



# Data Scientist

## — Master's Program —



Understand Generative AI  
and its potential



Leverage the IBM Advantage with  
masterclasses, ask-me-anything  
sessions and hackathons by IBM

**Exposure to prominent tools:**



ChatGPT



Midjourney

and more

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## About the Course

In partnership with IBM, the Data Scientist Master's Program propels your data science career, providing world-class training and essential skills. Offering comprehensive instruction in sought-after data science and machine learning skills, the program ensures hands-on experience with vital tools like Python, SQL, Excel, machine learning, Tableau, Generative AI, prompt engineering, ChatGPT, and more. Achieve expertise in data science through a deep exploration of data interpretation nuances, mastery of machine learning, and the acquisition of powerful programming skills, elevating your career to new heights.

# Key Features of the Program



Data Scientist Program completion certificate.



Industry masterclasses delivered by experts from IBM.



Core curriculum delivered in live online classes by industry experts.



Earn IBM certificates for IBM courses.



Live interactive sessions on the latest AI trends, such as ChatGPT, Generative AI, prompt engineering, and more.



Exclusive hackathons and “ask-me-anything” sessions by IBM.



3 Capstones and 25+ hands-on projects from various industry domains.



Simplilearn’s career services help you get noticed by top hiring companies.



Gain exposure to Python, Tableau, SQL, ChatGPT, OpenAI, Dall-E and other prominent tools.

# About IBM and Simplilearn Collaboration

IBM is a leading cognitive solution and cloud platform company offering a plethora of technology and consulting services. Each year, IBM invests approximately \$6 billion in research and development and has achieved five Nobel Laureates, nine US National Medals of Technology and Innovation, five US National Medals of Science, six Turing Awards, and 10 inductees in the US Inventors Hall of Fame.

A partnership between IBM and Simplilearn introduces students to the best-in-class applied learning experience, making them experts in data and AI. In collaboration with IBM, this program delivers a top-notch, industry-relevant curriculum and prepares students for any job role in the data science domain.

## About Simplilearn

Simplilearn is the world's #1 online bootcamp 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 transforming the global economy, such as artificial intelligence, data science, cloud computing, programming, and more. 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.

# Eligibility Criteria

For admission to this program, candidates should have:

- ✓ A bachelor's degree with an average score of at least 50 percent
- ✓ Prior knowledge or experience in programming and mathematics
- ✓ 2+ years of formal work experience (preferred)

## Who is this Program Ideal for?

This program caters to working professionals from a variety of industries and backgrounds. The diversity of our students adds richness to class discussions and interactions. A role in data science requires an amalgam of experience, data science knowledge, and the use of the correct tools and technologies. It is a solid career choice for professionals seeking to transition into the data science field. Aspiring professionals of any educational background with an analytical bent of mind are most suited to pursue this Post Graduate Program in Data Science.

