

Data Analytics Curriculum (180 hours ~ 6 months)

Module 1: Introduction to Data Analytics

Topic	Sessions	Duration	Description
1. Introduction to Data Analytics	Define data & its classification, Define analysis & its classification Various Tools required in data analytics and their limitations and advantages	3 hours	Understand the different types of data and its analysis

Module 2: Data Analytics using Excel with Gen AI (46 hours)

2. Basic Excel: Introduction to excel interface, formula & functions.	Use of IF, IFS, SUM, SUMIF, SUMIFS, COUNT, COUNTA, COUNTIF, COUNTIFS, AVERAGE, AVERAGEIF, AVERATEIFS, MIN, MAX etc. Text Functions, Data Time Functions, Logical Operators, Stats & Math Functions	3 hours	By the end of this module, participants would have understood basic excel concepts.
3. Advance Excel: Data Management	VLOOKUP, HLOOKUP, XLOOKUP, INDEX, MATCH, SWITCH, OFFSET, INDIRECT Using Name Ranges, Data Validation, Data Sorting and Filtering,	6 hours	By the end of this module, participants would have understood advanced formulae, data validation, sorting and filtering.
4. Data Analytics Techniques:	What if Analysis: • Introduction to Solver • Using Pivot Tables • Pivot Charts	3 hours	By the end of this module, participants would have understood What-if Analysis.
5. Advanced Charting Techniques:	• Waterfall, Sparklines etc. • Dashboarding Techniques	6 hours	By the end of this module, participants would have understood Advanced Charting Techniques.

6. Financial Analysis: Understand & using financial functions	PMT, FV, NPV, IRR, RATE, Depreciation Functions	2 hours	By the end of this module, participants would have understood how to use financial functions.
7. Statistical Analysis for Decision Making	• Descriptive • Diagnostic/Inferential • Regression Analysis • Forecasting	6 hours	By the end of this module, participants would have understood statistical analysis for decision making.
8. Data Consolidation and Collaboration	• Consolidating Data from Multiple Sheets or Workbooks • Protecting Sheets and Workbooks • Sharing Workbooks • Tracking Changes	2 hours	By the end of this module, participants would have understood data consolidation and collaboration.
9. Automating Tasks with Macros	• Introduction to Macros • Recording and Editing a Macros • Introduction to VBA • Basic VBA programming	6 hours	By the end of this module, participants would have understood recording and editing a macro.
10. ChatGPT with EXCEL Part 1	• Generate Formulae and Functions using ChatGPT for EXCEL • Data Modelling with ChatGPT • Master Excel with ChatGPT • Use Power Query Like Never Before with ChatGPT	3 hours	By the end of this module, participants would be able to generate formulae and functions using ChatGPT, Data Modelling with ChatGPT and Write Power Query with ChatGPT

11. ChatGPT with EXCEL Part 2	• VBA with ChatGPT • Create Sample Data using ChatGPT • Advanced Conditional Formatting with ChatGPT	3 hours	By the end of this module, participants would be able to write VBA code with ChatGPT, Create Sample Data using ChatGPT and perform Advanced Conditional Formatting with ChatGPT
12. Reporting and Presentation using Copilot/Analyze Data	• Best Practices for Report Design • Creating Interactive Reports • Preparing Data for Presentation	3 hours	By the end of this module, participants would have understood best practices for report design, how to create interactive reports and prepare data for presentation.
13. Analyzing real-world business cases with Excel and AI	• Case study analysis, • Discussion	2 hours	

Module 3: Database Management using SQL (31 hours)

Topic	Session	Duration	Learning Outcome
14. Introduction to Database Management Systems (DBMS)	• Overview of DBMS: Types and Functions • Importance of Databases in Business and Applications • Introduction to Relational Databases	2 hours	• Understand the role and importance of DBMS in managing data. • Identify different types of databases and their applications. • Comprehend the basics of relational databases.

