apps
5. Deploying Apps on Web and Automation
6. Bonus: Cloud Analytics (AWS/GCP/Azure)

DATA-DRIVEN BUSINESS DECISIONS

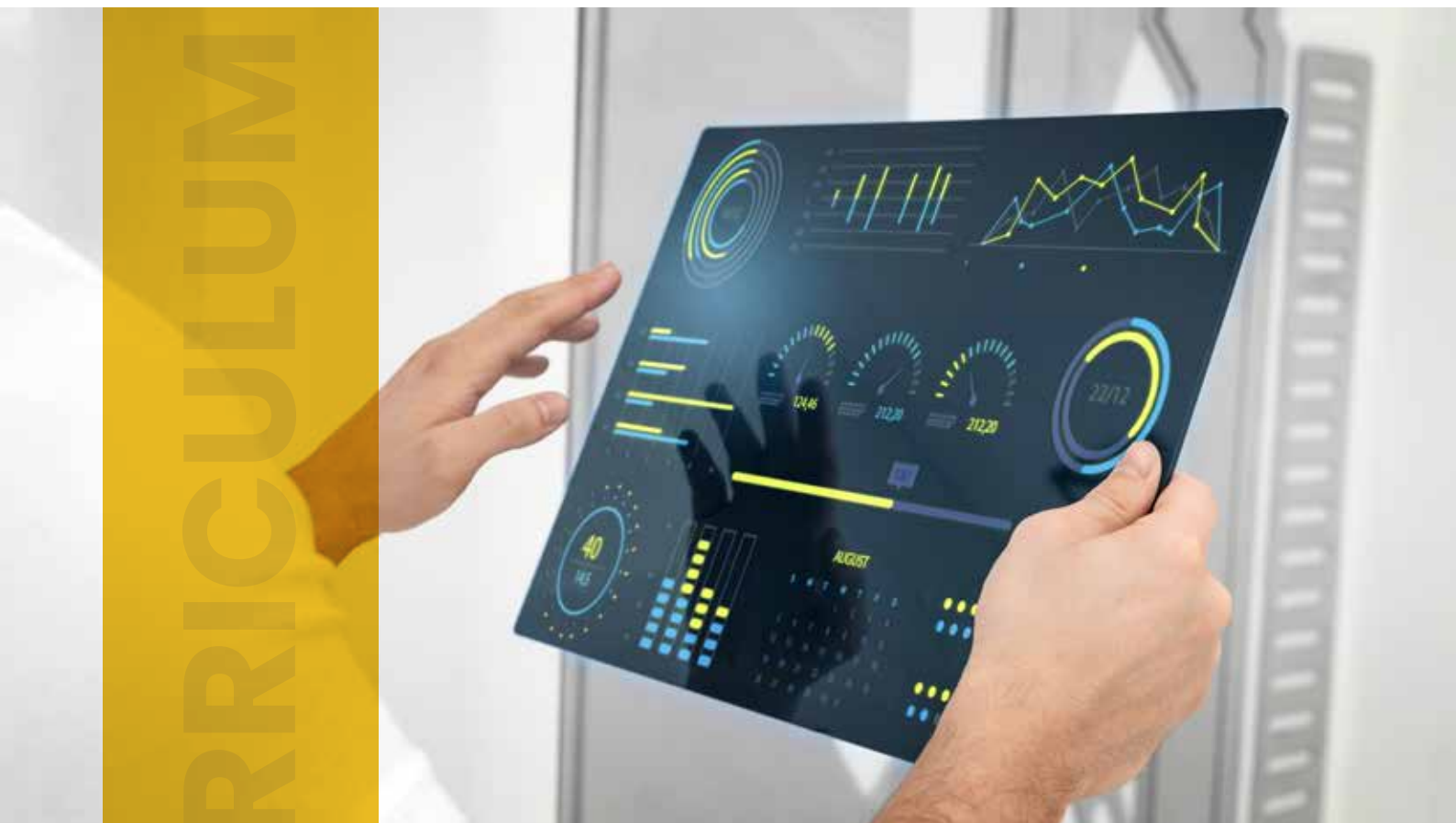
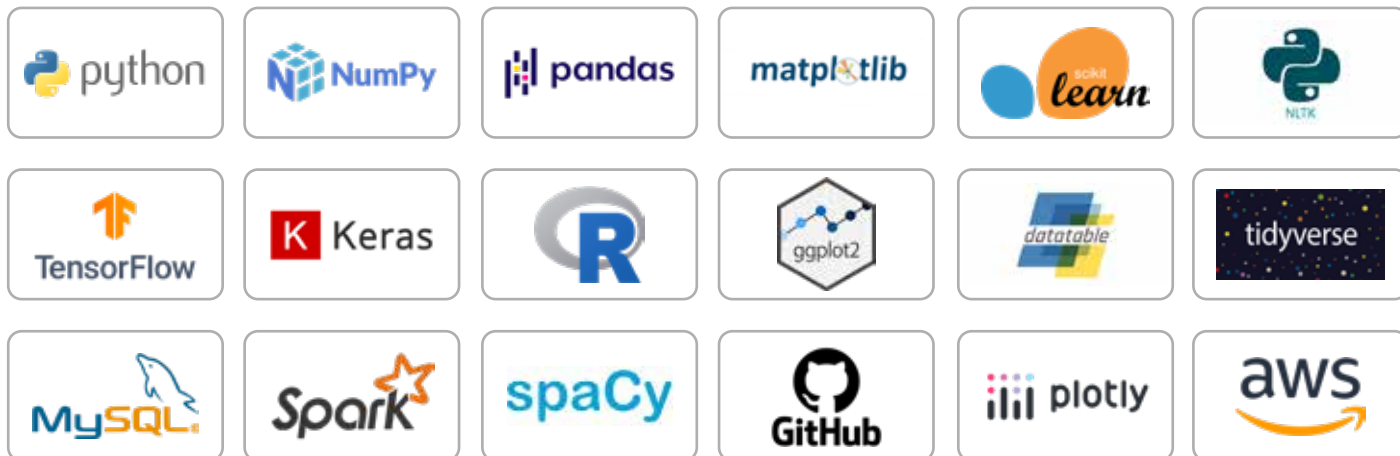
All modules covered till now include hands-on practice with datasets. This module goes further to discuss and practice with real-world contexts. The module covers applications of concepts covered in previous modules to real-world business contexts (operational and strategic), and the usage of data science and artificial intelligence in different real-world industry use cases. Privacy, ethics, and regulatory concerns in different industries and business contexts are also covered.

