**Track: Data Analytics with Power BI**

**Course Objectives:**

The broad range of essential skills encompassing programming, statistics, data analytics, data wrangling, data visualization, communication, business foundations, and ethics will enhance students' competitiveness in the dynamic field of Data Analytics with Power BI in the industry. Equipped with a practical understanding of sought-after technical skills and the interpersonal abilities valued by employers, students will graduate ready to apply their expertise in data analytics across various industries.

|  |  |
| --- | --- |
| **Learning Outcome** | **Use Cases** |
| Understand Data Collection, Metadata, and Data Quality | A student may analyze climate data, understand how it's collected, explore metadata like time and location, and assess data quality to draw reliable conclusions about climate change trends. |
| Intermediate Proficiency in Data Acquisition and Organization | A student might gather and organize financial data from various sources to analyze trends in market performance and understand factors influencing economic indicators. |
| Intermediate Proficiency in Data Visualization | A student might visualize patient outcomes over time, using charts and graphs to communicate trends in treatment efficacy to medical professionals. |
| Articulate Meaningful Lines of Inquiry | In a marketing context, a student might explore customer behavior through the collection and analysis of purchase data. This could involve investigating factors influencing buying decisions, such as demographics, product preferences, and promotional effectiveness. |
| Communicate Data Limitations and Analysis Results | A student studying online behavior might communicate limitations in survey data, explain the methods used to gather information, and present results regarding user preferences and engagement patterns. |
| Reflect on Ethics in Data Analysis | A student analyzing social media trends might reflect on the ethical considerations of extracting and using user data, considering privacy implications and potential biases in the dataset that could affect the interpretation of results. |

**Program Benefits:**

* **Hands-on experience:** Gain practical experience through exercises, and real-world scenarios/case studies.
* **Industry relevance:** Stay up to date with current technologies, frameworks, and best practices.
* **Portfolio development:** Build a strong portfolio showcasing your ideas to solve the case studies and to demonstrate your skills to potential employers.
* **Career support:** Receive guidance on job search strategies and interview preparation to launch your software development career.

Upon successful completion of the program, learners will have a comprehensive understanding of **Data Analytics with Power BI** principles, be able to create functional dashboard, and possess the necessary skills to pursue entry-level roles or further education in the field.

**Prerequisites:**

* Basic knowledge of using the internet and computer systems.
* Basic knowledge on Statistics
* Basic understanding of problem solving.
* Introductory understanding of programming and tools.

**Software and tools requirement:**

* A Computer System (PC/Laptop) with Windows/Linux and compatibility to required software(s)
* High speed internet connection
* Visual Studio Code: <https://code.visualstudio.com/download>
* Power BI : [Download Power BI Desktop from Official Microsoft Download Center](https://www.microsoft.com/en-in/download/details.aspx?id=58494)

**Program Outline:**

|  |  |
| --- | --- |
| **#** | **Duration** |
| Course Content (Technical) | 30 Hrs (Total)   * Theoretical discussion - 5 Hrs * Hands On – 25 Hrs |
| Case Study | 5 Hrs |
| Employability Skills-Self Paced | 5 Hrs |
| **Total Duration:** | **40 Hrs** |

**Assessment Rubric**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Assessment Component** | **Evaluation Parameters** |
| **1.** | Trainer Led Session Attendance (Minimum 60 percent Attendance) | VIA LMS |
| **2.** | Case study Submission | VIA LMS |

**Program Structure:**

**Program Duration:**

The program is designed to be completed in 8 weeks covering around 40 hours of content and Case Study.