15. Fundamentals of SQL	• Introduction to SQL: Definition and Uses • SQL Syntax and Structure • Basic SQL Commands: SELECT, INSERT, UPDATE, DELETE	2 hours	• Gain familiarity with SQL and its purpose in database management. • Understand the basic syntax and structure of SQL queries. • Execute basic SQL commands for data manipulation.
16. Data Definition Language (DDL)	• Creating Databases and Tables • Modifying Table Structures: ALTER TABLE • Dropping Tables and Databases	2 hours	• Create and manage databases and tables using DDL commands. • Modify existing table structures to accommodate changes. • Delete tables and databases when no longer needed.
17. Data Manipulation Language (DML)	• Inserting Data into Tables • Updating Existing Data • Deleting Data from Tables • Retrieving Data with SELECT Queries	2 hours	• Insert new records into database tables. • Update existing data in the tables. • Delete unnecessary or obsolete data. • Retrieve and filter data using SELECT queries.
18. Advanced SQL Queries	• Using JOINS to Combine Tables • Subqueries and Nested Queries • Working with Aggregate Functions: COUNT, SUM, AVG, MAX, MIN • Grouping Data with GROUP BY and HAVING Clauses • Windows Functions	4 hours	• Combine data from multiple tables using various JOIN operations. • Write subqueries and nested queries for complex data retrieval. • Apply aggregate functions to summarize data. • Group data and filter grouped results effectively.

19. Advanced Topics in SQL	• Stored Procedures and Functions • Triggers and Event Handling • Working with Views • Advanced Query Optimization Techniques	2 hours	• Create and use stored procedures and functions for reusable code. • Implement triggers for automated event handling. • Utilize views for simplified data access. • Apply advanced techniques to optimize complex queries.
20. SQL Functions and Expressions	• String Functions: CONCAT, LENGTH, SUBSTRING • Numeric Functions: ROUND, CEIL, FLOOR • Date and Time Functions: NOW, DATEADD, DATEDIFF • Conditional Expressions: CASE, IFNULL	2 hours	• Utilize string functions to manipulate text data. • Apply numeric functions for mathematical operations. • Use date and time functions to handle temporal data. • Implement conditional expressions for dynamic query results.
21. Data Integrity and Constraints	• Understanding Data Integrity • Applying Constraints: PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK • Referential Integrity and Foreign Keys	2 hours	• Ensure data integrity through the use of constraints. • Define and apply various constraints to database tables. • Maintain referential integrity using foreign keys.
22. Indexing and Performance Optimization	• Introduction to Indexes: Types and Uses • Creating and Managing Indexes • Query Optimization Techniques • Analyzing and Improving Query Performance	2 hours	• Understand the purpose and types of indexes. • Create and manage indexes to improve query performance. • Apply techniques to optimize SQL queries.

			Analyze and enhance the performance of database operations
23. Transactions and Concurrency Control	- Understanding Transactions and ACID Properties - Implementing Transactions with BEGIN, COMMIT, and ROLLBACK - Handling Concurrency: LOCKS and Isolation Levels	2 hours	- Understand the concept of transactions and their properties. - Implement transactions to ensure data consistency. - Manage concurrency using locks and isolation levels.
24. Database Security and User Management	- Introduction to Database Security - Creating and Managing Users - Granting and Revoking Privileges - Implementing Security Best Practices	2 hours	- Recognize the importance of database security. - Create and manage database users and roles. - Grant and revoke privileges to control access. - Implement best practices to ensure database security.
25. Backup and Recovery	- Importance of Backup and Recovery - Performing Database Backups - Restoring Databases from Backups - Strategies for Disaster Recovery	2 hours	- Understand the necessity of regular database backups. - Perform database backup operations. - Restore databases from backup files. - Develop strategies for effective disaster recovery.
26. Practical Exercises and Projects	- Hands-On SQL Exercises to Reinforce Learning - Mini-Projects to Apply SQL Skills - Group Projects and Presentations - Feedback and Q&A Sessions	3 hours	- Reinforce learning through practical SQL exercises. - Apply SQL skills in real-world scenarios through projects. - Collaborate on group projects and present findings. - Participate in feedback and Q&A

			sessions for deeper understanding.
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Module 4: Storytelling using Power BI with AI (26 hours)

