eict IIT Roorkee

masai

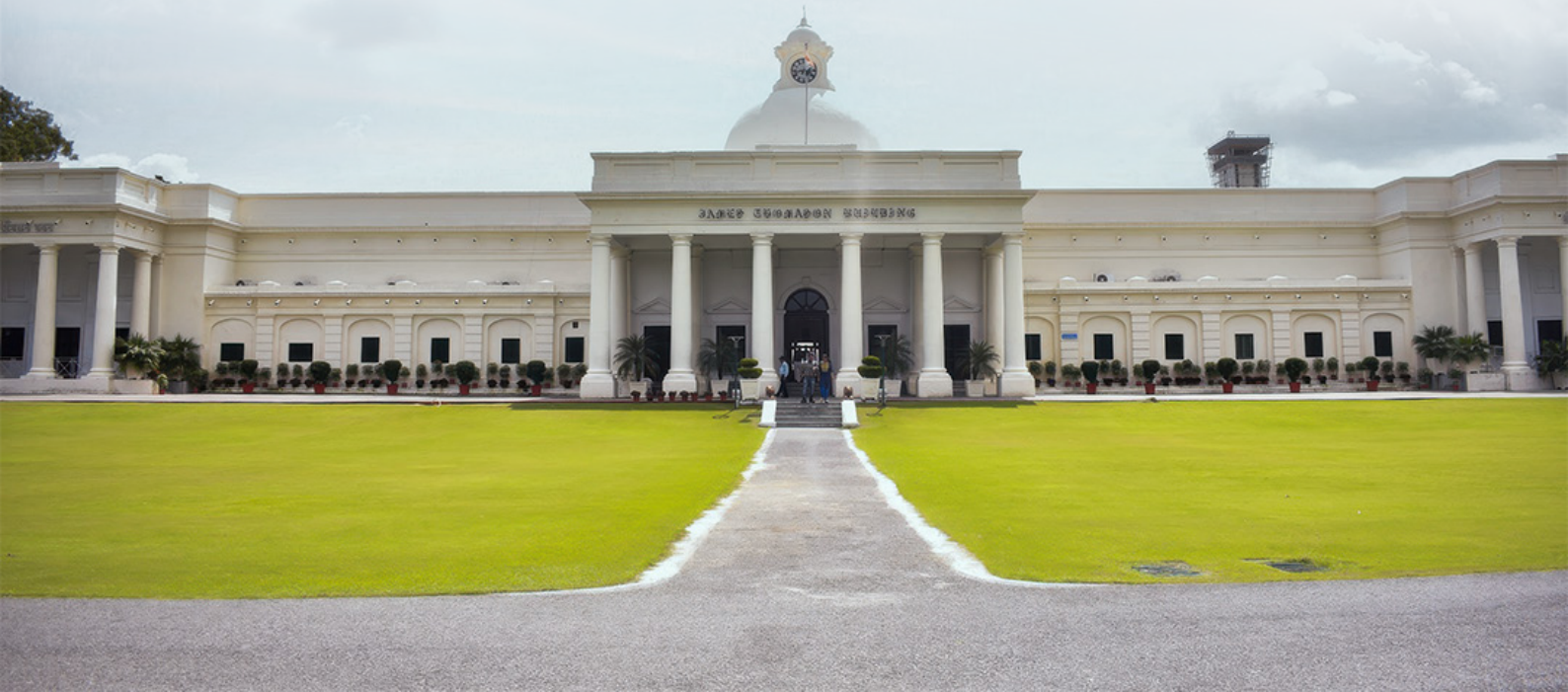
DATA ANALYTICS WITH AI AND GEN AI

FROM E&ICT ACADEMY, IIT ROORKEE

In association with masai

About E&ICT Academy, IIT Roorkee

- **The Electronics & ICT Academy (E&ICT)**, supported by MeitY, Govt. of India, aims to bridge the gap between industry demand and academic knowledge by delivering specialized, hands-on training and upskilling programs in emerging areas of the Information & Communication Technology and Electronics sector.
- **The Indian Institute of Technology (IIT) Roorkee:** A legacy of over 175 years. Established in 1847 as India's first engineering college, it became an IIT in 2001, excelling in engineering and technology.
- **Rankings:** IIT Roorkee consistently ranks among the top engineering and research institutions in India. In the NIRF India Rankings 2024, IIT Roorkee was ranked #6 in the 'Engineering' category and #8 in the 'Overall' category.
- **Strong Industry & Research Ecosystem:** With active collaborations, incubators, and innovation hubs, IIT Roorkee bridges academia and industry to drive real-world impact.
- **Industry-Focused Learning:** IIT Roorkee maintains strong ties with industries across its campus locations, providing students with opportunities for internships, real-world projects, and networking with business leaders.



