# IIT Kharagpur - Virginia Tech
## Certificate Program
### in **Business Analytics** and **AI**

**Course duration: May 30, 2022 - January 07, 2023**

**Jointly Organized by:**

**Indian Institute of Technology Kharagpur**
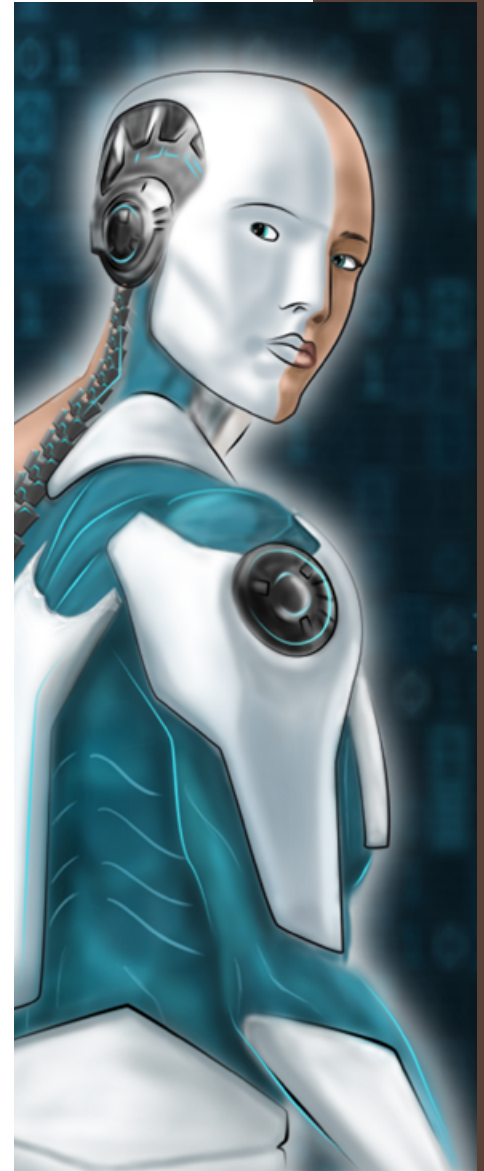**Kharagpur - 721302, West Bengal, India**

**Virginia Tech**
**Blacksburg, VA 24061, United States**

# About the Program

AI has now become mainstream spurred by the pandemic and a data driven world. Modern technology produces a vast amount of information that provides businesses an opportunity to understand customer preferences and needs better. AI has become vital in order to understand and interpret the data that is being produced at the rate of 2.5 quintillion bytes every day. This is just a number without anyone really knowing the volume of data being produced. Suffice it to say that without intelligent computing it would be impossible to effectively use this data to make our lives better. The IIT Kharagpur – Virginia Tech collaboration is a step towards addressing this challenge. The certificate program prepares analytics talent for today's market that demands an understanding of artificial intelligence and its applications in data analytics.

With more time spent on smart devices and increased interaction with search engines, social media, and news feeds, the nature of data continues to evolve with a degree of anarchy. Unstructured data is growing significantly faster than data in rows and columns. Add to this mix Internet of Things (IoT) and you begin to see that the volume, velocity, and variety of data require thinking within a completely new paradigm.

Students who transform themselves to become innovative thinkers can provide effective solutions that benefit their immediate community and the world. The program in business analytics and AI positions you for this transformation and to think entrepreneurially. Using an interdisciplinary approach, the program helps you identify the utility in data so that you can affect the customer experience, diagnose problems, impact efficiency, satisfy customers, and improve our quality of life.

# Objectives of the program

The program integrates four dimensions of the analytics world: data, computational models, technology, and applications. Through a series of modules organized along these dimensions, the faculty and your coursework equip you with a new way of thinking and a new set of skills that will prepare you to address the challenges of today's world.

The joint certificate program in Business Analytics and Artificial Intelligence (AI) is a 9-month program, organized into multiple sequential units with the last 3 months dedicated to a comprehensive capstone project under the guidance of IIT Kharagpur and Virginia Tech faculty. Upon completion of all requirements, students will obtain a certificate in Business Analytics and AI from IIT Kharagpur and Virginia Tech. Our classes are modular in approach where each module is lead by a faculty member who is considered to be an expert in the field. Other experts from industry and academia assist the lead faculty members as needed.

The program is intended to motivate students to pursue careers in data science and artificial intelligence. The models proffered by AI and data science are robust, however, its applications are challenging. Our faculty will prepare you to apply the models in different domains including health sciences, business, and engineering.