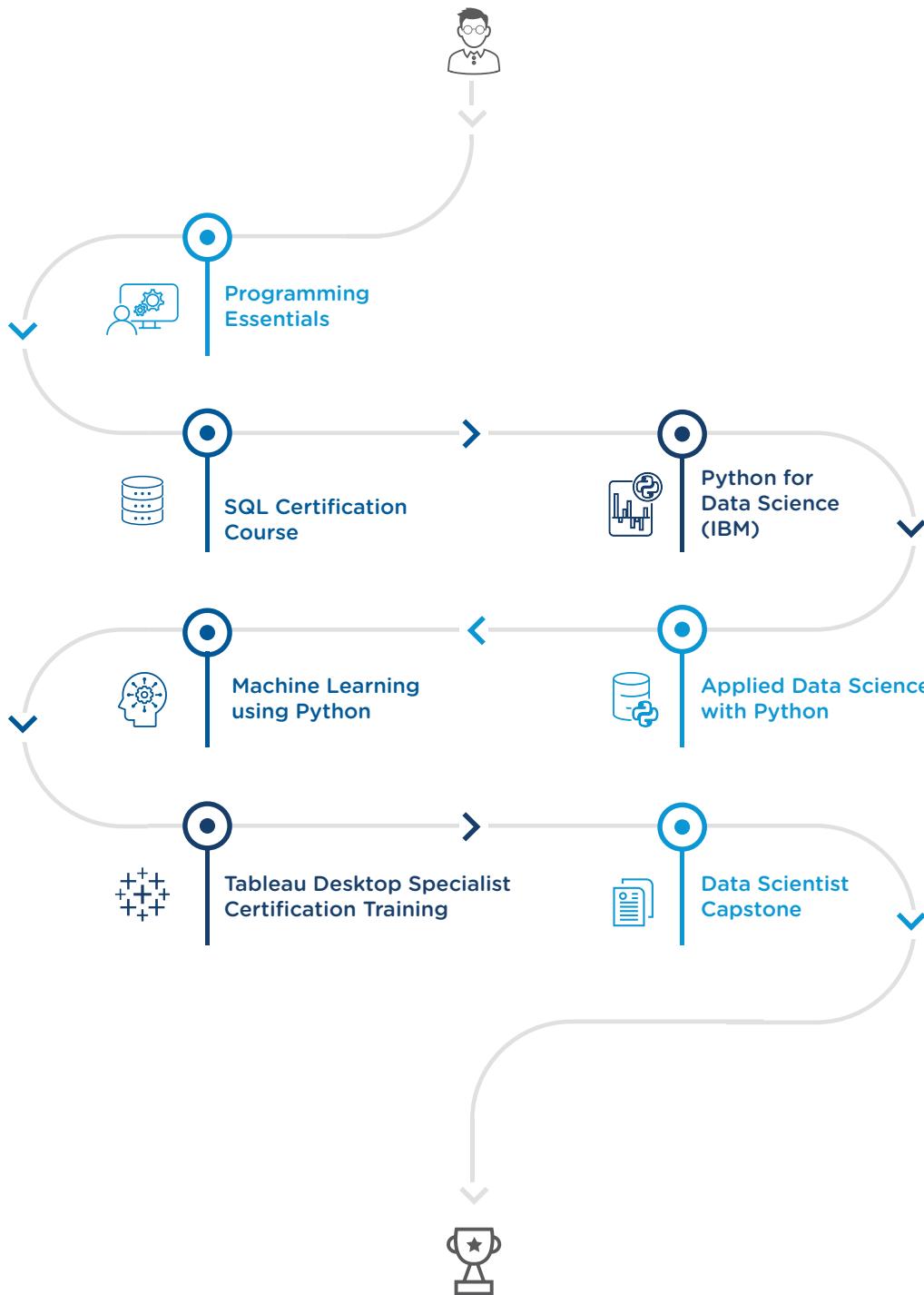
### **Professionals keen to develop expertise in data science, with the objective of:**

- ✓ Enhancing effectiveness in their current role
- ✓ Transitioning to data science roles in their organization
- ✓ Seeking to advance their career in the industry
- ✓ Giving shape to entrepreneurial aspirations

# Program Outcomes

- ✓ Understand Generative AI, its landscape, and practical applications
- ✓ Learn about prompt engineering, explainable AI, conversational AI, large language models, ChatGPT, and much more
- ✓ Perform scientific and technical computing using the SciPy package and its sub-packages such as Integrate, Optimize, Statistics, IO, and Weave
- ✓ Grasp fundamentals of Excel analytics functions and conditional formatting
- ✓ Understand the tools and techniques used in business analysis planning and monitoring
- ✓ Understand and use linear and non-linear regression models and classification techniques for data analysis
- ✓ Learn to visualize data using Tableau and Power BI and become proficient in building interactive dashboards
- ✓ Gain an in-depth understanding of data structure and data manipulation
- ✓ Apply effective prompt engineering techniques to improve the performance and control the behavior of generative AI models
- ✓ Obtain a comprehensive knowledge of supervised and unsupervised learning models such as linear regression, logistic regression, clustering, dimensionality reduction, K-NN, and pipelines
- ✓ Master the concepts of recommendation engines and time series modeling
- ✓ Gain practical mastery over principles, algorithms, and applications of machine learning
- ✓ Gain expertise in mathematical computing using the NumPy and scikit-learn package

# Learning Path



## Electives

- ✓ Business Analytics with Excel
- ✓ PL-300 Microsoft Power BI Certification Training
- ✓ Essentials of Generative AI, Prompt Engineering & ChatGPT
- ✓ R Programming for Data Science (IBM)
- ✓ Data Scientist Industry Masterclass

STEP

1

2

3

4

5

6

7

# Programming Essentials

In this course, you will develop essential Python skills that are a crucial foundation for your progress throughout the program.