Why Choose This Course?

- **Prestigious Certification*:** Earn a Certificate of Completion from E&ICT Academy, IIT Roorkee, recognising your learning and achievement
- **Campus Immersion:** Optional 3-day campus immersion to interact with faculty/experts, peers, and the institute ecosystem.
- **Future-Proof Career Gateway:** Enter the fast-evolving AI era by mastering Data Analytics with AI through hands-on learning guided by leading IIT faculty
- **Advanced Curriculum:** Access cutting-edge business analysis content, engaging simulations, and practical evaluations. Focus on real-time project implementation for hands-on mastery.
- **Practical-Based Learning:** Engage in immersive, hands-on projects that span data foundations, AI-assisted analytics, and agentic system design- applying Python, LLM frameworks, and multi-agent architectures to solve real-world, industry-driven business challenges.
- **Placement Opportunities**:** Receive resume reviews, career coaching, and placement support to land your dream role

**Certificate Eligibility: Minimum 65% overall attendance and 35% in the cumulative evaluation score*
***Receive resume reviews, career coaching, and placement support to land your dream role (Eligibility: 65% attendance & overall 70% marks; offered by Masai)*

What Will You Learn?

Drive your career forward by mastering Data Analytics with AI and Generative AI. Build a strong foundation in data architecture, SQL, Python, and spreadsheets, then advance to Large Language Models, strategic prompt engineering and AI-assisted analytics. Gain hands-on expertise in Generative AI, multi-agent systems, and automation, emerging as a portfolio-ready professional equipped to solve complex, AI-driven business challenges.

Toolkit

python™ NumPy pandas OpenAI matplotlib

Google Sheets Claude seaborn

Course Details

Course Duration	Time Commitment	Certification
6 Months	8-10 hours per week	E&ICT Academy, IIT Roorkee

Course Syllabus

Module 1: Core Data Architecture & Analytical Foundations

This initial phase establishes the bedrock of data literacy. Learners will master the tools required to organize, clean and query data, moving from basic spreadsheets to advanced programming logic.

Key Learning Outcomes:

- Relational Intelligence (SQL): Constructing complex queries to manage and retrieve data from relational database management systems
- Algorithmic Thinking with Python: Building a functional coding foundation in Google Colab; mastering variables and complex data structures
- Spreadsheet Engineering: Mastering advanced Google Sheets functions for data hygiene and structural organization
- Data Ecosystems: Navigating the information lifecycle and understanding diverse data types
- The Intelligence Landscape: A high-level synthesis of AI ecosystems and the emergence of Machine Learning

Tools & Technologies:

Google Sheets | Python | Google Colab | SQL | Relational Database Management Systems

Module 2: LLM Frameworks & Strategic Prompt Engineering

Shift from data management to human-AI interaction. This module explores the mechanics of Large Language Models and the art of extracting high-value output through structured communication.

Key Learning Outcomes:

- Heuristics of Prompting: Implementing zero-shot and few-shot strategies to guide model reasoning and output
- Programmatic AI: Understanding the logic of API integration and interacting with models via code
- Model Mechanics: Understanding LLM architecture; tokenization; and the distinction between proprietary and open-source ecosystems
- Collaborative Analysis: Leveraging LLMs for advanced content synthesis; reporting; and creative analytical partnering

Tools & Technologies:

OpenAI API | Anthropic Claude | Hugging Face | GPT Models
Prompt Engineering Frameworks

Module 3: Intelligence-Driven Wrangling & Visual Narratives

Learn to use AI as a "Co-pilot" for deep-dive analysis. This module focuses on using specialized Python libraries and AI tools to turn raw data into persuasive visual stories.

Key Learning Outcomes:

- Computational Analytics: Mastering NumPy and Pandas for high-speed numerical processing and data manipulation
- Dynamic Visualization: Creating informative charts and visual narratives that translate technical findings into business insights
- AI-Assisted Pre-processing: Utilizing automated frameworks for rapid data cleaning and hygiene
- The Art of Hypothesis: Using AI to generate data-driven questions and uncover non-obvious patterns

Tools & Technologies:

NumPy | Pandas | Matplotlib | Seaborn | AI Data Cleaning Tools

Module 4: Architecting Agentic Systems & Automation

Move beyond static AI to autonomous systems. This module focuses on designing agents that don't just "talk" but actually "act" to achieve specific goals.

