Professional Certificate Program in

Data Analytics & Generative AI

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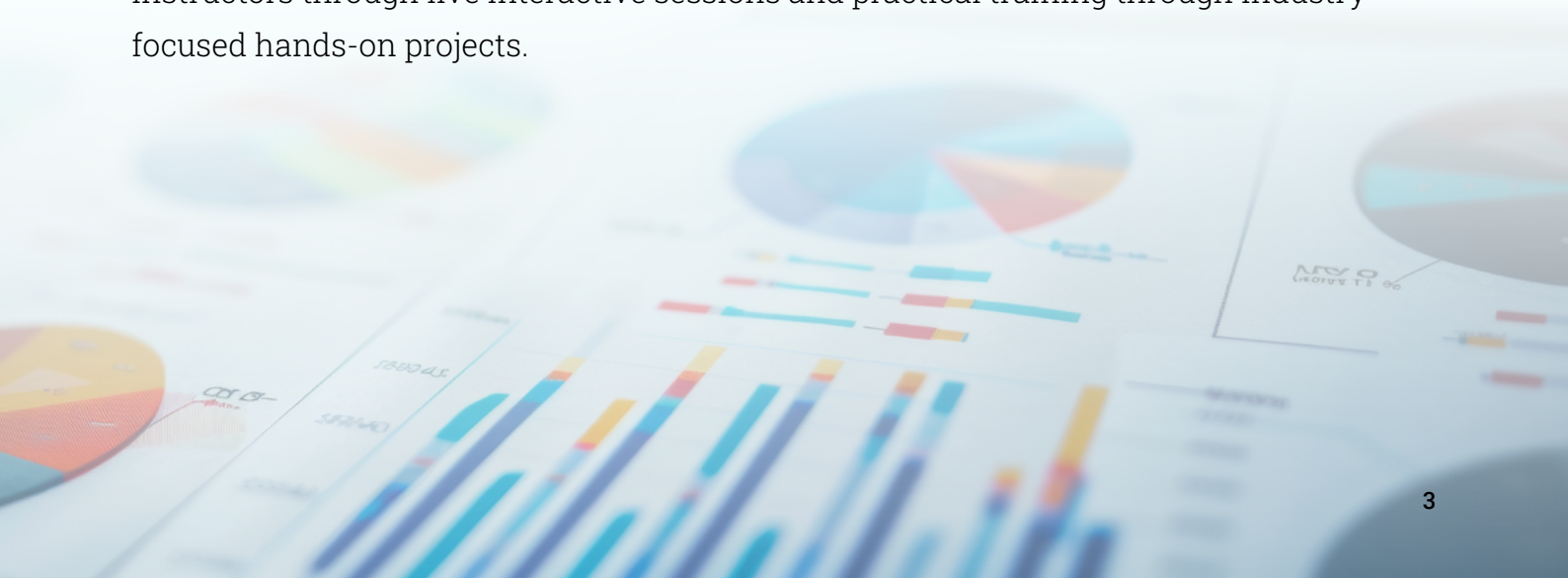**simplilearn**

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About the Program

The market growth of Data Analytics and Generative AI represents a transformative era in data-driven decision-making. The global big data and analytics market was valued at $225.3 billion in 2023 and is projected to reach $665.7 billion by 2033, growing at a CAGR of 11.6% from 2024 to 2033. Statistical data showcases its rapid adoption, especially in the finance, healthcare, and manufacturing sectors, as organizations leverage analytics for precision and insights.

Concurrently, Generative AI is emerging as a disruptive force, facilitating creative automation. Market dynamics indicate a significant uptick in adopting Generative AI solutions, driven by its ability to generate content, design, and innovate autonomously. Industries are recognizing its potential for efficiency and innovation.

This interplay of Data Analytics and Generative AI reflects a broader trend in the evolution of data-driven decision-making. As businesses navigate an era of unprecedented data abundance, integrating analytics and AI enhances operational efficiency and fuels innovation and strategic planning. The symbiotic relationship between these technologies positions organizations to extract maximum value from their data, steering them towards a future where insights are derived from data and actively generated and enhanced by intelligent systems.

This program aims to help learners master the in-demand skills needed for a successful career in data analytics with an added flavor of generative AI. It covers key tools and concepts like Excel, SQL, programming fundamentals, mathematical and statistical computing, data manipulation, exploratory data analysis, ETL, data visualization with Tableau, generative AI, prompt engineering and more. Learn from experienced instructors through live interactive sessions and practical training through industry-focused hands-on projects.