## Learning Outcomes:

- ✓ Acquire proficiency in both procedural and object-oriented programming
- ✓ Recognize the advantages and benefits of using Python as a programming language
- ✓ Install Python and its integrated development environment
- ✓ Become familiar with Jupyter Notebook and its practical applications
- ✓ Implement Python identifiers, indentations, and comments effectively
- ✓ Understand Python's data types, operators, and string functions
- ✓ Learn about the various types of loops in Python
- ✓ Explore the concept of variable scope within functions
- ✓ Explain the principles and characteristics of object-oriented programming
- ✓ Describe methods, attributes, and access modifiers in Python
- ✓ Gain a solid understanding of multi-threading

## Topics covered:

- ✓ Fundamentals of Programming
- ✓ Introduction to Python Programming
- ✓ Python Data Types and Operators
- ✓ Conditional Statements and Loops in Python
- ✓ Python Functions
- ✓ Object-Oriented Programming Concepts with Python
- ✓ Threading

## SQL Certification Course

Pending

Enroll in this course to acquire essential knowledge for effectively working with SQL databases and leveraging them in your applications. Throughout the course, you will gain a solid understanding of SQL statements, conditional statements, commands, joins, subqueries, and various functions, empowering you to manage your SQL database for scalable growth.

### Learning Outcomes:

- ✓ Develop a comprehensive understanding of databases and their relationships
- ✓ Learn how to use common query tools and work with SQL commands
- ✓ Master transactions, table creation, and views for efficient database management
- ✓ Comprehend and execute stored procedures to perform complex operations
- ✓ Acquire expertise in various SQL lessons, including filtering, ordering, aliasing, aggregate commands, grouping, conditional statements, joins, subqueries, views, and indexing
- ✓ Explore different SQL functions such as string, mathematical, date and time, and pattern-matching functions
- ✓ Understand user access control functions to ensure database security

### Topics covered:

- ✓ SQL Statements
- ✓ Restore and Back-up
- ✓ Selection Commands - Filtering & Ordering
- ✓ Aggregate Commands
- ✓ Group By Commands
- ✓ Conditional Statements
- ✓ Joins
- ✓ String Functions
- ✓ Mathematical Functions
- ✓ Date and Time Functions
- ✓ Pattern (String) Matching
- ✓ User Access Control Functions

## Python for Data Science (IBM)

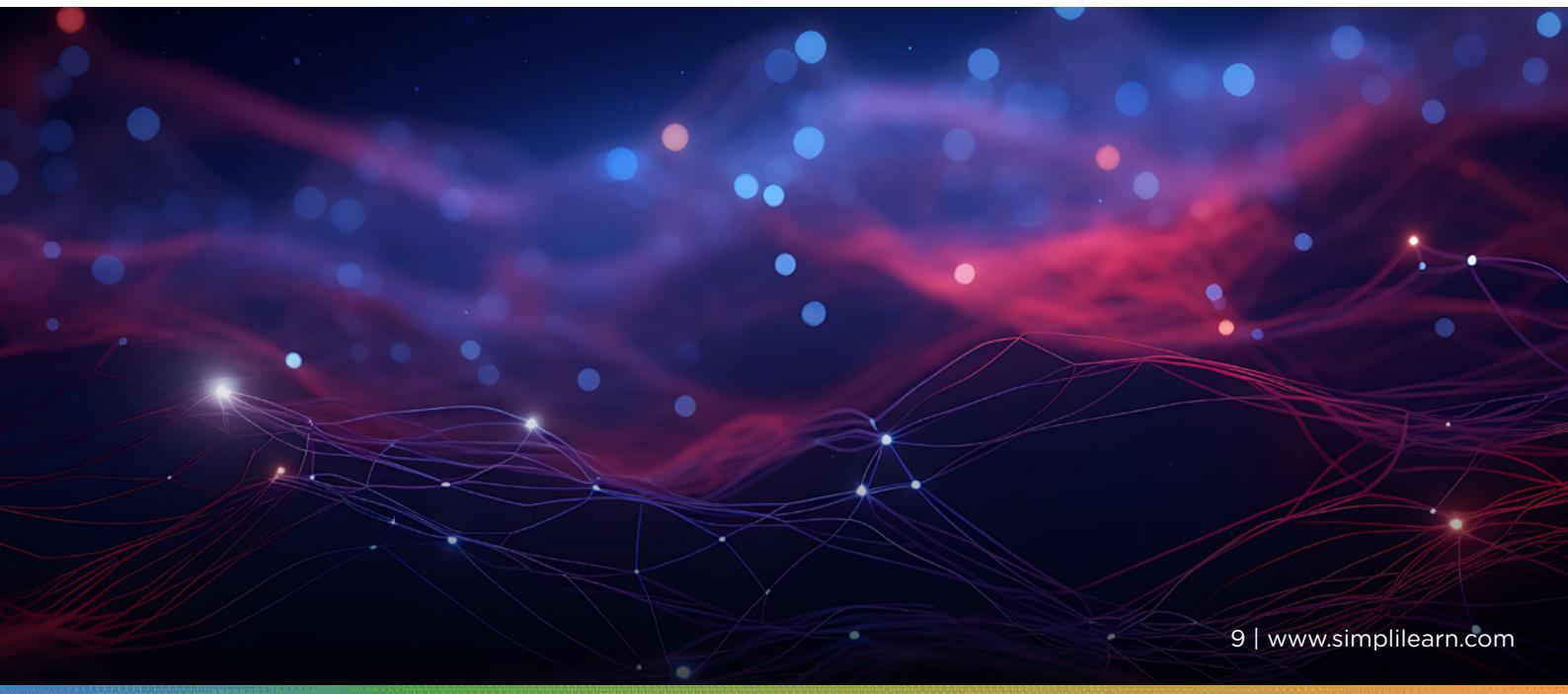
The course provides the necessary skills to leverage Python for data science. By the course's conclusion, participants will be proficient in writing Python scripts and performing hands-on data analysis using a Jupyter-based lab environment.

