Information Booklet cum Syllabus

Of

Data Analyst

Revision-I

January 2026

National Institute of Electronics and Information Technology
An Autonomous Scientific Society under
Ministry of Electronics and Information Technology, Government of India

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1. About Course

The Data Analytics Course provides a practical and industry-oriented learning experience focused on transforming data into meaningful insights. The course covers essential analytics tools and techniques including Excel, SQL, Python, Pandas, data visualization, Tableau, Power BI, and an introduction to Big Data and Hadoop. Through hands-on training and real-world projects, learners gain the skills required to analyze business data, create interactive dashboards, and support data-driven decision-making, preparing them for roles such as Data Analyst and Business Intelligence Analyst.

2. NIELIT

National Institute of Electronics and Information Technology, NIELIT, (Erstwhile DOEACC Society) is an autonomous scientific society of the Ministry of Electronics& Information Technology, Government of India. The Society is registered under the Societies Registration Act, 1860. NIELIT was set up to carry out Human Resource Development and related activities in the area of Information, Electronics & Communications Technology (IECT). NIELIT is engaged both in Formal & Non-Formal Education in the areas of IECT besides development of industry oriented quality education and training programmes in the state-of-the-art areas. NIELIT has endeavored to establish standards to be the country's premier institution for Examination and Certification in the field of IECT. It is also one of the National Examination Body, which accredits institutes/organizations for conducting courses in IT and Electronics in the non-formal sector.

3. Objective of Course

The objective of this course is to equip learners with strong foundations in data analytics concepts, data handling, analysis, visualization, and business intelligence, along with hands-on experience using industry-standard tools and real-world datasets.

After completing the course, learners will be able to:

- Develop a strong understanding of data analytics fundamentals, business problems, and analytical thinking.
- Work with different types of data (structured, semi-structured, and unstructured) and identify key performance indicators (KPIs).
- Perform data cleaning, analysis, and reporting using Excel for business use cases.
- Write efficient SQL queries to extract, filter, aggregate, and analyze data from relational databases.
- Use Python and Pandas for data preprocessing, manipulation, and analytical workflows.
- Conduct Exploratory Data Analysis (EDA) to uncover patterns, trends, and insights from data.
- Create meaningful data visualizations using Python libraries and apply business storytelling techniques.
- Build interactive dashboards and reports using Tableau and Power BI for decision support.
- Understand Big Data concepts and the fundamentals of the Hadoop ecosystem for large-scale data processing.
- Apply end-to-end data analytics skills on real-world datasets through hands-on projects and a capstone project, demonstrating problem-solving, analytical thinking, and professional reporting.

4. Job Roles of Course

This Course is designed to equip a learner with necessary skills as per following job roles:

- Data Analyst
- Business Analyst
- Business Intelligence (BI) Analyst
- Reporting Analyst
- Junior Data Analyst
- Data Operations Analyst
- MIS Executive / MIS Analyst

5. Eligibility

12th Pass, Basic Knowledge of Computer

6. Total duration of the course

180 Hours (Theory: 80 Hrs, Practical/Tutorial: 100 Hrs)

7. Course Details

7.1. Course Outline and Objective of Each Unit

S. No.	Module Name	Duration (Theory) in Hours	Duration (Practical) in Hours	Total Learning Hrs.	Learning Objectives
1	**Data Analytics Fundamentals & Excel**	10	10	20	• Understand fundamentals of data analytics and business problem solving. • Analyze different data types and KPIs. • Perform data cleaning, analysis, and reporting using Excel. • Build dashboards and MIS reports.
2	**SQL for Data Analysis**	15	20	35	• Understand relational database concepts. • Write SQL queries to extract and analyze business data. • Apply joins, subqueries, and window functions. • Optimize queries for analytical use cases.
3	**Python & Pandas for Data Analysis**	15	20	35	• Learn Python programming for analytics. • Perform data manipulation using Pandas and NumPy. • Conduct data preprocessing and transformation. • Analyze datasets efficiently using Python tools.
4	**Data Collection, EDA & Visualization**	10	15	25	• Collect data using web scraping and APIs. • Perform Exploratory Data Analysis (EDA). • Create meaningful visualizations. • Generate insights and KPIs for business decisions

5	**Business Intelligence Tools (Tableau & Power BI)**	10	15	25	• Design interactive dashboards using Tableau and Power BI. • Perform data modeling and calculations. • Use DAX and calculated fields for advanced reporting. • Publish and optimize BI dashboards.
6	**Big Data Fundamentals & Capstone Project**	20	20	40	• Understand Big Data concepts and Hadoop ecosystem. • Work with HDFS and Hive basics. • Apply analytics skills to real-world datasets. • Complete an end-to-end industry-oriented project.