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Indian Institute of Technology Guwahati
An Initiative of Ministry of Electronics & Information Technology(MeitY)

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About E&ICT Academy, IIT Guwahati

As an initiative of the Ministry of Electronics & Information Technology (MeitY), the Electronics & ICT Academy was set up at the Indian Institute of Technology Guwahati (IIT Guwahati) under the scheme of "Financial Assistance for setting up Electronics and ICT Academies." On 26 March 2015, the project started at IIT Guwahati and the academy was inaugurated by Prime Minister Shri. Narendra Modi on 19 January 2016. The objective of the academy is to provide skill training to the Faculty Members (engineering & non-engineering) in the area of recent trends in engineering & ICT applications. The academy is designing specialized modules for imparting quality training for enhancing employability and capacity building in the field of Electronics & ICT. In the past 7 years, the academy has successfully conducted 400+ programs through conventional classroom teaching and virtual classroom mode in different institutes/universities of north eastern states in particular and a few in other states of India. To date, the academy has successfully trained 20,000+ participants. The academy has also signed an MoU with institutes/universities to host the programs and conduct hands-on sessions. The academy collaborated with industries as training/ industry partners. The academy also offers online advanced certification courses in data science, artificial intelligence & machine learning, big data, cloud computing, full stack development, UI/UX, and VLSI design, and trained 2,000+ graduates and working professionals. The academy has also trained 140+ Assam Police and Indian Navy officials on cybercrime concepts and data science.

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About Simplilearn

Simplilearn is the world's #1 online certificate program provider, enabling learners around the globe with rigorous and highly specialized training offered in partnership with world-renowned universities and leading corporations. We focus on emerging technologies and skills, such as data science, cloud computing, programming, and more, that are transforming the global economy. Our hands-on and immersive training includes live virtual classes, integrated labs and projects, 24x7 support, and a collaborative learning environment. Over two million professionals and 2000 corporate training organizations across 150 countries have harnessed our award-winning programs to achieve their career and business goals.

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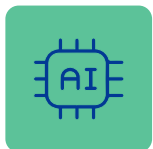MINISTRY OF
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Key Features of the Program

Certificate of program completion from the E&ICT Academy at IIT Guwahati

Curriculum delivered in live online classes by experienced industry veterans

Exposure to Generative AI and its diverse applications in the analytics domain

Academic masterclasses delivered by insightful IIT Guwahati faculty

Opportunity to earn an 'Executive Alumni Status' from E&ICT Academy, IIT Guwahati

Eligibility for a campus immersion program organized at IIT Guwahati

Exclusive hackathons and "Ask-Me-Anything" sessions by IBM

Certificates for IBM courses and industry masterclasses by IBM experts

Practical learning through 25+ hands-on projects and 3 capstone projects

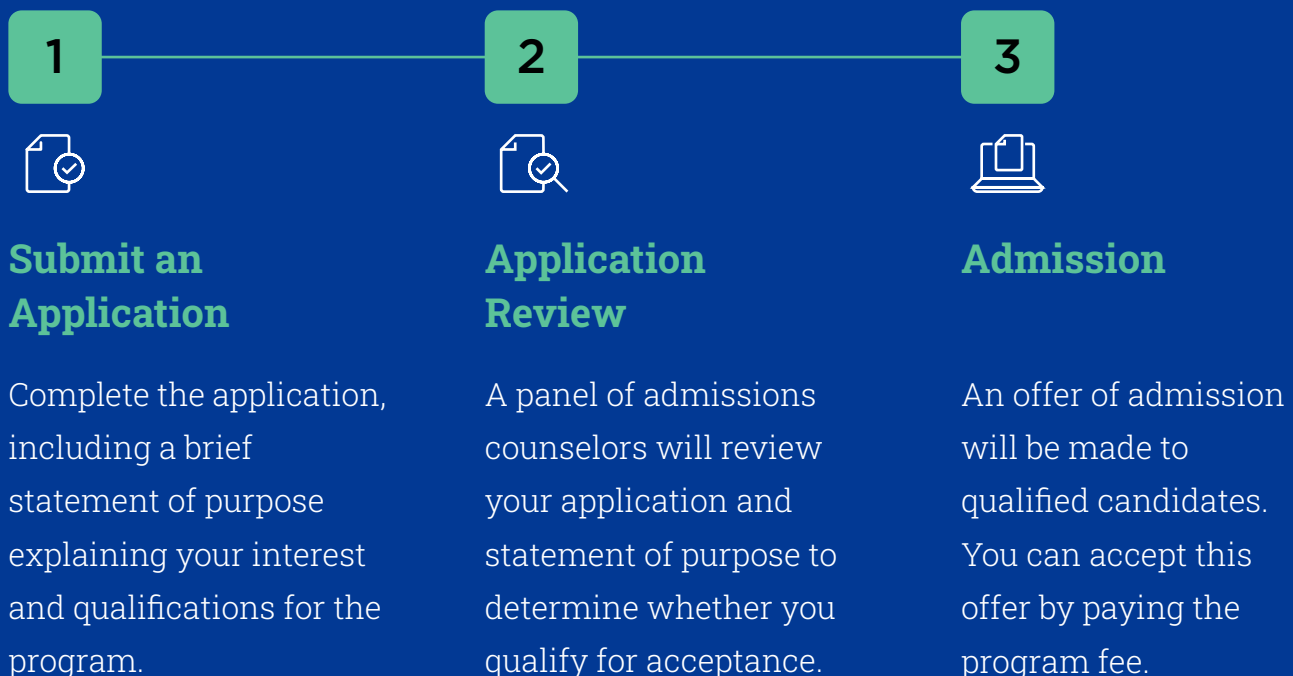Simplilearn's JobAssist helps you get noticed by top hiring companies