Module	Session Description	Duration	Learning Outcome
27. Introduction to Power BI and AI Integration	• Overview of Power BI as a data visualization and analytics tool. • Introduction to AI capabilities integrated into Power BI. • Importance of storytelling in data analysis and visualization.	2 hours	By the end of this module, participants would have understood Power BI Ecosystem
28. Data Loading and Modeling	• Importing data from various sources • Transforming and cleaning data using Power Query • Understanding Data Modelling • Creating relationships between tables • Introduction to DAX (Data Analysis Expressions)	3 hours	By the end of this module, participants would have understood how to load, transform and clean data using Power BI and have understood Data Modelling.
29. Basic and Advanced DAX	• Basic DAX Functions • Calculated Columns • Using Filter • Value • Calculate functions • Time intelligence functions • CALCULATE function in detail Using Filter • Aggregation functions • DAX for solving real-world scenarios	3 hours	By the end of this module, participants would have understood Basic and Advanced DAX.
30. Visualizations and Advanced Visualizations	• Creating basic visualizations: Bar charts, Line charts, Pie charts, etc. • Formatting and customizing visuals • Using advanced visuals: Maps, Tree maps, Waterfall, etc. • Creating custom visuals, Using visuals from Marketplace	3 hours	By the end of this module, participants would have able to create different charts and able to create advanced visualisations.
31. Dashboard, Reports and Services	• Creating Reports • Building Dashboards • Pinning visuals to Dashboard	3 hours	By the end of this module, participants would have able to

	• Introduction to Power BI Service • Publishing reports • Creating Dashboards in Power BI Service		create Dashboard, Reports and would have known about Power BI.
32. Collaboration, Sharing & Power BI Mobile	• Sharing reports and dashboards • Collaborating in Workspaces • Using Apps and App Workspaces • Overview of Power BI Mobile • Designing for mobile view	3 hours	By the end of this module, participants would have understood the Collaboration and Sharing of Workspaces and Dashboards would have able to design for mobile view.
33. Power BI Advanced Features	• Introduction to Power BI Embedded • Power BI API • Power BI and R or Python	3 hours	By the end of this module, participants would have understood Power BI Advanced Features.
34. Understanding AI-Powered Insights in Power BI	• Explanation of AI-powered features in Power BI (Quick Insights, AI visuals, etc.). • How AI enhances data exploration and analysis in Power BI. • Benefits of leveraging AI for data storytelling in Power BI reports.	3 hours	By the end of this module, participants would have aware about AI-powered features in Powe BI.
35. Case Studies: AI-Powered Data Stories	• Real-world examples of successful data storytelling with Power BI and AI. • Analysis of effective storytelling techniques and AI integrations. • Lessons learned and best practices derived from case studies.	3 hours	By the end of this session participants would be able to create data stories using AI-powered features.

Module 5: Tableau for Business Intelligence (34 hours)

Module	Session Description	Duration	Leaning Outcome
36. Introduction to Tableau and AI	• Overview of Tableau: Features and Capabilities • Importance of Data Visualization and AI • Installing and Setting Up Tableau	1 hour	• Understand the capabilities of Tableau and its role in data visualization. • Recognize the importance of AI in