### Learning Outcomes:

- ✓ Create your first Python program using variables, strings, functions, loops, and conditions
- ✓ Understand and apply concepts related to lists, sets, dictionaries, conditions, branching, objects, and classes in Python
- ✓ Utilize the pandas library to load, manipulate, and save data, and read and write files in Python

### Topics covered:

- ✓ Python Basics
- ✓ Python Data Structures
- ✓ Python Programming Fundamentals
- ✓ Working with Data in Python
- ✓ Working with NumPy Arrays



## Applied Data Science with Python

This course comprehensively explores data science essentials, covering data preparation, model building, and evaluation. Participants will delve into fundamental Python concepts, including strings, Lambda functions, and lists. Additionally, they will gain proficiency in essential topics such as NumPy, linear algebra, and statistical concepts, which include measures of central tendency and dispersion, skewness, covariance, and correlation. The course also encompasses hypothesis testing techniques such as Z-test, T-test, ANOVA, and data manipulation using pandas. Participants will use popular libraries like Matplotlib, Seaborn, Plotly, and Bokeh to enhance their data visualization skills.

### Learning Outcomes:

- ✓ Explain the fundamentals of data science and its practical applications
- ✓ Explore the processes of data preparation, model building, and evaluation
- ✓ Apply Python concepts related to strings, Lambda functions, and lists comprehensively
- ✓ Develop a strong understanding of NumPy and its applications, including array indexing and slicing techniques
- ✓ Apply principles of linear algebra in data analysis, including its application in calculus
- ✓ Calculate measures of central tendency and dispersion in data
- ✓ Gain a clear understanding of statistical concepts like skewness, covariance, and correlation
- ✓ Describe the null hypothesis and alternative hypothesis in hypothesis testing
- ✓ Examine different hypothesis tests, including Z-test, T-test, and ANOVA
- ✓ Understand the concept of ANOVA for statistical analysis
- ✓ Work with pandas' two primary data structures: Series and DataFrame.
- ✓ Utilize pandas for data loading, indexing, reindexing, and data merging
- ✓ Prepare, format, normalize, and standardize data using data binning techniques
- ✓ Create effective visualizations using Matplotlib, Seaborn, Plotly, and Bokeh

## Topics covered:

- ✓ Introduction to Data Science
- ✓ Essentials of Python Programming
- ✓ NumPy
- ✓ Linear Algebra
- ✓ Statistics Fundamentals
- ✓ Probability Distributions
- ✓ Advanced Statistics
- ✓ Working with pandas
- ✓ Data Analysis
- ✓ Data Wrangling
- ✓ Data Visualization
- ✓ End-to-End Statistics Applications in Python



## Machine Learning using Python

This course comprehensively explores diverse machine learning types and their practical applications. Participants will gain insights into the machine learning pipeline, delving into supervised learning, regression models, and classification algorithms. Additionally, the course covers unsupervised learning, clustering techniques, and ensemble modeling. Participants will also evaluate well-known machine learning frameworks like TensorFlow and Keras and get hands-on experience building a recommendation engine using PyTorch.