## Duration:
## May 30, 2022 – January 07, 2023

# Program Schedule

| Module |
| --- |
| Prerequisite Software including Python |
| Introduction to Business Analytics and Artificial Intelligence |
| Structured and Unstructured Databases |
| Statistics for Business Analytics |
| Classification and Clustering Methods |
| Neural Networks, Deep Learning, and Decision Trees; Hands-on Pytorch, Tensor-Flow (Colab/AWS/Azure) |
| Visualization and Storytelling with Data |
| Big Data |
| Application Domains and Case Studies: Computer Vision,  NLP and Sentiment Mining, Time Series Modeling, Integration with other Technologies |
| Industry Talk Series |
| Capstone Project Presentations |

# Chief Faculties

Our lead faculty members have Ph.Ds from highly reputed universities and have a vast amount of experience. Each one of them is considered an expert in their field and have achieved excellence in their academic pursuits. Our faculty are from academia and industry. The academic faculty provide the theoretical foundation for the program. The faculty from industry will teach you how to apply these theories using technologies in practice. Additionally, graduate assistants from IIT Kharagpur will provide you guidance on assignments, projects, and tests.

Professor Tarun Sen (Virginia Tech)
Professor Swagato Chatterjee (IIT Kharagpur)
Professor Pabitra Mitra (IIT Kharagpur))
Professor Reza Barkhi (Virginia Tech)
Professor Sujoy Bhattacharya (IIT Kharagpur))
Professor Sourav Mukhopadhyay (IIT Kharagpur))
Professor Alok Kanti Deb (IIT Kharagpur))
Professor Barbara Fraticelli (Virginia Tech)
Professor Ali Habibnia (Virginia Tech)
Professor Jacob Shortt (Virginia Tech)
Professor Satyam Priyadarshy (Haliburton)

# Professor Tarun Sen

Dr. Tarun K. Sen, is Managing Director of the Post Graduate Program in Business Analytics (PGP-BA) and Professor Emeritus of Accounting and Information Systems at Virginia Tech. His current research includes the implementation challenges of university faculty systems and machine learning applications in industry. His passion for programs in data analytics comes from his long association with research and education in the applications of analytical and data models to address business problems. Sen was active in funded research and published in leading journals, including Management Science, INFORMS Journal on Computing, Decision Support Systems, and IEEE Transactions on Systems, Man and Cybernetics.

https://vtindia.in/team/tarun-sen/

# Professor Swagato Chatterjee

Dr. Swagato Chatterjee currently holds the position of Assistant Professor of Marketing and Analytics at Vinod Gupta School of Management of IIT Kharagpur. His research interests are in the areas of marketing analytics, game theory, service marketing, bottom of pyramid marketing and consumer decision making.

http://www.iitkgp.ac.in/department/BM/faculty/bm-swagato

# Professor Pabitra Mitra

Professor Pabitra Mitra is from the Department of Computer Science and Engineering of IIT Kharagpur. His research interests include Machine Learning, Pattern Recognition, Data Mining and Information Retrieval.

http://www.iitkgp.ac.in/department/CS/faculty/cs-pabitra

# Professor Reza Barkhi

Dr. Barkhi is a KPMG Professor, Department of Accounting and Information Systems, Virginia Tech. Dr. Barkhi's current research emphases are in the areas of the design of GDSS and Organizational Integration Systems, distributed decision making, design of telecommunication networks, and economics of information systems.

https://acis.pamplin.vt.edu/directory/Barkhi.html

# Professor Sujoy Bhattacharya

Dr. Bhattacharya is an Associate Professor in the Vinod Gupta School of Management at IIT Kharagpur. He works in the area of Business Analytics applied to Marketing and Finance Problems.

http://www.iitkgp.ac.in/department/BM/faculty/bm-sujoybtc

# Professor Sourav Mukhopadhyay

Professor Sourav Mukhopadhyay is from the Department of Mathematics at IIT Kharagpur. Prof. Mukhopadhyay's research interests include algebraic cryptanalysis on symmetric cipher, cloud computing, digital rights managements, key pre-distribution for wireless sensor networks, time/memory trade-off cryptanalysis, functional encryption, quantum cryptography, blockchain, bitcoin and cryptocurrency.

http://www.iitkgp.ac.in/department/MA/faculty/ma-sourav

# Professor Alok Kanti Deb

Dr. Alok Kanti Deb is currently an Associate Professor with the Department of Electrical Engineering at IIT Kharagpur. His research interests include control systems, computational intelligence, soft computing, fault diagnosis and prognosis.

http://www.iitkgp.ac.in/department/EE/faculty/ee-alokkanti

# Professor Barbara Fraticelli

Dr. Barbara Fraticelli is an Assistant Professor of Practice in the Business Information Technology, Virginia Tech. Dr. Barbara's research interests focus on all areas of operations research, including optimization, probability and statistics, analytics, and supply chain management. She has taught classes for sophomores through graduate students, as well as executive seminars on analytics.

https://bit.vt.edu/faculty/directory/fraticelli.html

# Professor Ali Habibnia

Dr. Habibnia is an Assistant Professor in the Department of Economics and the Computational Modeling and Data Analytics, College of Science, Virginia Tech. His research interest lies in Big Data Econometrics, Statistical Machine Learning, Deep Learning, Nonlinear Econometric Analysis, Forecasting, Computational Finance, Network Analysis, Nonlinear Systems, and Hyperparameter Optimization.

http://www.alihabibnia.com/

# Professor Jacob Shortt

Jacob Shortt is an Assistant Professor of Practice at the Department of Accounting and Information Systems, Virginia Tech. His research is focused on Banking regulation, financial accounting, auditing and internal controls.