|  |  |  |
| --- | --- | --- |
| **Week** | **Description of the content to be covered** | **Duration (hrs)** |
| **Week 1** | **Data Analytics Managed Services**  **Overview:**   * Definition of Data Analytics Managed Services * Importance of Data Analytics in today's world * Key Components of Data Analytics Managed Services * Implementation process of Data Analytics Managed Services * Benefits of Data Analytics Managed Services   **Use Cases:**   * In Financial Services * In Healthcare   **Data Analysis using Power BI**  **Getting Started with Power BI**   * Data Visualization, Reporting * Business Intelligence (BI), Traditional BI, Self-Serviced BI * Cloud Based BI, On-Premises BI | **5 hrs.** |
| **Week 2** | **Getting Started with Power BI**   * Cloud Based BI, On-Premises BI * Power BI Products * Power BI Architecture * Brief History of Power BI * Power BI Desktop (Power Query, Power Pivot, Power View) * Flow of Work in Power BI Desktop * Power BI Report Server, Power BI Service, Power BI Mobile Flow | **5 Hrs.** |
| **Week 3** | **Power Query**   * Data Transformation, Benefits of Data Transformation * Shape or Transform Data using Power Query * Overview of Power Query / Query Editor, Query Editor User Interface The * Ribbon (Home, Transform, Add Column, View Tabs) * The Queries Pane, The Data View / Results Pane, The Query Settings Pane, Formula Bar * Saving the Work * Datatypes, Changing the Datatype of a Column Filter in Power Query * Auto Filter / Basic Filtering * Filter a Column using Text Filters, Number Filters, Date Filters, Multiple Columns * Remove Columns / Remove Other Columns * Name / Rename a Column * Reorder Columns or Sort Columns * Add Column / Custom Column Split * Columns, Merge Columns, PIVOT, UNPIVOT Columns, Transpose Columns * Header Row or Use First Row as Headers, Keep Top Rows, Keep Bottom Rows Keep, Range of Rows, Keep Duplicates, Keep Errors * Remove Top Rows, Remove Bottom Rows, Remove Alternative Rows, Group Rows / Group By * Remove Duplicates, Remove Blank Rows, Remove Errors   **Power BI Q-M Functions**  **M Language**   * IF..ELSE Conditions, Transform Column () Types * Remove Columns (), Split Columns (), Replace Value() * Table. Distinct Options and GROUP BY Options Table. * Group (), Table. Sort () with Type Conversions PIVOT * Operation and Table. Pivot (). List Functions Using * Parameters with M Language | **5 Hrs.** |
| **Week 4** | **Data Modelling**   * Data Modeling Introduction * Relationship, Need of Relationship * Relationship Types / Cardinality in General * One-to-One, One-to-Many (or Many-to-One), Many-to-Many * AutoDetect the relationship, Create a new relationship, Edit existing relationships * Make Relationship Active or Inactive * Delete a relationship | **5 Hrs.** |
| **Week 5** | **Data Analysis Expressions (DAX)**   * What is DAX, Calculated Column, Measures, DAX Table and Column Name Syntax * Creating Calculated Columns, Creating Measures Calculated, Columns Vs Measures, DAX Syntax & Operators * DAX Operators, Types of Operators * Arithmetic Operators, Comparison Operators, Text Concatenation Operator, Logical Operators   **DAX Functions Types**   * Date and Time Functions, Text Functions, Logical Functions, Math & Statistical Functions, Filter Functions   **Text Functions**   * LEN, CONCATENATE (&), LEFT, RIGHT, MID UPPER, LOWER, TRIM, SUBSTITUTE, BLANK   **Logical Functions**   * IF, TRUE, FALSE NOT, OR, IN, AND IF ERROR SWITCH   **Math & Statistical Functions**   * INT, ROUND, ROUNDUP, ROUNDDOWN, DIVIDE, EVEN, ODD, POWER, SIGN * SQRT, FACT, SUM, SUMX, MIN, MINX, MAX, MAXX, COUNT, COUNTX, AVERAGE, AVERAGEX, COUNTROWS, COUNTBLANK   **Filter Functions**   * CALCULATE, ALL, RELATED * Report View | **5 Hrs.** |
| **Week 6** | **Creating Interactive Visualizations and Reports**  **Report View User Interface**   * Fields Pane, Visualizations pane, Ribbon, Views, Pages Tab, Canvas Visual * Interactions * Interaction Type (Filter, Highlight, None) * Visual Interactions Default Behaviour, Changing the Interaction   **Grouping and Binning Introduction**   * Using grouping, Creating Groups on Text Columns * Using binning, Creating Bins on Number Column and Date Columns * Sorting Data in Visuals * Changing the Sort Column, Changing the Sort Order * Sort using column that is not used in the Visualization * Sort using the Sort by Column button * Hierarchy Introduction, Default Date Hierarchy * Creating Hierarchy, Creating Custom Date Hierarchy * Change Hierarchy Levels * Drill-Up and Drill-Down Reports * Data Actions, Drill Down, Drill Up, Show Next Level   **Visualizations**   * Visualizing Data, Why Visualizations * Visualization types, Create and Format Bar and Column Charts, Create and Format Stacked Bar Chart Stacked Column Chart Create * Format Clustered Bar Chart, Clustered Column Chart * Create and Format 100% Stacked Bar Chart, 100% Stacked Column Chart Create and, * Format Pie and Donut Charts * Create and Format Scatter Charts, Create and Format Table Visual, Matrix Visualization, Line and Area Charts * Create and Format Line Chart, Area Chart, Stacked Area Chart, Combo Charts, Create and Format Line and Stacked Column Chart, Line and Clustered Column Chart * Create and Format Ribbon Chart, Waterfall Chart, Funnel Chart   **Creating Dashboards**   * Pin Visuals and Pin LIVE Report Pages to Dashboard * Advantages of Dashboards * Interacting with Dashboards * Formatting Dashboard * Sharing Dashboard | **5 Hrs.** |
| **Week 7** | **Case Study**   * Apply acquired knowledge and skills to solve case study. * Emphasis on Practical Problem Solving | **5 Hrs.** |
| **Week 8** | **Employability Skills**   * Effective Communication in Data Analytics * Problem Solving and Critical Thinking Skills * Collaboration and Teamwork * Time Management & Organization Skills * Presentation Skills and report writing | **5 hrs. (Self-Paced)** |