### Learning Outcomes:

- ✓ Examine various types of machine learning and understand their unique characteristics
- ✓ Analyze the machine learning pipeline and gain a comprehensive understanding of key operations involved in machine learning operations (MLOps)
- ✓ Explore supervised learning and its wide range of applications
- ✓ Understand the concepts of overfitting and underfitting and learn techniques to detect and prevent them
- ✓ Analyze different regression models and identify their suitability for specific scenarios
- ✓ Identify linearity between variables and create correlation maps
- ✓ List various types of classification algorithms and comprehend their specific applications
- ✓ Master various types of unsupervised learning methods and determine their appropriate use
- ✓ Gain a deep understanding of different clustering techniques within unsupervised learning
- ✓ Examine different ensemble modeling techniques, such as bagging, boosting, and stacking
- ✓ Evaluate and compare different machine learning frameworks, including TensorFlow and Keras
- ✓ Build a recommendation engine using PyTorch

## Topics covered:

- ✓ Machine Learning
- ✓ Supervised Learning
- ✓ Regression and its Applications
- ✓ Classification and its Applications
- ✓ Unsupervised Learning
- ✓ Ensemble Learning
- ✓ Recommendation Systems

## Tableau Desktop Specialist Certification Training

This Tableau course gives participants a comprehensive understanding of creating captivating visualizations, optimizing data organization, and designing informative charts and dashboards to facilitate informed business decisions. Throughout the program, you will delve into data visualization concepts, gain proficiency in crafting diverse combo charts and stories, and learn to work with filters, parameters, and sets. Additionally, you will master the art of constructing interactive dashboards.

### Learning Outcomes:

- ✓ Acquire expertise in various visualization techniques, such as heat maps, treemaps, waterfall charts, and Pareto charts
- ✓ Understand the importance of metadata and its application in Tableau
- ✓ Skillfully work with filters, parameters, and sets to manipulate data effectively
- ✓ Become proficient in utilizing special field types and Tableau-generated fields and creating and employing parameters
- ✓ Learn how to construct different charts, interactive dashboards, and captivating story interfaces and how to share insights effectively
- ✓ Gain proficiency in data blending, creating data extracts, and efficiently organizing and formatting data
- ✓ Master various calculations, including arithmetic, logical, table, and level of detail (LOD)

### Topics covered:

- ✓ Introduction to Data Visualization
- ✓ Overview of Tableau
- ✓ Tableau Workspace and Different Chart Types
- ✓ Creating Charts and Data Preparation Techniques
- ✓ Effective Data Preparation Techniques
- ✓ Working with Filters and Analytics in Tableau
- ✓ Building Dashboards in Tableau

## Data Scientist Capstone Pending

The data science capstone project provides a valuable opportunity to apply the skills you have acquired during this program. With the guidance of dedicated mentors, you will address a real-world data science problem aligned with industry standards. This comprehensive project covers data processing, model building, and reporting business results and insights. It is the final step in your learning journey and enables you to demonstrate your data science expertise to potential employers.

### Key learning objectives:

- ✓ Data Processing: Utilizing various techniques to transform raw data into meaningful insights
- ✓ Model Building: Employing techniques such as regression and decision trees to create accurate and intelligent machine learning models capable of making predictions
- ✓ Python or SAS: Developing your model and conducting a complete model-building exercise, including data splitting, testing, and validating data using the k-fold cross-validation process
- ✓ Model Fine-tuning: Applying various techniques to enhance the model's accuracy and selecting the best-performing champion model
- ✓ Dashboarding and Result Presentation: Using Tableau to create a dashboard with meaningful insights to present your final results

This project will allow you to showcase your practical data science skills and reinforce your understanding of the entire data science process. As a result, you will be well-prepared to impress potential employers with your expertise.

# Electives

## Business Analytics with Excel

Enroll in this course to gain practical, data-driven decision-making skills by mastering data analysis and statistics. Leveraging Excel, you will acquire the expertise to perform sophisticated data analytics, empowering you to make informed business decisions confidently.