Key Learning Outcomes:

- Development Frameworks: Hands-on architecture using LangChain to design multi-step agent workflows
- Web & Tool Integration: Enabling agents to research; browse; and interact with external APIs autonomously
- Anatomy of Agency: Defining the components of autonomous assistants; including planning; reasoning; and memory
- Goal-Oriented Design: Applying project management logic to define and achieve complex automation goals
- Collaborative Swarms: Building multi-agent systems with CrewAI to manage sequential tasks and diverse roles

Tools & Technologies:

LangChain | CrewAI | AutoGen | AI Automation Frameworks | API Integration Tools

Module 5: Capstone Project

The program culminates in a full-cycle development project where learners apply the entire curriculum to solve a real-world business challenge.

Key Learning Outcomes:

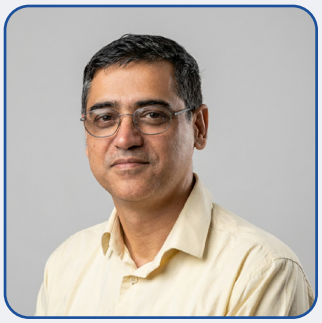
- Technical Prototyping: Building a functional multi-agent or AI-powered application from the ground up
- Solution Scoping: Defining project boundaries and identifying relevant public datasets and AI tools
- Professional Launch: Finalizing your AI portfolio and preparing for transition into the AI-enabled workforce
- Stakeholder Articulation: Mastering the technical pitch; explaining design decisions and showcasing project ROI

Tools & Technologies:

Full AI Tech Stack (Python | LangChain | CrewAI) | Public Datasets
Portfolio Presentation Tools

Due to the evolving nature of the industry expectations and partner institute feedback, some syllabus aspects may change. Any updates will be communicated during the Inauguration Session(s) or at the start of the relevant module

Under The Guidance Of



Prof. Sanjeev Manhas

Principal Investigator of E&ICT Academy, IIT Roorkee

A distinguished academician, researcher, and innovator with extensive experience in academia, research, and industry. He holds a Ph.D. in Electronics and Computer Engineering from De Montfort University, UK, and an M.Tech. from IIT Madras. He has worked at Micron Semiconductor and the Institute of Microelectronics, Singapore, contributing to advanced DRAM and CMOS process integration. His research spans nanoscale devices, device-circuit co-design, novel memories, MEMS, sensors, and CMOS process technologies.

Our Instructors and Industry Experts

Prof. Abhishek Samantray

Assistant Professor, IIT Roorkee

Prof. Abhishek Samantray is an Assistant Professor in the Department of Humanities and Social Sciences at the Indian Institute of Technology Roorkee and a Joint Faculty Member of the Mehta Family School of Data Science and Artificial Intelligence. His teaching assignments include courses such as Big Data Analytics, Mathematics for Data Science, Basic and Advanced Statistics, Computer Programming for Economists, and Economics, reflecting his interdisciplinary focus at the intersection of data science, analytics, and socio-economic systems.

His research interests encompass contemporary socio-economic topics including digital markets and society, sustainable health and development, and finance and society along with business and industry analytics and applied data science, including statistics, causal inference, network analysis, and big data analytics.

Prof. Partha Pratim Roy

Professor, IIT (ISM) Dhanbad

Prof. Partha Pratim Roy (Fellow IETE, Fellow IEI, Senior Member IEEE) is working as a Professor in the Department of Computer Science and Engineering at IIT (ISM) Dhanbad, following eleven years of service as faculty at IIT Roorkee. He received his M.S. (2006) and Ph.D. (2010) degrees in Computer Science from the Universitat Autònoma de Barcelona, Spain, and completed post doctoral research in France and Canada from 2010–2013. Earlier, he spent four years in the industry with Tata Consultancy Services and Samsung R&D, where he led the Computer Vision group. Dr. Roy's honors include the Best Student Paper Award at ICDAR 2009, the Top 10 % Paper Awards at ICIP 2014 and 2019, and the iHUB Divyasampark Faculty Fellowship (2022 to 2023). He has published over 250 peer reviewed papers in international journals and conference proceedings and routinely serves on program committees of major international conferences. Dr. Roy is an Associate Editor for IEEE Transactions on Circuits and Systems for Video Technology, ACM Transactions on Asian and Low Resource Language Information Processing, and Neurocomputing. He has successfully led several projects as Principal Investigator with funding from DRDO, DST-SERB, MeitY, SPARC, NIC, and HP.