**Real-world Case Studies**: \*\***Students are required to complete any one case study \*\***

1. **Real-Time Analysis of Bank Customers (Data Analytics with Power BI)**

The majority of trust comes from a customer when their data is protected. Banks or other financial institutions deal with a lot of personal information from customers. As important as collecting this information and verifying it from the client is, it is equally important to make sure this information is secure on the bank servers.

If there is any fault or lack of protection from the bank’s side then it is guaranteed that the customer will not continue services the next time. It is only an assurance that it will work. Here we have to solve this,

* 1. To monitor sales and overhead expenditures
  2. To Implement fund management strategies
  3. To Track profitability, track products, services, and customers
  4. To Predict and forecast with data projections
  5. To Improve budget and enhance the productivity of finance team

1. **Profit Analysis of Global Superstores (using power BI)**

The sales analysis on Superstore dataset is a comprehensive study that aims to analyze the sales performance of a fictional retail company called " **Global Superstores** ".

* Variable can use - sales transactions, customers, products, and geographical locations.
* Aim to do - data visualization and reporting tool, to create interactive dashboards and reports that provide insights into the sales performance of Superstore.
* To cleaned and transformed using Power Query, and a data model is created using Power BI's data modelling tools.
* To analysis includes several key metrics, such as sales revenue, profit, and margin, which are visualized using charts, tables, and graphs.
* To analysis provide valuable insights into Superstore's sales performance, highlighting areas of strength and weakness. and that furniture is the most profitable product category. The analysis also identifies opportunities for improvements.

1. **Analysis of Crypto Currency Growth in last 5 year (Data Analytics with Power BI)**

This study is relevant to understand deeply the impact of cryptocurrency on investors decision making and the economy. It plays vital role in financial investments nowadays and helps raising digital capital and does affects growth of economy. To meet the current requirements of the digital era and influence decisions of the investors.

Analysing the strengths and weaknesses of cryptocurrency in India. 1) Analysing the current position of cryptocurrency and its investors. 2) Providing information about the economic position of the economy post introduction of cryptocurrency. 3) Studying the change cryptocurrency have made on investors and economy.

To learn the impact of cryptocurrency on Indian economy

* To study the current status of cryptocurrency in India and the future it holds
* To understand the significance of cryptocurrencies according to the perception of investors.
* To analyse the perception of investors towards cryptocurrencies.
* To study the factors considered by the investors & those which ultimately influence him while
* investing.
* To predict the future prospects of the cryptocurrency investment market.
* Examining the current profitability of various cryptocurrencies. Analysis helps in finding out the earning capacity and returns of cryptocurrencies.