https://acis.pamplin.vt.edu/directory/Shortt.html

# Professor Satyam Priyadarshy

Dr. Priyadarshy is Chief Data Scientist at Halliburton. He is also Senior Fellow of International Cyber Security Center at George Mason University. He is a veteran of Big Data and Data Science. He is a global leader often referred as Venture Idealist, who transforms businesses by leveraging Big Data, Data Science, and Emerging Technologies.

http://www.priyadarshy.com/

# Selection criteria

**An admission committee will select 100 applicants based on the academic background, and work experience (between 2 to 5 years). Knowledge of computer programs supported by the relevant document is a plus.**

# Course Fee

**For Indian: INR 1,00,000 + GST (18%)**
**For foreign national: USD 1500 + GST (18%)**

# Who can attend?

## Applicants should have the following qualifications:

1. An undergraduate degree in engineering or science like, computer science, information systems, statistics, mathematics or related areas with a minimum GPA of 8.0 or 75% marks.
2. Work experience between 2-5 years.
3. Knowledge in computer programs supported by relevant documents.
4. A willingness to learn and put in the effort to complete the requirements for the course.  If you are a working professional, you should be aware that you will need to spend at least 6-8 hours per week on the course.

# Certificate Requirements

For successful completion of the certificate, students are expected to complete the following with a minimum passing grade:
1. projects in databases, predictive analytics, machine learning, big data, and other assignments
2. Exams (2)
3. Capstone project and presentation

# Application process

You need to apply following the link given below with an application fee of INR 500 (For foreign national USD 10$). Once we receive your application, an admission committee will shortlist 100 applicants based on the academic background, and work experience. Applicant fees are non-refundable.

## Apply here
https://erp.iitkgp.ac.in/CEP/courses.htm

# About Indian Institute of Technology Kharagpur:

Indian Institute of Technology Kharagpur is a higher educational institute known globally for its graduate output and affordable technology innovations. Set up in 1951 in a detention camp, Indian Institute of Technology Kharagpur (IIT Kharagpur) is the mother of IITs and is recognized as an Institute of Eminence by the Govt. of Indian in 2019. The key areas of research of IIT Kharagpur are Affordable Healthcare Technologies, Advanced Manufacturing, Advanced Transportation, Precision Agriculture and Food Technology, Cyberphysical Systems, Ecology & Environment, Mining, Water Resources and Architecture. The Institute is engaged in several international and national mission projects and ranks significantly in research output including 50-100 IPR filed annually and about 2000 research publications in top journals and conferences. At present, the Institute has about 750 full-time equivalent faculty members, more than 14000 students and over 70000 Alumni. For more information visit: www.iitkgp.ac.in

# About Virginia Tech:



Dedicated to its motto, *Ut Prosim* (That I May Serve), Virginia Tech pushes the boundaries of knowledge by taking a hands-on, transdisciplinary approach to preparing scholars to be leaders and problem-solvers. As the Commonwealth of Virginia's most comprehensive university and a leading research institution, Virginia Tech offers about 280 undergraduate and graduate degree programs to more than 37,000 undergraduate, graduate, and professional students across the commonwealth and manages a research portfolio of more than $556 million. The university fulfills its role as a land-grant institution by fostering a collaborative environment that integrates technology into all disciplines, so that the Virginia Tech community can serve as a force for positive change around the commonwealth, the country, and the world.

Virginia Tech has a 2,600-acre main campus in Blacksburg, Virginia; a significant presence across the commonwealth, including the Innovation Campus in Northern Virginia, the Health Sciences and Technology Campus in Roanoke, and sites in Newport News and Richmond; educational and research facilities across the state; a study-abroad site in Switzerland; and a 1,800-acre agriculture research farm near the main campus. The campus proper is located in the New River Valley and is 38 miles southwest of Roanoke. Virginia Tech has 2,070 instructional faculty members (both full and part-time) and 51 percent of faculty are tenured. Virginia Tech is among 5 percent of universities in the nation for research expenditures, 48th overall in the National Science Foundation's annual survey of higher-ed research expenditures and has 230 acres, 33 buildings, and 180 companies housed in the **Virginia Tech Corporate Research Center**.

# Program Coordinators:

**Pabitra Mitra**
Professor,
Department of Computer Science and Engineering,
Indian Institute of Technology Kharagpur

**Swagato Chatterjee**
Assistant Professor,
Vinod Gupta School of Management,
Centre of Excellence in Artificial Intelligence (AI)
Indian Institute of Technology Kharagpur

**Pralay Mitra**
Associate Professor,
Department of Computer Science and Engineering,
Indian Institute of Technology Kharagpur

# Important dates:

Advertisement appears in IITKgp Webpage and Social Media (also press release by VT): **April 22, 2022**
Application portal opens on: **April 22, 2022**
Application portal closes on: **May 12, 2022**
Issue of admission offer letter to the selected applicants: **May 16, 2022**
Last Date for Payment of Course Fee: **May 26, 2022**
Course duration: **May 30, 2022 - January 07, 2023**

# Contact:

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