Prof.Saurabh Srivastava

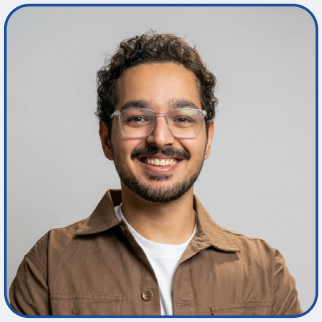
Assistant Professor, IIT (ISM) Dhanbad

Prof.Saurabh Srivastava working as an Assistant Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology (ISM), Dhanbad. My teaching areas cover Software Engineering, Database Systems, Object-Oriented Programming, and Unix-based Software Tools. I am also the Faculty-in-Charge of Automation, through which I am responsible for the development and upkeep of the Institute's in-house ERP system, and Co-Faculty-In-Charge at Cyberlabs, the student innovation centre under NVCTI. My area of research includes Software Architecture, Conversational Agents, and Large Language Model (LLM) applications in AI-intensive systems. I have been associated with various sponsored projects, such as an ISRO-sponsored project for designing an expert AI agent for mission operation management through LLMs and another on hyperspectral imaging for detection of pollutants in mining conditions. Before joining IIT(ISM), I have served in academic and research positions in institutions like IIIT Lucknow and IBM Research India, and industry with companies like ISRO and Illuminate Health Inc. I have done my Ph.D. and M.Tech. in Computer Science from IIT Kanpur, where my Ph.D. research was into architectural concerns of chatbot development. I am interested in developing useful systems based on good design principles and like interacting with students and colleagues both in research and teaching roles.

Prof. Rajendra Pamula

Assistant Professor, IIT (ISM)Dhanbad

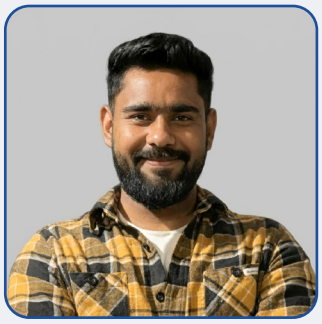
Prof. Rajendra Pamula is an Associate Professor in the Department of Computer Science and Engineering at the Indian Institute of Technology (ISM) Dhanbad, where he has been serving since 2010. His teaching portfolio includes core and advanced courses such as Internet Technology, Machine Learning, and Mobile & Wireless Network Security at undergraduate and postgraduate levels. His research interests lie in the areas of Data Mining, Machine Learning, and Wireless Networks, with a focus on intelligent data analysis and networked systems.



Shaunak Chadha

Senior Product Data Scientist, Google

Shaunak Chadha is a Senior Product Data Scientist at Google, with 6+ years of experience in product data science, analytics, and experimentation. He has previously worked with PayPal, Uber, and Razorpay, partnering closely with product and business teams to drive growth and decision-making through data. His work spans KPI and metrics strategy, payments and SMB analytics, funnel and cohort analysis, and end-to-end A/B testing from hypothesis and sample sizing to impact measurement. He is skilled in SQL and Python, builds scalable dashboards and data pipelines, and is known for turning complex data into clear, actionable product insights.



Rituraj Singh Gour

Business Analyst, Adobe

Rituraj Singh Gour is a Business Analyst II at Adobe, with over 4+ years of experience in data analytics, business intelligence, and decision science. Prior to Adobe, he worked at Amazon as a Business Analyst and Business Intelligence Engineer, where he drove high-impact analytics initiatives across customer experience and operations. He specializes in SQL-driven analysis, dashboarding, and data storytelling using tools such as Python, Power BI, and ETL frameworks. His work has contributed to improving user retention, optimizing business processes, and enabling data-backed strategic decisions across large-scale, global platforms.

Admission Process

Submit Application
Complete application form to showcase your motivation and goals

Complete Counselling
Only shortlisted candidates go through the counselling process

Start Learning
Learn from India's top educators and stand out from the crowd

Fees Structure

Application Fee (Non-Refundable)	**₹100**

	Option 1	Option 2
	Upfront	**EMI** (Through Masai's NBFC Partners)
Secure Seat Fee (Non-Refundable)	₹4,000	₹4,000
Programme Fee (Non-Refundable)	₹53,000	₹6,772 x 9 months
Total	₹57,000*	₹64,948*

**GST at 18% extra, as applicable*

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