7.2. Detailed Course

Module Name	Unit	Contents	Hrs
Data Analytics Fundamentals & Excel	**Introduction to Data Analytics**	• Definition and scope of Data Analytics • Role of Data Analyst • Data Analytics lifecycle • Types of analytics	**20**
	Business Data & KPIs	• Structured vs Unstructured data • Business problems to analytics solutions • KPIs and metrics	
	Excel for Data Analysis	• Data cleaning techniques • Sorting, filtering, conditional formatting • Excel functions (logical, statistical, lookup)	
	Dashboards & Reporting	• Pivot tables and pivot charts • Excel dashboards • MIS and business reporting	
Machine Learning	**Database Fundamentals**	• Database concepts • Relational databases • Introduction to SQL	**35**
	Core SQL	• SELECT, WHERE, ORDER BY • Aggregate functions	

		• GROUP BY and HAVING	
	Advanced SQL	• Joins (INNER, LEFT, RIGHT, FULL) • Subqueries and CTEs • Window functions (ROW_NUMBER, RANK) • CASE WHEN and date functions	
	Query Optimization	• Indexing basics • Query performance concepts	
Python & Pandas for Data Analysis	**Python Basics**	• Python syntax and environment setup • Variables, data types, operators • Conditional statements and loops	**35**
	Python Libraries	• NumPy arrays and operations • Introduction to Pandas	
	Pandas for Data Analysis	• DataFrames and Series • Data cleaning and preprocessing • Handling missing and duplicate data	
	Advanced Pandas	• GroupBy and aggregation • Merging and joining DataFrames • Working with datetime data	
Data Collection, EDA & Visualization	**Web Scraping**	• Introduction to web scraping • HTML basics • Requests and BeautifulSoup • APIs vs Web Scraping	**25**
	Exploratory Data Analysis	• Data distributions and outliers • Descriptive statistics • Data profiling	
	Data Visualization	• Matplotlib basics • Seaborn advanced plots • Choosing the right chart	
	Business Insights	• Storytelling with data • Insight and KPI reporting	
Business Intelligence Tools (Tableau & Power BI)	**Tableau Fundamentals**	• Tableau interface and architecture • Data connections • Calculated fields and filters	**25**
	Tableau Dashboards	• Interactive dashboards • Storytelling and publishing • Performance optimization	

	Power BI Fundamentals	• Power BI interface • Power Query transformations • Data modeling	
	Advanced Power BI	• DAX basics and advanced functions • KPI cards, slicers, drill-through • Dashboard optimization	
Big Data Fundamentals & Capstone Project	**Introduction to Big Data**	• Big Data concepts and characteristics (5Vs) • Traditional data vs Big Data	**40**
	Hadoop Ecosystem	• Hadoop architecture • HDFS, YARN, MapReduce • Introduction to Hive	
	Capstone Project	• Problem identification and dataset selection • Data collection and preprocessing • Analysis, visualization, and dashboarding • Final presentation and documentation	

8. Reference Books/ Study Materials

1) Data Analytics Made Accessible – Anil Maheshwari
2) Excel Data Analysis and Business Modeling – Wayne L. Winston
3) SQL for Data Analytics – Upom Malik & Matt Goldwasser
4) Python for Data Analysis – Wes McKinney
5) Storytelling with Data – Cole Nussbaumer Knaflic
6) The Definitive Guide to DAX – Marco Russo & Alberto Ferrari
7) Learning Tableau – Joshua N. Milligan
8) Hadoop: The Definitive Guide – Tom White

9. Practical Assignments

i. Data cleaning and preparation of raw business data using Excel (duplicates, missing values, formatting).

ii. Creation of Pivot Tables and interactive Excel dashboards for sales and performance analysis.

iii. Writing SQL queries to extract, filter, aggregate, and analyze data from a relational database.

iv. Performing joins and subqueries in SQL to solve real-world business reporting problems.

v. Data analysis and preprocessing using Python and Pandas on real-world datasets.

vi. Conducting Exploratory Data Analysis (EDA) to identify trends, patterns, and outliers.

vii. Creating data visualizations using Matplotlib and Seaborn for analytical insights.

viii. Web data collection using basic web scraping techniques or APIs.

ix. Designing an interactive business dashboard using Tableau.

x. Building a complete Power BI dashboard with KPIs, filters, and insights for decision-making.