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Eligibility Criteria

For admission to this Data Analytics and Generative AI program, candidates:

- Should have a bachelor's degree with an average of 50% or higher marks

- Are encouraged to have prior work experience, but this is not a mandatory requirement

- Don't need prior coding experience or technology know-how

Application Process

The application process consists of three simple steps:

1	2	3
Submit an Application	**Application Review**	**Admission**
Complete the application, including a brief statement of purpose explaining your interest and qualifications for the program.	A panel of admissions counselors will review your application and statement of purpose to determine whether you qualify for acceptance.	An offer of admission will be made to qualified candidates. You can accept this offer by paying the program fee.

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Talk to an Admissions Counselor

Our team of dedicated admissions counselors is prepared to address your questions or concerns about this Data Analytics & Generative AI program.

Our team is available to:

- ✓ Answer your questions about the application process

- ✓ Discuss your financing options

- ✓ Provide insight into the curriculum, program outcomes and more.

Inquire Now

Contact Us | 1-800-212-7688

Industry Trends

$665.7 billion

Expected size of the big data and analytics market by 2030

Source: Allied Market Research

27.6%

Expected CAGR of the global data analytics market From 2023 To 2030

Source: Market Research

$4.4 trillion

Expected value added by Generative AI to the global economy annually.

Source: Mckinsey

$667.9 billion

Estimated Generative AI market size by 2030, growing at a CAGR Of 47.5%

Source: Fortune Business Insights

₹9,57,470

The average annual salary of a data analytics professional in India

Source: Glassdoor

Who is this Program Ideal for?

This program caters to working professionals from a variety of industries and backgrounds. Aspiring professionals of any educational background with an analytical bent of mind are most suited to pursue this Data Analytics & Generative AI program. We welcome professionals keen to develop expertise in data analytics, with the objective of:

- Enhancing effectiveness in their current role
- Advancing their career in the data analytics field
- Transitioning to data analytics roles in their organization
- Giving shape to entrepreneurial aspirations

Program Outcomes

- Gaining proficiency in Excel for data analysis and decision-making
- Understanding AI fundamentals and generative AI models
- Achieving mastery in SQL for database management and data querying
- Mastering prompt engineering and understanding ChatGPT mechanisms
- Implementing ETL processes for data extraction, transformation, and loading
- Exploring generative AI's applications in various data analytics scenarios.
- Leveraging Tableau to build interactive dashboards for effective data presentation
- Developing proficiency in Power BI for data storytelling and visualization
- Understanding basic Python concepts and syntax
- Understanding ethical considerations in data analytics and AI
- Applying Python libraries (Pandas, NumPy, Matplotlib) for data analytics

Learning Path Visualization

Core Topics

Business Analytics with Excel

Data Acquisition and Manipulation using SQL

Extract, Transform, Load (ETL)

Data Visualization using Tableau

Fundamentals of Python Programming

Data Analytics with Python

Data Analysis and Visualization with Python by IBM

Essentials of Generative AI, Prompt Engineering & ChatGPT

Applications of Generative AI in Data Analytics

Data Ethics

Capstone Project

Elective

- Mathematical Optimization for Business Problems by IBM
- Data Storytelling using Power BI
- Data Analytics with R Programming
- Academic Masterclass
- Industry Masterclass

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Core Courses:

Module 1

Business Analytics with Excel

Become proficient in business analytics with foundational statistics and techniques—an initial step in this Data Analytics and Generative AI program.