1. Operational and Strategic Business Contexts
2. Industry Cases (Finance, Health, Energy, etc.)
3. Statistics and Machine Learning Use Cases
4. Generative AI Use Cases
5. Exclusive Case Studies using Real-world Datasets
6. Bonus: Cases Selection based on Learners' Interest

Note: *subject to modifications at a later stage if required, as per the discretion of the faculty.

CURRICULUM

TOOLS YOU WILL LEARN



CURRICULUM

PROGRAMME DETAILS

Delivery Mode:

- The regular mode of delivery for weekend sessions is online.
- Sessions during campus immersion at IIT Roorkee will be offline.

Duration: 6-8 Months

Pedagogy:

- 75+ lecture hours and 60+ hours of practical experience during the weekends, and campus immersions at IIT Roorkee Campus.

Hands-on

Case Studies

Capstone Project

Hackathon(s)

Class Schedule: Sunday, 10:00 am to 01:00 pm

*Seats are limited



Application Closure Date | Closing Soon

Commencement Date | 3rd May 2026

Campus Immersion:

Mode: Offline

Campus immersion at IIT Roorkee is optional for all participants. Its schedule will be decided and informed to all participants of the programme a few months prior to the scheduled dates. Campus immersion will be fully managed by IIT Roorkee.

- Two campus immersions are available within the programme. Both are optional for all participants.