1. **Power BI enabled Crop Production Analysis (Data Analytics with Power BI)**

* This report delves into the captivating realm of India's agricultural cultivation, providing a comprehensive visual exploration of key aspects and trends in the agricultural sector. Through the visual representations, readers can gain valuable insights into crop production, seasonal variations, regional distribution, and overall production trends. These visualizations enable intuitive analysis, allowing stakeholders to uncover patterns, identify areas of growth or concern, and make data-driven decisions.
* By harnessing the power of PowerBI, this report not only presents the data in a visually appealing manner but also provides an interactive experience for readers to explore the intricacies of India's agricultural cultivation. To Extract the Insights from the data and put the data in the form of visualizations, Dashboards and Story we employed PowerBI tool.

1. **Analysis of Commercial Electricity Consumption in Indian State (Data Analytics with Data from Cloud/Web)**

With the electricity consumption being so crucial to the country, we came up with a plan to study the impact on energy consumption state and region wise.

* Rows are indexed with dates and columns represent states.
* Rows and columns put together, each datapoint reflects the power consumed in Mega Units (MU) by the given state (column) at the given date (row).
* Energy is one of the most important resources available to man and it is necessary to keep a check on the growing need for energy day by day.
* The Issue of the availability of Energy is getting prominent these days. So, to analyze the consumption of energy and production of Energy via available Energy Resources is important.
* The project describes the consumption of energy resources of all states of India in the last few years with respect to the population of India state-wise and predicts the future energy requirements for every state.

1. **360-degree Business Analysis of Online Delivery Apps using Power BI**

The volume of data keeps rising, and data technologies change every other day. This makes it more difficult for the organizations to benefit from data investments and place a data-driven strategy across the organization.

At this moment, many powerful and advanced data analytics and data visualization tools made it possible to create powerful and engaging visualizations quickly. Power BI visualizations are one of the easiest ways to start your data visualization journey and tell an amazing data story.

Data visualization is the graphical representation of data through dashboards, interactive reports, charts, graphs, and other formats.

Data visualization with Power BI enables anyone to collect, prepare, analyze, and visualize data in minutes and help make better business decisions. Dashboards are an important visualization format that provides 360-degree-view and helps quickly gain insights.

Power BI Dashboards Can Be Used To Show:

* Overall sales performance of a business
* Entire customer acquisition funnel
* How the sales number compare to different periods
* Healthcare KPIs covering various metrics, demographics, and scenarios
* Customer service and how long it takes to resolve issues
* Top performing products in terms of profitable revenue
* Social media monitoring and analytics
* Patients management and demographics
* Inventory analysis and management
* Hospitality management
* Time-tracking and project management
* Sentiment analysis and brand engagement

1. **Inventory and sales analysis of Departmental Store**

Departmental Store analysis is commonly found today at most retail store registers. Store merchandise, identified by a price code is checked out by a cashier who then accepts payment for the item(s). A Departmental Store analysis is either read by a bar code scanner or manually entered by the cashier. At the completion of a sale, a receipt is created for the customer and sales information is collected for the generation of reports later.

The Retail Analysis built-in sample contains a dashboard, report, and semantic model that analyzes retail sales data of items sold across multiple stores and districts. The metrics compare this year's performance to last year's for sales, units, gross margin, variance, and new-store analysis.

1. **Global Olympics Dataset Diagnosis using Power BI (Data Analytics with Power BI)**

This analysis aims to answer some important questions about how countries have joined the Olympics over the years, how many medals they’ve won, the ages of participants, and details about their height and weight. Also, I’m exploring the balance between male and female participants, highlighting the top-performing athletes, and identifying the most frequently played games in the Olympics. These questions help us understand a lot about the Olympics:

* Identifying Countries Participation in the Olympics (1896–2016)
* What is the comprehensive historical medal count of countries in the Olympics across all years?
* What is the current count of countries and athletes participating in the Olympics?
* What is the distribution of ages among participants in the Olympics?
* What are the variations observed in the height and weight of male and female participants in the Olympics, and how do these differences contribute to our understanding of athletes’ physical characteristics across genders?
* In the context of the entire narrative, how does India’s performance stand out from the broader story of the Olympics?