	• Introduction to AI in Data Analytics		enhancing data analytics. • Set up Tableau and integrate it with AI tools.
37. Getting Started with Tableau	• Tableau Interface and Navigation • Connecting to Data Sources • Data Import and Preparation • Understanding Tableau Data Types and Structures	2 hours	• Navigate the Tableau interface confidently. • Connect to and import data from various sources. • Prepare and clean data for analysis. • Understand different data types and structures in Tableau.
38. Basic Data Visualization Techniques	• Creating Simple Visualizations: Bar Charts, Line Charts, and Pie Charts • Customizing Visualizations: Colors, Labels, and Tooltips • Using Filters and Parameters • Sorting and Grouping Data	3 hours	• Create basic visualizations to represent data. • Customize visual elements to enhance readability and aesthetics. • Apply filters and parameters for dynamic data exploration. • Sort and group data effectively for better insights.
39. Advanced Visualization Techniques	• Creating Advanced Charts: Scatter Plots, Histograms, and Heat Maps • Using Dual-Axis and Combined Charts • Building Interactive Dashboards • Introduction to Calculated Fields	3 hours	• Create advanced visualizations to represent complex data. • Utilize dual-axis and combined charts for comparative analysis. • Design interactive dashboards for user engagement. • Use calculated fields to perform custom calculations within visualizations.

40. Introduction to AI and Machine Learning Concepts	• Basic Concepts of AI and Machine Learning • Overview of AI Techniques Relevant to Data Visualization • Examples of AI Applications in Business Intelligence	2 hours	• Understand fundamental AI and machine learning concepts. • Recognize AI techniques applicable to data visualization. • Identify practical applications of AI in business intelligence.
41. Integrating AI with Tableau	• Connecting Tableau with AI Services (R, Python, Azure AI) • Using Tableau's Built-In AI Features (Explain Data, Ask Data) • Implementing AI-Powered Predictions and Recommendations in Dashboards	3 hours	• Integrate Tableau with AI services like R, Python, and Azure AI. • Utilize Tableau's built-in AI features for deeper insights. • Implement AI-powered predictions and recommendations in visualizations.
42. Data Analysis with Tableau and AI	• Using Tableau's Analytical Tools: Trend Lines, Reference Lines, and Forecasting • Incorporating AI-Driven Insights into Data Analysis • Performing Predictive Analysis with Tableau and AI • Case Studies of AI in Data Analysis	2 hours	• Apply Tableau's analytical tools for trend and forecast analysis. • Incorporate AI-driven insights into data analysis processes. • Perform predictive analysis using Tableau and AI. • Learn from real-world case studies on AI in data analysis.
43. Dashboard Design and Best Practices	• Principles of Effective Dashboard Design • Layout and Formatting Techniques • Using Actions to Create Interactivity	3 hours	• Design effective and user-friendly dashboards. • Apply best practices for layout and formatting.

	• Ensuring Performance Optimization		• Implement interactive elements to enhance user experience. • Optimize dashboard performance for faster insights.
44. Storytelling with Tableau and AI	• Creating Data Stories with Tableau • Using AI to Enhance Data Storytelling • Best Practices for Data Storytelling • Case Studies: Successful AI-Enhanced Data Stories	3 hours	• Craft compelling data stories using Tableau. • Leverage AI to enhance the storytelling process. • Apply best practices for effective data storytelling. • Analyze case studies of successful AI-enhanced data stories.
45. Working with Maps in Tableau	• Introduction to Geospatial Data and Mapping • Creating Basic Maps: Symbol and Filled Maps • Advanced Mapping Techniques: Custom Geocoding, Map Layers • Using Maps for Spatial Analysis with AI	3 hours	• Work with geospatial data to create maps in Tableau. • Create and customize symbols and filled maps. • Apply advanced mapping techniques for detailed analysis. • Use AI to enhance spatial data analysis.
46. Integrating Tableau with Other AI Tools	• Exporting Data and Visualizations from Tableau • Connecting Tableau with R and Python for Advanced Analytics • Integrating Tableau with AI Services (Azure AI, Google AI, AWS AI) • Using Tableau with Databases and Cloud Services	3 hours	• Export Tableau data and visualizations for further analysis. • Connect Tableau with R and Python for advanced analytics. • Integrate Tableau with various AI services. • Use Tableau with databases and cloud services for comprehensive analysis.