### Learning Outcomes:

- ✓ Understand the importance of business analytics and its role in various industries
- ✓ Grasp the fundamentals of Excel analytics functions and conditional formatting
- ✓ Learn how to analyze complex data sets efficiently using pivot tables and slicers
- ✓ Solve stochastic and deterministic analytical problems using Excel's powerful tools, including Scenario Manager, Solver, and Goal Seek
- ✓ Apply statistical tools and concepts like moving averages, hypothesis testing, ANOVA, and regression to data sets using Excel
- ✓ Effectively represent your findings using charts and dashboards
- ✓ Get introduced to the latest Microsoft analytics tools and technologies

### Topics covered:

- ✓ Introduction to CBAP certification
- ✓ Introduction to Business Analytics
- ✓ Formatting and Conditional Formatting in Excel
- ✓ Important Functions in Excel
- ✓ Analyzing Data with Pivot Tables
- ✓ Dashboarding
- ✓ Business Analytics with Excel
- ✓ Data Analysis Using Statistics

By completing this course, you will gain valuable data analysis and statistical skills using Excel, preparing you to make data-driven decisions that can significantly impact your professional endeavors.

## PL-300 Microsoft Power BI Certification Training

Microsoft Power BI offers robust tools to analyze data and extract valuable business insights through interactive dashboards. This comprehensive training course on Power BI empowers you to fully harness its potential, enabling you to solve business challenges and improve operations effectively. Throughout the course, you'll learn to develop dashboards from published reports expertly, utilize Quick Insights to discover valuable patterns rapidly and adopt practical approaches for various tasks performed within Power BI, from data gathering to in-depth analysis. Additionally, the course provides helpful troubleshooting techniques to address various issues that may arise while using Power BI.

### Learning Outcomes:

- ✓ Create dynamic dashboards from published reports, enhancing data visualization and interactivity
- ✓ Rapidly generate visuals and dashboards with quick insights to gain valuable insights from your data
- ✓ Utilize natural language in the Q&A feature to generate visuals for actionable insights
- ✓ Create and manage data alerts to stay informed of important changes in your data
- ✓ Learn best practices for report layout and data visualization to maximize the impact of your reports
- ✓ Understand when to use specific charts or graphs based on the questions you're addressing or the story you're presenting
- ✓ Incorporate shapes into your reports to design and emphasize key elements to create narratives
- ✓ Integrate custom visuals into your reports and dashboards to tailor them to your specific needs
- ✓ Share reports and dashboards effectively, understanding the pros and cons of different sharing methods
- ✓ Complete a comprehensive Power BI data analysis and visualization project from start to finish
- ✓ Enhance team collaboration using Microsoft Teams to facilitate smooth communication and sharing

## Topics covered:

- ✓ Data Retrieval and Preparation Techniques for Efficient Analysis
- ✓ Developing Proficiency in Data Management
- ✓ Generating Interactive Reports and Dashboards
- ✓ Tips and Tricks for Efficient Power BI Usage

By completing this course, you will gain a strong command of Power BI, enabling you to analyze data effectively, create compelling visualizations, and derive valuable insights to make informed business decisions.

## Essentials of Generative AI, Prompt Engineering & ChatGPT

In this course, participants will comprehensively study generative AI models, particularly ChatGPT. The curriculum covers essential principles of Generative AI, prompt engineering, explainable AI, conversational AI, ChatGPT, and other large language models.

## Learning Outcomes:

- ✓ Build strong foundations in generative AI models, understanding their core principles and various types
- ✓ Recognize the importance of explainable AI and distinguish between different approaches to achieve transparency in AI systems
- ✓ Apply effective prompt engineering techniques to optimize performance and control the behavior of generative AI models
- ✓ Develop a comprehensive understanding of ChatGPT, exploring its operational mechanisms, notable features, and limitations
- ✓ Explore diverse applications and scenarios where ChatGPT can be effectively utilized
- ✓ Master fine-tuning techniques to personalize and enhance ChatGPT models
- ✓ Address the ethical challenges of Generative AI models, ensuring responsible data usage, mitigating bias, and preventing misuse
- ✓ Gain insights into the transformative potential of Generative AI across various industries and examine prominent generative AI tools
- ✓ Dive into the future of generative AI, identifying challenges and the necessary steps to unlock its full potential