Learning Outcomes

- Comprehend the significance of business analytics in the industry

- Master Excel analytics functions and conditional formatting

- Analyze intricate data sets using pivot tables and slicers

- Apply statistical tools (e.g. moving averages, hypothesis testing, ANOVA, regression) in Excel

- Visualize insights using charts and dashboards

Topics covered

- Introduction to Business Analytics

- Conditional Formatting and Essential Functions

- Dashboard Creation

- Analysis with Pivot Tables

- Excel in Business Analytics

- Statistical Data Analysis

- Power BI

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Module 2

Data Acquisition and Manipulation using SQL

Acquire essential skills to begin working with SQL databases. Learn about fundamental SQL concepts, including statements, conditional queries, commands, joins, subqueries, and diverse functions crucial for effective SQL database management and scalability.

Learning Outcomes

- Understand database structures and relationships

- Utilize common query tools and execute SQL commands

- Master transactions, table creation, and views

- Execute and comprehend stored procedures

Topics covered

- Fundamental SQL Statements

- Database Restoration and Back-up

- Filtering with Selection Commands

- Ordering in Selection Commands

- Conditional Statement Implementation

- Utilizing Group By Commands

- Understanding Joins

- Execution of Subqueries

- Usage of Views and Index

- Implementing String Functions

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Module 3

Extract, Transform and Load (ETL)

Embark on a comprehensive exploration of ETL essentials crucial for robust data analysis. Learn about systematically extracting structured/unstructured data, rule formulation, and utilizing diverse ETL tools like Nifi and Talend. Develop repository data loading expertise, distinguish between batch and real-time ETL, apply real-time processing and optimize with parallel techniques, and efficiently manage ETL workflows for seamless data analysis.

Learning Outcomes

- Identify and access diverse data sources (databases, APIs, files, etc.), understanding source connections and configurations

- Extract structured/unstructured data employing incremental and full extraction techniques

- Perform data cleansing, validation, normalization, and aggregation to handle quality issues effectively

- Create transformation rules and mappings for varied data types, managing schema changes

- Load transformed data efficiently into target repositories, optimizing loading for performance

- Optimize ETL processes for enhanced speed and efficiency and learn parallel processing techniques

Topics covered

- ETL Fundamentals

- Data Source Identification

- Data Extraction

- Data Transformation

- Data Mapping and Conversion

- ETL Tools and Technologies

- Data Loading

- Batch and Real-time ETL

- Error Handling and Logging

- Performance Optimization

- Automation

- Monitoring and Maintenance

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Module 4

Data Visualization using Tableau

This Tableau course will give a comprehensive understanding of crafting impactful visualizations, efficient data organization, and designing informative charts and dashboards to empower better business decisions. Explore data visualization concepts and diverse chart creation, and master constructing interactive dashboards by working with filters, parameters, and sets. Learn how to use various visualization techniques like heat maps, treemaps, and Pareto charts.

Learning Outcomes

- Acquire expertise in visualization techniques, including heat maps, treemaps, waterfalls, and Pareto charts

- Manipulate data effectively using filters, parameters, and sets

- Master specific field types, Tableau-generated fields, and creating and utilizing parameters

- Learn how to create various charts, interactive dashboards, captivating story interfaces, and effective data-sharing methods

- Gain proficiency in data blending, creating extracts, and organizing/formatting data effectively

Topics covered

- Data Visualization

- Tableau Workspace and Chart Types

- Chart Creation and Data Preparation

- Introduction to Tableau

- Preparation Techniques

- Filters and Analytics in Tableau

- Tableau Dashboards

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Module 5

Fundamentals of Python Programming

This course focuses on building fundamental Python skills crucial for your progression in this program.