- The first campus immersion will be for 3 days and will be held at Greater Noida Extension Center (GNEC).
 - This will be held towards the end of the second module (Data Mining and Machine Learning).
 - The purpose is to deepen the understanding of initial modules with more exercises and examples and to meet and know faculty and peers. This will also facilitate a better understanding of business and personal learning requirements, and team formations for capstone projects.
- The second campus immersion will be for 5 days and will be held at IIT Roorkee Main Campus at Roorkee, Uttarakhand.
 - This will be held towards the end of the fifth module (Data-driven Business Decisions) and will involve an extensive set of learning activities.
 - These will include open data science lectures, quizzes, on-spot case studies, personalized doubt clarifications, a hackathon, a campus tour, and a social dinner.

Note: IIT Roorkee will provide on-campus accommodation and food to all participants. Travel expenses will be borne by individual participant or the participant's organization.



CAPSTONE PROJECT AND HACKATHON(S)

CAPSTONE PROJECT

MODE: SELF-PACED

LEARNING OUTCOMES

- The project allows participants to build end-to-end data science project on their own or in teams.
- Participants will develop skills related to topic formulation (optional), collect and manage required data, process and analyse it, deploy the model on the web (optional), report final results, and present and discuss the results and learning experience.

TOPICS & GUIDANCE

- Participants can work on topics that are of interest to the individual/team. The topic can also be chosen from a pre-defined list shared by the programme coordinator.
- Need-based personalized guidance will be available during dedicated time slots.

EVALUATION

- The project is one of the components of the assessment required for certification.

HACKATHONS

MODE: ONLINE/OFFLINE

LEARNING OUTCOMES

- By participating in hackathon(s), participants will sharpen problem-solving skills in a real-time competitive environment.
- Previous participants have commented on visible gain in practical experience in developing innovative solutions, and practical experience in enhancing teamwork abilities.

QUIZZES & ASSIGNMENTS

MODE: SELF-PACED

LEARNING OUTCOMES

- Regular quizzes will be held to ensure that participants benefit the most from the delivered materials.

EVALUTION

- Quizzes and assignments are included in components of the final assessment, required for certification.



FACULTY



DR. PARTHA PRATIM ROY

AREAS OF INTEREST:

Deep Learning, Artificial Intelligence, Image Processing, Transformers/LLMs & Generative AI, Pattern Recognition, Medical Imaging



DR. ABHISHEK SAMANTRAY

AREAS OF INTEREST:

Big Data Analytics, Time Series, Networks, Data Science Applications in Business & Industry



DR. PRAVENDRA SINGH

AREAS OF INTEREST:

Deep Learning, Machine Learning, Computer Vision, Image Processing, Pattern Recognition, Medical Imaging, Artificial Intelligence