## Topics covered:

- ✓ Introduction to Generative AI and its Landscape
- ✓ Explainable AI: Understanding the Importance of Transparency
- ✓ Conversational AI: Applications and Advancements
- ✓ The Art of Prompt Engineering
- ✓ Designing and Generating Effective Prompts for AI models
- ✓ Exploring Large Language Models
- ✓ In-depth Analysis of ChatGPT and its Applications
- ✓ Fine-tuning Techniques for Personalization
- ✓ Ethical Considerations in Generative AI Models: Responsible Data Usage and Privacy
- ✓ Exploring the Future of Generative AI
- ✓ Leveraging AI Technologies for Innovation

Upon completing this course, you will possess comprehensive knowledge of Generative AI, focusing on ChatGPT, enabling you to apply these cutting-edge technologies responsibly and creatively across various domains.

## R Programming for Data Science

R programming is a vital tool for data analysis and is essential for aspiring data science professionals. This course teaches you how to write R code, explore R's data structures, and create custom functions. By the end of the course, you will be well-prepared to embark on your first data analysis project.

## Learning Outcomes:

- ✓ Learn about fundamental concepts such as math, variables, strings, vectors, factors, and vector operations in R
- ✓ Gain essential knowledge about arrays and matrices, lists, and data frames
- ✓ Explore conditions and loops, functions in R, objects, classes, and debugging
- ✓ Master the art of accurately reading and handling text, CSV, and Excel files
- ✓ Learn how to save and write data objects in R
- ✓ Understand and effectively work with strings and dates in R

## Topics covered:

- ✓ R Basics
- ✓ Data Structures in R
- ✓ R Programming Fundamentals
- ✓ Working with Data in R
- ✓ Strings and Dates in R

By completing this course, you will acquire the necessary skills in R programming to kickstart your data analysis journey and prepare yourself for success in data science.

## Data Scientist Industry Masterclass

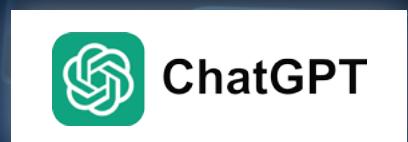
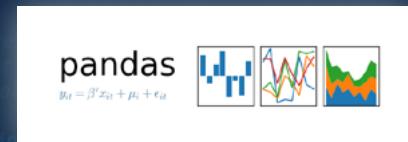
Attend this live interactive industry masterclass to gain insights about the latest advancements in data science.



# SKILLS COVERED

|   |                           |   |                                      |
|---|---------------------------|---|--------------------------------------|
|    | Generative AI             |    | Model Building and Fine Tuning       |
|    | Prompt Engineering        |    | Ensemble Learning                    |
|    | ChatGPT                   |    | Data Visualization                   |
|    | Exploratory Data Analysis |    | Database management                  |
|    | Descriptive Statistics    |   | Data Science                         |
|  | Inferential Statistics    |  | Supervised and Unsupervised Learning |
|  | Explainable AI            |   |                                      |
|  | Conversational AI         |   |                                      |
|  | Large Language Models     |   |                                      |

# Tools Covered



# Projects



## Sales Analysis

Utilize Python to analyze a clothing company's sales data for the fourth quarter across Australian states to help the company make data-driven decisions for the coming year.



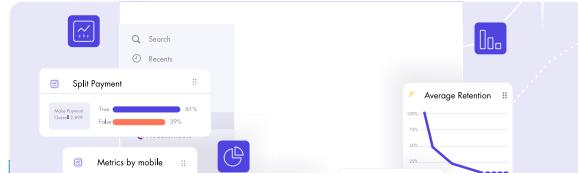
## Employee Performance Analysis

Create ML programs to understand different factors affecting employee turnover. Use clustering, the SMOTDE technique, and the K-fold cross-validation model to analyze performance and suggest employee retention strategies.



## Classification of Songs

Perform exploratory data analysis and cluster analysis to create personalized song lists and an efficient recommendation system.