Learning Outcomes

- Attain proficiency in procedural and object-oriented programming

- Understand Python's benefits and practical applications

- Set up Python and Jupyter Notebook and grasp their utility

- Implement Python basics, including identifiers, indentations, and comments

- Master Python data types, operators, and string functions

- Explore Python loop types and variable scope within functions

Topics covered

- Programming Fundamentals

- Introduction to Python

- Python Data Types and Operators

- Conditional Statements and Loops in Python

- Python Functions

- Object-Oriented Programming in Python

- Threading in Python

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Module 6

Data Analytics with Python

Embark on a comprehensive data journey with our course covering Data Acquisition using APIs, Database Management with SQL and Python, Statistics Fundamentals, Probability Distributions, Advanced Statistics, Statistical Analysis with Python, Hypothesis Testing, Correlation, Regression Analysis, Time Series Analysis, and ANOVA/Chi-Square Tests. Gain practical skills for insightful data analysis in just one course!

Learning Outcomes

- Develop proficiency in retrieving and managing data through Application Programming Interfaces (APIs) for analytical purposes

- Utilize SQL and Python for robust database management, ensuring seamless data handling and analysis

- Apply various probability distributions as analytical tools for insightful data exploration and interpretation

- Employing sophisticated statistical methodologies for in-depth data analysis and interpretation

- Choose and utilize correlation and regression analysis techniques effectively

- Analyze and interpret time-based data patterns and trends

- Conduct ANOVA and Chi-Square tests for varied data sets and derive meaningful insights

Topics covered

- Data Acquisition with APIs

- Database Management with SQL and Python

- Statistics Fundamentals

- Probability Distributions

- Advanced Statistics

- Statistical Analysis with Python

- Hypothesis Testing

- Correlation and Regression Analysis

- Time Series Analysis

- ANOVA and Chi-Square Tests

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Module 7

Data Analysis and Visualization with Python by IBM

Elevate your data analytics beyond spreadsheets. Utilize Python for statistical analyses and impactful data visualizations. This course guides you from Python basics to diverse data exploration, teaching data preparation, statistical analysis, meaningful visualizations, and efficient prediction of future trends.

Learning Outcomes

- Master data analysis using Python

- Acquire skills in importing, cleaning, and preparing datasets

- Summarize data and construct machine learning models with scikit-learn

- Develop proficiency in building data pipelines

- Explore Python's data visualization libraries, including Matplotlib, Seaborn, and Folium

Topics covered

- Data Analysis with Python

- Data Visualization with Python

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Module 8

Essentials of Generative AI, Prompt Engineering & ChatGPT

This course offers an in-depth exploration of generative AI models, particularly focusing on ChatGPT. Participants will acquire comprehensive knowledge of foundational generative AI principles, including prompt engineering, explainable AI, conversational AI, ChatGPT, and other extensive language models.

Learning Outcomes

- Build a solid understanding of diverse generative AI models, encompassing their core principles and variations

- Apply effective prompt engineering techniques to enhance performance and manage generative AI model behavior

- Explore various applications and contexts where ChatGPT can be utilized effectively

- Acquire familiarity with fine-tuning methods to personalize and refine ChatGPT models

- Gain insights into the transformative potential of generative AI across industries while evaluating leading generative AI tools

Topics covered

- Evolution of AI to Generative AI

- Large Language Models

- Popular Generative AI Tools

- Fundamentals of Prompt Engineering

- Designing and Creating Effective Prompts

- ChatGPT Models

- Fine-tuning Strategies for ChatGPT

- Business Applications of GenAI

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Module 9

Applications of Generative AI in Data Analytics

Uncover generative AI's crucial role in data analytics by understanding how it generates synthetic data, enhances visualizations, and discovers hidden insights. Leverage its potential for ETL optimization, accurate forecasting, and addressing integration challenges. Explore future trends and ethical considerations, gaining a holistic view of generative AI's impact. The curriculum spans data augmentation, visualization, and forecasting, offering an understanding of how GenAI intersects with data analytics.

Learning Outcomes

- Understand the fundamental concepts and importance of generative AI within modern data analytics

- Employ generative AI techniques to address data scarcity and generate synthetic data for testing models, privacy-preserving analysis, and data augmentation

- Utilize generative AI tools to create tailored, interactive, and accessible data visualizations

- Apply generative AI to discover hidden patterns, identify anomalies, and extract insights from data exploration

- Optimize ETL processes and data pipelines by leveraging AI for automated data cleaning, intelligent transformation, and real-time analysis

Topics Covered

- Overview of Generative AI in Data Analytics

- Data Augmentation using Generative AI

- Generative AI for Tailored Data Visualization

- Generative AI in Data Exploration

- AI-Optimized ETL Processes

- Generative AI in Data Modeling and Forecasting

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Module 10

Data Ethics

This course provides a comprehensive understanding of the ethical considerations and responsibilities in the realm of data analytics. Participants will delve into the multifaceted landscape of data ethics, exploring its relevance, legal frameworks, privacy concerns, security protocols, biases, decision-making frameworks, visualization practices, and the societal impacts of data analytics.