47. Tableau Server and Tableau Online	• Introduction to Tableau Server and Tableau Online • Publishing and Sharing AI-Enhanced Dashboards • Managing Permissions and Access • Best Practices for Collaboration and Sharing	3 hours	• Understand the functionalities of Tableau Server and Tableau Online. • Publish and share AI-enhanced dashboards with stakeholders. • Manage permissions and access for secure collaboration. • Apply best practices for effective team collaboration and sharing.
48. Hands-On Exercises and Projects	• Practical Exercises to Reinforce Learning • Guided Projects to Apply Tableau and AI Skills • Group Projects and Presentations • Feedback and Q&A Sessions	3 hours	• Reinforce learning through practical exercises. • Apply Tableau and AI skills in guided projects. • Collaborate on group projects and present findings. • Receive feedback and participate in Q&A sessions for deeper understanding.

Module 6: Data Analytics using Python Programming (19 hours)

Module	Session Description	Duration	Learning Outcome
Python Programming Basics	• Introduction to Python • Data Types and Variables • Control Structures (Conditionals and Loops) • Functions and Modules • Error Handling and Debugging	3 hours	• Write and execute Python programs. • Utilize basic and advanced Python constructs for data manipulation.
Data Structures and Libraries	• Lists, Tuples, Sets, and Dictionaries • Numpy for Numerical Data	4 hours	• Use Numpy and Pandas for data manipulation and analysis.

	- Pandas for Data Manipulation - DataFrames and Series		Implement efficient data structures for handling large datasets.
Data Collection and Cleaning	- Importing Data (CSV, Excel, SQL, JSON) - Handling Missing Data - Data Cleaning Techniques - Data Transformation	3 hours	- Import data from various sources. - Apply data cleaning techniques to handle missing or inconsistent data.
Exploratory Data Analysis (EDA)	- Descriptive Statistics - Data Visualization with Matplotlib and Seaborn - Identifying Patterns and Outliers - Correlation Analysis	3 hours	- Conduct descriptive statistical analysis. - Create meaningful visualizations to uncover insights from data.
Statistical Analysis	- Probability Concepts - Hypothesis Testing - ANOVA, T-tests, Chi-Square Tests - Regression Analysis	3 hours	- Perform hypothesis testing and other statistical analyses. - Interpret the results of statistical tests.
Hands-On Exercises and Projects	- Practical Exercises - Individual and Group Projects - Presentations and Feedback Sessions - Q&A and Troubleshooting Common Issues	3 hours	By the end of this session participants would be able to clean, prepare and analyze the data and drill out the insights from data.

Module 7: Machine Learning with R and Python (Prediction & Forecasting) (21 hours)

Module	Session Description		Learning Outcome
Machine Learning Basics	- Introduction to Machine Learning - Supervised vs. Unsupervised Learning - Model Training and Evaluation - Scikit-Learn Library	3 hours	- Explain the significance and applications of machine learning in various fields. - Outline the course objectives and structure.
Supervised Learning Techniques	- Linear Regression - Logistic Regression - Decision Trees and Random Forests	6 hours	Train and evaluate machine learning models using Scikit-Learn.

	Support Vector Machines		
Unsupervised Learning Techniques	- Clustering & Segmentation (K-means, Hierarchical) - Principal Component Analysis (PCA) - Association Rule Learning	3 hours	Train and evaluate machine learning models using Scikit-Learn.
Time Series Analysis	- Introduction to Time Series Data - Decomposition of Time Series - Forecasting Models (ARIMA, Prophet) - Seasonal Adjustments	3 hours	- Perform time series decomposition and forecasting. - Utilize models like ARIMA for time series prediction.
Natural Language Processing (NLP)	- Text Preprocessing - Sentiment Analysis - Topic Modeling - NLP Libraries (NLTK, spaCy)	3 hours	- Preprocess and analyze textual data using NLP techniques. - Implement sentiment analysis and topic modeling.
Hands-On Exercises and Projects	- Practical Exercises - Individual and Group Projects - Presentations and Feedback Sessions - Q&A and Troubleshooting Common Issues	3 hours	By the end of this session participants would be able to clean, prepare and analyze the data and drill out the insights from data.