## 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.



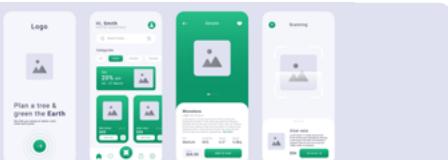
## Crime Analysis with Tableau Dashboard

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



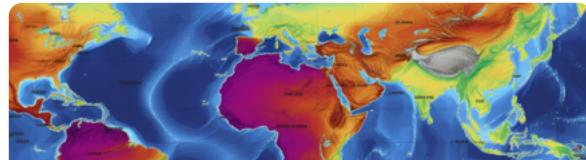
## Marketing Strategies with Exploratory Data Analysis

Perform exploratory data analysis and hypothesis testing to help a marketing department understand the factors contributing to customer acquisition and build a better strategy.



## Ecommerce App with Python

Develop an ecommerce app on the Python platform that can categorize, add or remove items from the cart and support different payment options.



## Weather Prediction

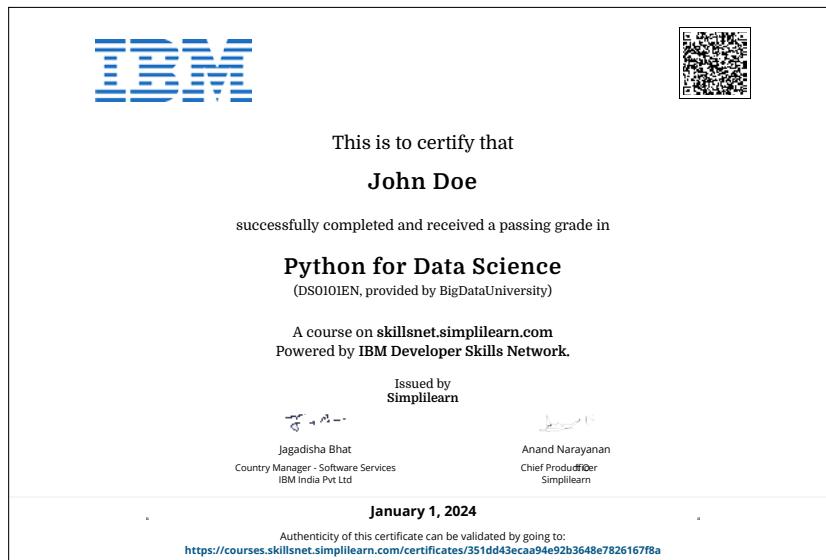
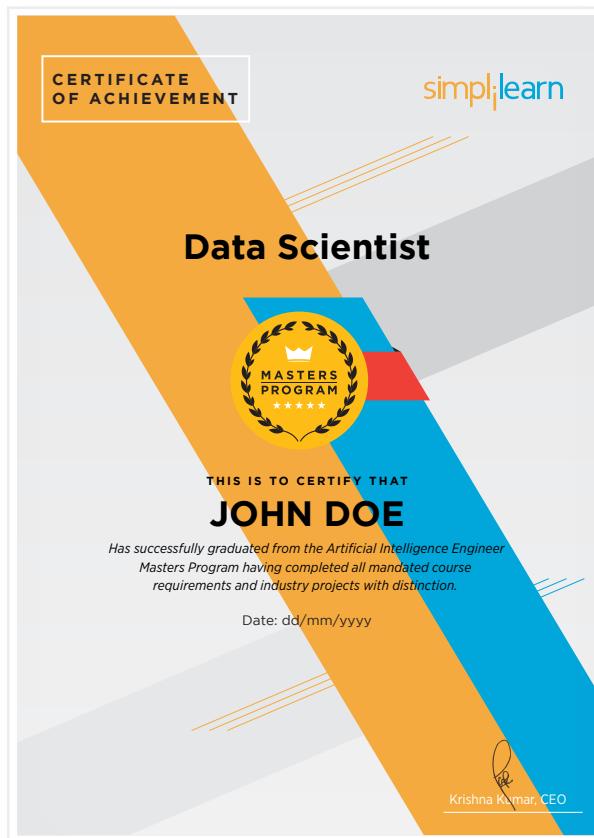
Create a classification model using ten years of rainfall data to predict the weather for different locations across Australia.



## Credit Card Fraud Analysis

Utilize data science and machine learning methodologies to identify fraudulent credit card transactions so that end customers are not charged for items they did not purchase.

# Certificate



Upon completion of this Master's Program, you will receive the certificates from IBM and Simplilearn in the Data Science courses in the learning path. These certificates will testify to your skills as an expert in Data Science. Upon program completion, you will also receive an industry-recognized Master's Certificate from Simplilearn.



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