Learning Outcomes

- Recognize the relevance and significance of data ethics in the field of data analytics

- Familiarize yourself with data protection laws and regulations like GDPR and CCPA

- Recognize the significance of maintaining data security and integrity

- Learn techniques for safeguarding data from unauthorized access and breaches

- Understand the concepts of bias and fairness in the context of data analytics

- Implement ethical practices in data visualization and communication

- Investigate ethical challenges during the development and deployment of ML and AI models

Topics Covered

- Introduction to Data Ethics

- Legal and Regulatory Frameworks

- Data Privacy and Consent

- Data Handling and Security

- Transparency and Accountability

- Bias and Fairness in Data Analysis

- Ethical Decision-Making

- Data Visualization and Communication

- Ethics in Machine Learning and AI

- Social and Ethical Impacts

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Module 11

Capstone Project

The capstone project culminates your immersive learning journey, delving into business analytics, data manipulation, visualization, and programming. Apply your newly aquired skills in Excel, Python, SQL, Tableau, and more to a real-world project by solving data-related challenges. Showcase your proficiency in ETL processes, visualization techniques, and ethical considerations. Choose between elective courses to further enrich your project, exploring generative AI, Power BI storytelling, R programming, or diving deeper into data ethics. This comprehensive project allows you to showcase expertise, creativity, and strategic thinking in solving complex data analytics problems.

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Electives:

1 Mathematical Optimization for Business Problems by IBM

Build optimization models to solve business problems. Learn different aspects of mathematical programming to construct optimization models using IBM Decision Optimization technology.

Key Learning Objectives

- Acquire skills in modeling and solving optimization problems

- Grasp the fundamentals of optimization models, encompassing data, decision variables, objective functions, and constraints

- Comprehend various solution types and the mathematical programming techniques employed for optimization

Topics Covered

- The Big Picture

- Linear Programming

- Network Models

- Beyond simple LP

- Modeling Practice

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2 Data Storytelling using Power BI

Opt for this elective course to master insightful data analysis and interactive dashboard creation. Learn how to harness Power BI's potential to address business challenges and streamline operations. The course delves into crafting dashboards from published reports, extracting valuable insights via Quick Insights, and practical methodologies across Power BI functions, spanning data collection to analysis. Additionally, it offers troubleshooting strategies for various Power BI issues.

Learning Outcomes

- Craft dynamic dashboards from reports, boosting data visualization and interactivity

- Generate visuals and dashboards using Quick Insights to extract key insights from data

- Utilize natural language in Q&A for actionable visual generation

- Create and manage data alerts for timely data updates

- Optimize chart selection based on contextual questions or narratives

- Incorporate shapes for emphasis and narrative enhancement in reports

- Integrate custom visuals tailored to specific requirements

- Explore different methods to share reports and dashboards efficiently

Topics Covered

- Efficient Data Retrieval and Preparation Techniques

- Proficient Data Management

- Interactive Report and Dashboard Creation

- Efficiency-enhancing Power BI Tips and Tricks

3 Data Analytics with R Programming

R is a robust data science and analytics language, boasting a vibrant community despite its steep learning curve. Its increasing popularity makes it the preferred choice for organizations seeking analytical prowess for competitive advantages.

Learning Outcomes

- Establish a foundational understanding of business and data analytics

- Set up R, RStudio, and R Workspace and explore various R packages

- Gain proficiency in R programming and executing diverse statements in R

- Comprehend R data structures and data import/export functions

- Implement Apply and DPLYR functions

- Leverage R graphics for effective data visualization

- Understand essential statistical concepts

- Perform hypothesis testing to enable informed business decision-making

- Use linear and non-linear regression models, along with classification techniques