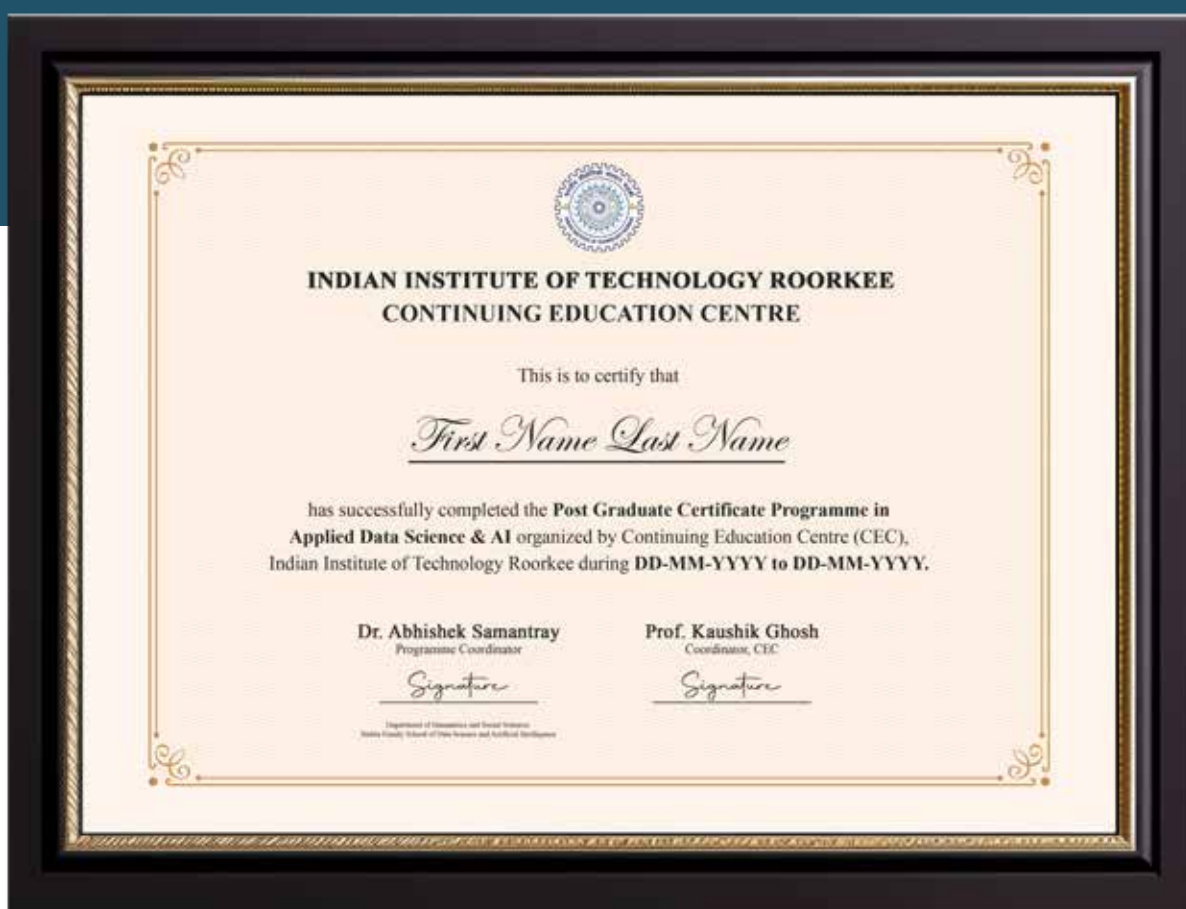
DR. APARAJITA KHAN

AREAS OF INTEREST:

Machine & Deep Learning, LLM, Medical NLP, Computational Biology & Bioinformatics, Epidemiology, Remote Sensing & Weather Analytics

ASSESSMENT & CERTIFICATION

Certificate of completion will be awarded by **IIT Roorkee** at the end of the programme to all participants who qualify the evaluation criteria (**60%** in overall assessment) and the attendance criteria (**75%** of all live online sessions).



- The above e-certificate is for illustrative purposes only and the format of the certificate may be changed at the discretion of IIT Roorkee.
- This programme is offered by the Continuing Education Centre (CEC), IIT Roorkee for working professionals in technical or managerial roles.

CAREER SUPPORT BY JARO EDUCATION

Profile Building Assistance:

We provide tailored suggestions to enhance learners' resumes and optimize their LinkedIn profile presence by aligning with corporate standards.

Career Enhancement Sessions:

Bridging connectivity to link the best talent with organizations through eminent sessions from top-class industry speakers.

Note: IIT Roorkee or Jaro Education do not guarantee or promise you a job or advancement in your existing position. Career services are simply provided as a service to help you manage your career in a proactive manner. Jaro Education provides the career services described here. IIT Roorkee is not involved in any way with the career services described above and offers no commitments.



FEE STRUCTURE

Application Fee: INR 1,500/- + GST | Programme Fee: INR 1,48,500/- + GST

*The application fee is non-refundable.

Total Fee INR 1,50,000/- + GST

Instalment Pattern

Instalment I

INR 74,250/- + GST

As mentioned in offer letter

Instalment II

INR 74,250/- + GST

15th July 2026

EASY EMI OPTIONS AVAILABLE

- Total Programme Fee will be paid to Jaro Education. Facilities for loan and EMI options are available by Jaro Education.
- Participants will pay a non-refundable Application Fee to Jaro Education during submission of the application.
- There are two campus immersion modules in the programme. IIT Roorkee will provide on-campus accommodation and food to all participants. Travel expenses will be borne by individual participant or the participant's organization.