- Master clustering methods like K-means, DBSCAN, and hierarchical clustering

Topics Covered

- Introduction to Business Analytics

- Introduction to R Programming

- Data Structures

- Data Visualization

- Statistics for Data Science I

- Statistics for Data Science II

- Regression Analysis

- Classification

- Clustering

- Association

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4   Academic Masterclass

Attend online interactive masterclasses delivered by IIT Guwahati faculty. Gain insights about technological advancements and techniques in the rapidly evolving field of Data Analytics and Generative AI.
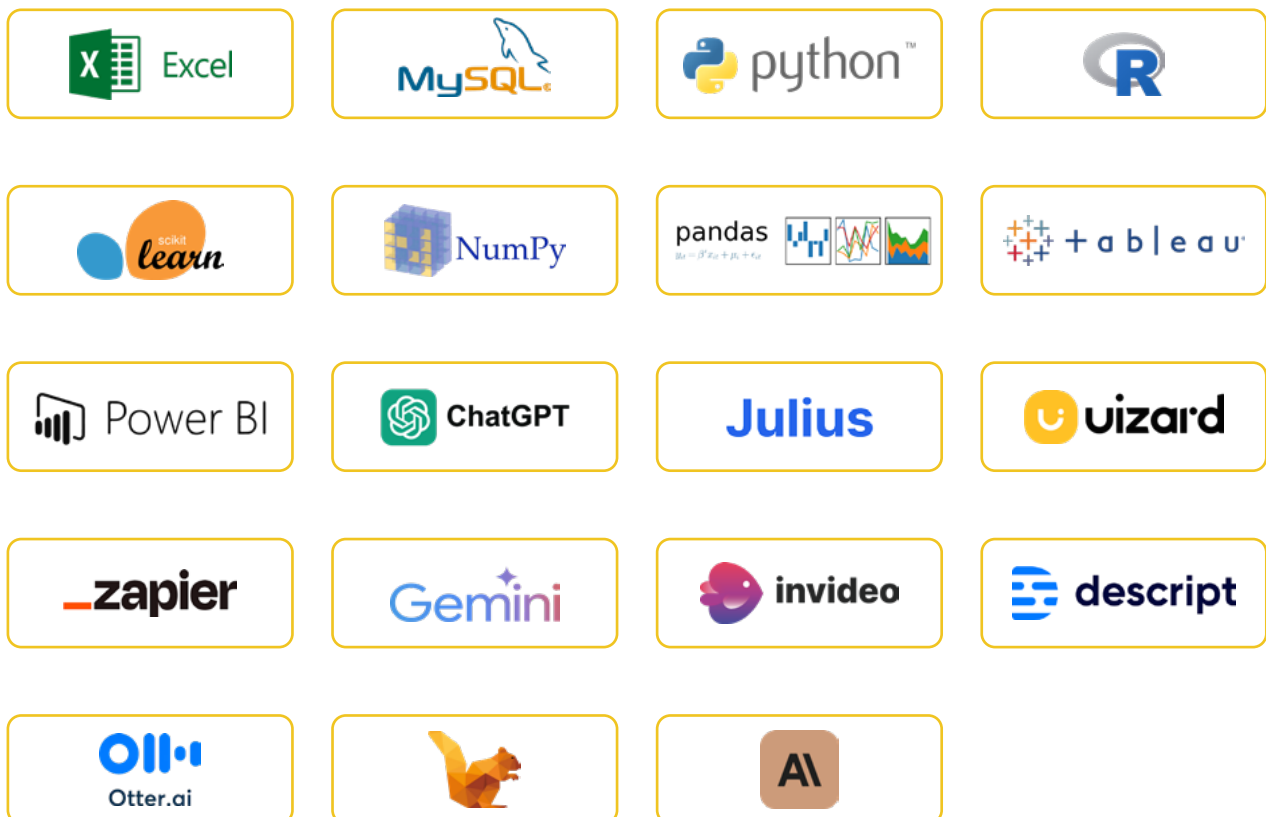
4   Industry Masterclass

Attend online interactive masterclasses delivered by industry leaders from IBM. These masterclasses will equip you with the skills to give your organization a competitive advantage in any industry by using data to make decisions, extract business insights, and predict future trends.

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Skills Covered

- Generative AI
- Prompt Engineering
- Data Analytics using Python
- Data Analytics using R
- Data Visualization with Tableau
- Data Storytelling with Power BI
- Extract, Transform and Load

- Statistical Analysis using Excel
- SQL
- Building Data Pipelines
- Regression Analysis
- Time Series Analysis
- Supervised Learning
- Unsupervised Learning

Tools Covered

Excel | MySQL | python | R

scikit learn | NumPy | pandas | tableau

Power BI | ChatGPT | Julius | uizard

zapier | Gemini | invideo | descript

Otter.ai

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Projects

Create a Virtual Assistant with Generative AI

Develop a conversational chatbot that can engage in meaningful dialogues, answer questions, provide recommendations, and assist with tasks based on the documents fed as input.

Employee Performance Mapping

Utilize an SQL database to map employee performance and construct reports for their appraisals

Air Cargo Analysis with SQL

Leverage SQL to generate reports using historical airline data, aiming to enhance services and improve customer experience.

Crime Analysis with Tableau Dashboard

Prepare a dashboard to keep the police department and the city updated on the statistics of crime events. You are required to create a dashboard and a visual story using Tableau.

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Creation of an Interactive Sales Dashboard

Create an interactive Sales Dashboard for an apparel OEM in Tableau for the Sales department to use for ad-hoc analysis and reporting

Develop E-commerce Application with Python

Develop an e-commerce app on the Python platform that could categorize, add or remove items from the cart and support different payment options

Build an online car rental platform

Create an Online car rental platform integrating scheduling and billing features, leveraging Object-Oriented Programming techniques.

Flight delay analysis and visualization

Analyze and visualize flight delays and their relationship with weather using histograms, scatter plots, box plots, and pie charts to improve airport performance

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Data Manipulation and Reporting with Power BI

Create an interactive Power BI report for Zomato to analyze restaurant data globally, drill down by location, service, rating, cost, and cuisines.

Sales Analysis using Python

Analyze sales data to identify top revenue states and create sales programs for underperforming areas. Clean, analyze, and visualize data using Jupyter for data-driven decisions.

## Sales Dashboard on various product categories

Create a sales dashboard to analyze trends by product category. Users can select a category to view detailed trends and product-wise sales data, enhancing data-driven insights.

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Certificates

E&ICT Academy, IIT Guwahati, has chosen to collaborate with Simplilearn for online professional programs. Simplilearn's award-winning immersive learning model, delivered via live virtual classes, focuses on applied learning methods to create an immediate career impact.

Upon completing the Professional Certificate Program in Data Analytics and Generative AI, you will receive a program completion certificate from the E&ICT Academy at IIT Guwahati.
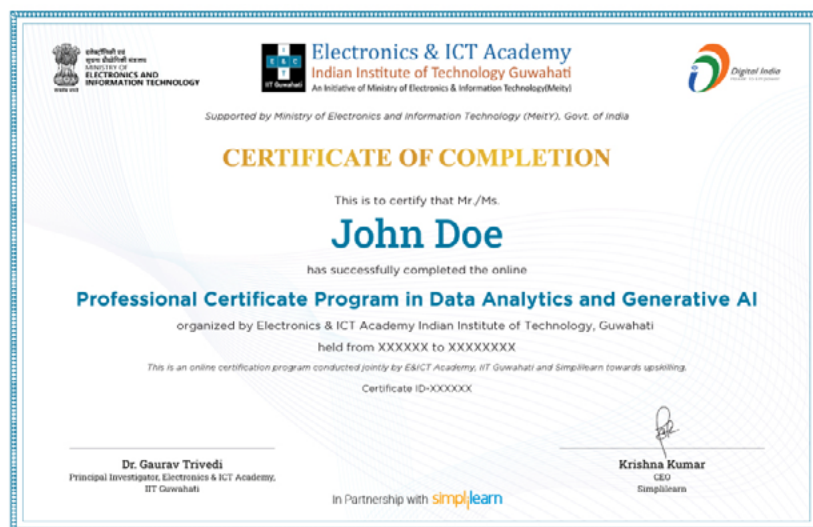
You also have a chance to earn IBM certificates for the IBM courses you complete (like the example shown above). Not only that, you will also receive certificates from Simplilearn for the individual courses completed in the learning path. These certificates will testify to your skills as an expert in the field of data analytics.

Electronics & ICT Academy
Indian Institute of Technology Guwahati
An Initiative of Ministry of Electronics & Information Technology(Meity)

MINISTRY OF
ELECTRONICS AND
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Dr. Gaurav Trivedi is an Associate Professor of Electronics and Electrical Engineering at IIT Guwahati. He is also a Principal Investigator at the E&ICT Academy. With an M.Tech. in Microelectronics and a Ph.D. in Electrical Engineering from IIT Bombay, his research spans circuit simulation, VLSI CAD, electronics system design, computer architecture, semiconductor devices, hardware security, embedded systems, IoT, high-performance computing, large-scale optimization, and machine learning.

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