ELIGIBILITY CRITERIA

- Participants with a bachelor's degree (or equivalent) from any recognized university in any discipline with 50% aggregate marks are eligible to apply to the programme.
- Work experience of one year is preferable after completion of the qualifying degree.

SCREENING CRITERIA

- Participants will submit personal details, educational qualification documents, resume, and statement of purpose.
- Selection to the programme will be made after scrutiny of the overall profile. Interviews may be conducted for certain applicants.
- Selection will continue on a rolling basis.

ABOUT IIT ROORKEE

#1 Among the IITs in the Citations per Faculty parameter
QS World University Rankings, 2021

#1-20 Among universities worldwide
in the Citations per Faculty parameter
QS World University Rankings, 2021

#1 Department of Architecture and Planning, IIT Roorkee
India's Best Architecture College 2022, India Today

#6 As per NIRF Engineering Rankings 2025

Indian Institute of Technology Roorkee is among the foremost institutes of national importance in higher technological education and in engineering, basic and applied research. Since its establishment, the Institute has played a vital role in providing the technical manpower and know-how to the country and in pursuit of research. The Institute ranks amongst the best technological institutions in the world and has contributed to all sectors of technological development. It has also been considered a trendsetter in the area of education and research in the fields of science, technology, and engineering.

The Institute had celebrated its Sesquicentennial in October 1996 and now completed more than 175 years of its existence. It was converted to IIT on September 21, 2001, by an Ordinance issued by the Government of India declaring it as the nation's seventh Indian Institute of Technology, an "Institution of National Importance".

The Institute offers Bachelor's Degree courses in 10 disciplines of Engineering and Architecture and a Postgraduate Degree in 55 disciplines of Engineering, Applied Science, Architecture, and planning. The Institute has a facility for doctoral work in all Departments and Research Centres.

The Institute admits students to B.Tech. and B.Arch. courses through the Joint Entrance Examination (JEE) conducted at various centres all over India.

ABOUT CONTINUING EDUCATION CENTRE (CEC)

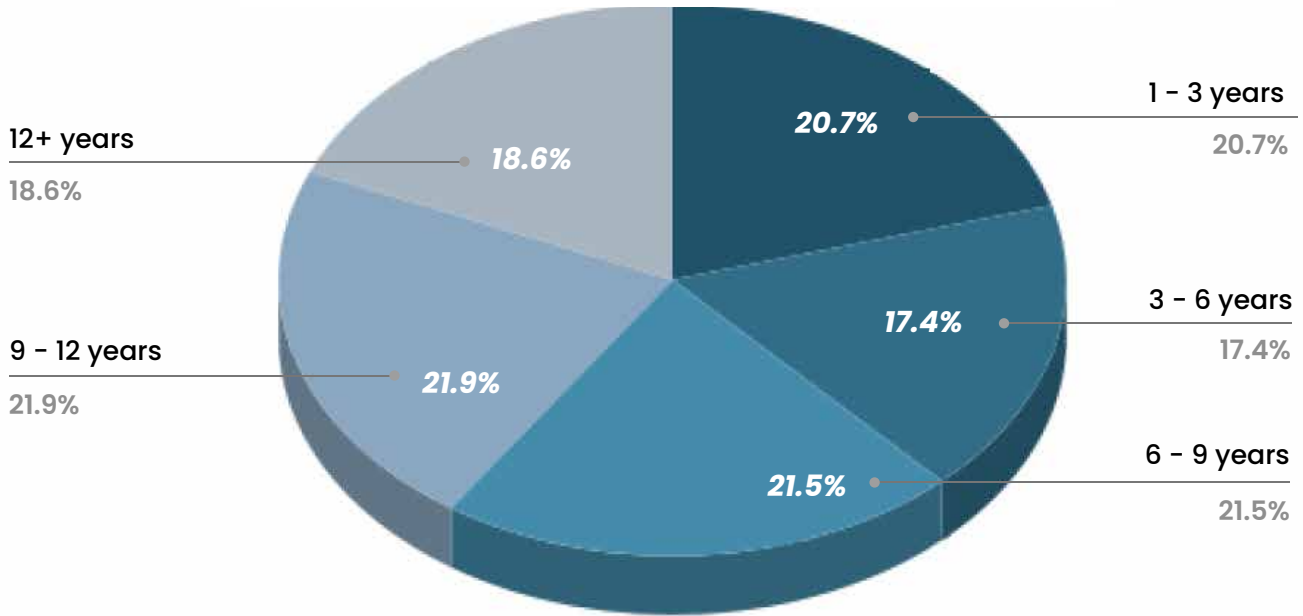
Continuing education centre of IIT Roorkee was established in 1955 for the promotion of knowledge upgradation activity in our country by organizing refresher/specialist courses for in-service technical and professional persons from various Govt./Semi Govt. organisations, public and private undertakings, research institutions, and industries. The centre conducts about 60 to 70 short-term courses (sponsored by different agencies/organisations) in continuing education every year in various disciplines of management, engineering, science, and technology in which the professionals are trained from all parts of the country as well as from the neighboring countries. Courses organized by this Centre are innovative, accessible, and stimulating and address to the current needs of the professionals. Courses are being organised through the technical expertise available in the departments and centres of the Institute. Experts from industries and R&D organisations are also invited to deliver lectures wherever necessary.

Centre organizes the courses in the beautiful campus of the Institute and also outside the Institute in consultancy as well as in sponsored mode that respond to clients' continuing professional development needs. The Centre is fully equipped with the facility of conference hall, accommodation, dining and recreation.

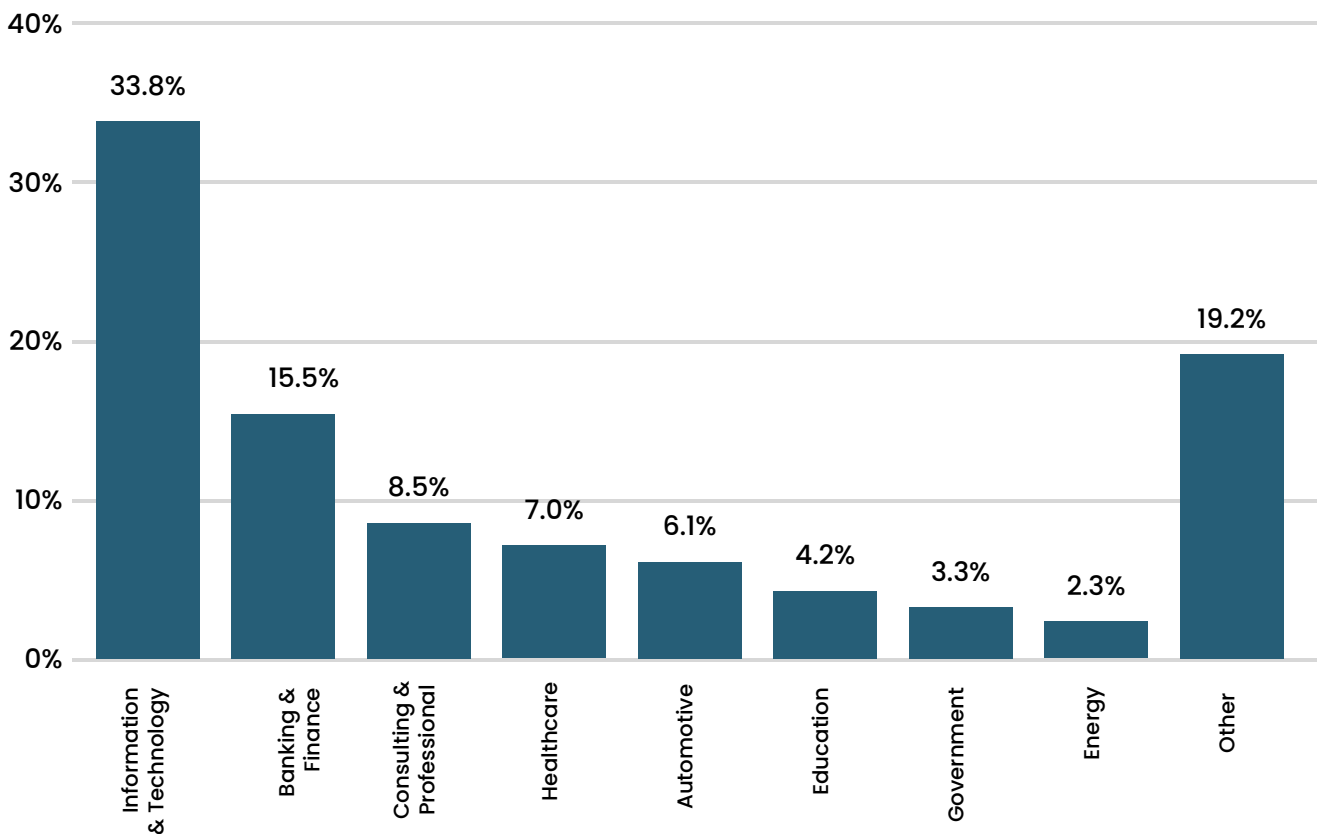


RECENT BATCH ANALYSIS

Work Experience



Industry Wise Bifurcation

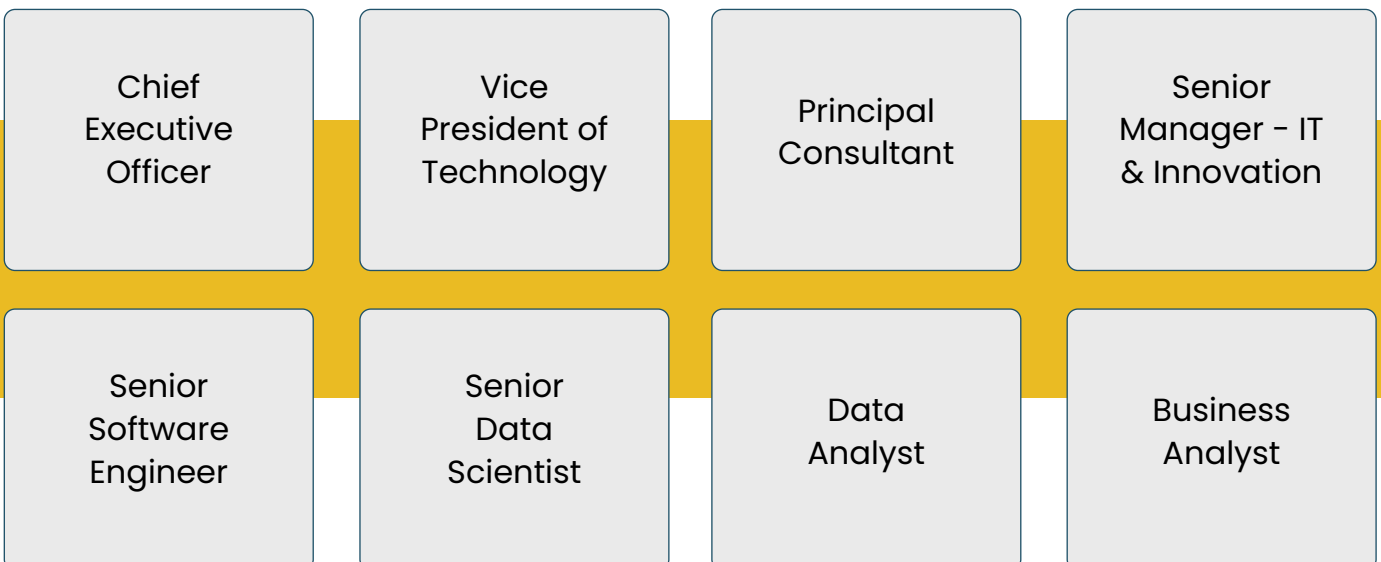


RECENT BATCH ANALYSIS

Top Companies



Top Designations:



Note: -

- Past performance does not guarantee future results.
- All company names are trademarks or registered trademarks of their respective holders. Use of these names does not imply any affiliation with or endorsement by them.
- Highlighted above are the previous batch demographics of the programme.
- This is a partial list.

DATA SCIENCE

Services Provided by:

jaro education

Jaro's Programme Expert



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