1. **IPL Analysis using Power BI**

The Indian Premier League (IPL) is a professional Twenty20 cricket league in India that has become one of the most popular and lucrative cricket tournaments in the world. Since its inception in 2008, the IPL has had a significant impact on Indian cricket, both on and off the field.

to IPL Matches from 2008 to 2022. The dataset consists of some important variables like All IPL Teams, Team Players, Toss Winning, Batsman, Bowlers, Venue(Stadiums), Matches Between Teams, Winning Situations, and a lot more. These variables will be used in generating insights into **IPL Teams analysis for better prediction** and will also help in making necessary recommendations and conclusions.

* Cleaning data: Removing or replacing null values, duplicates, or inconsistent data.
* Splitting and merging columns: You can split a column into multiple columns or merge two or more columns into one.
* Formatting data: Changing the format of data types such as date, time, or text.
* Filtering data: You can filter data based on specific criteria, such as a date range or value range.
* Adding custom columns: You can add new columns to a table based on calculated expressions, such as a calculated column or measure.
* Grouping and aggregating data: You can group data based on specific columns and then perform aggregations, such as sum or average.
* Pivot and unpivot data: You can pivot data to create a new table with columns that represent values from the original table.

To perform these tasks, Power BI offers various data transformation options such as Query Editor, DAX expressions, and Power Query. You can access these options by clicking on the “Transform data” button in the Home tab of the Power BI Desktop ribbon.

1. **Power BI Powered Global Terrorism Dataset Analysis (Data Analytics with Power BI)**

Terrorism is the use of violence and intimidation, especially against civilians, in the pursuit of political, ideological, or religious goals. It is a tactic used by individuals or groups to achieve their objectives by creating fear and causing disruption.

Terrorism can take many forms, including bombings, assassinations, hijackings, and cyberattacks. It can be carried out by state actors or by non-state actors, such as terrorist organizations or extremist groups. The impact of terrorism is far-reaching, as it can cause physical harm, psychological trauma, and economic damage.

However, the problem of terrorism remains a significant global challenge, and efforts to address it must be ongoing and multifaceted.

Answers based on analysis?

* The Middle East & North Africa suffered the most from terrorism.
* Taliban was the most successful terrorist group.
* Deadliest Weapon used was the explosives.
* Bombing & explosions were the most preferred attack type.
* Highest individual targeted was 40.40k.
* The most assaults ever were committed in 2014, according to analysis in history.

1. **Supply Chain Analysis of Inventories (Data Analytics with Power BI)**

Interactive data visualization and analytics are hot topics for supply chain technologies, according to many leaders and decision-makers. Decision-makers can effectively manage the supply chain of their enterprise better by leveraging business intelligence and analytics to visualize data that makes it meaningful and readily accessible. Self-service features from platforms and tools like Power BI can enhance this. Power BI allows business and non-technical users to build their respective reports, conduct their own queries, and examine the significance and context of data. Moreover, [data visualization](https://emtemp.gcom.cloud/ngw/globalassets/en/supply-chain/documents/trends/6-ways-supply-chian-analytics-mitigate-business-disruptions.pdf) also contributes to resilience building by providing additional context into the impact of potential future supply chain disruptions.

Power BI is one platform that enables the integration of disparate data sources into coherent and interactive visualizations. Although enterprise resource planning (ERP) and materials requirement planning (MRP) software can provide snapshots of the supply chain, their usage alone is no longer sufficient. An analysis tool can complement ERP and MRP systems by consolidating dispersed data, removing silos between business functions, and uncovering insights. This is critical in multinational digital supply chains, where integrating massive datasets from disparate, fragmented sources is essential for maximizing commercial value.

1. **An Analysis of Unemployment in Republic of India (Data Analytics with Power BI)**

The word unemployment belongs to a state in which a respective actively seeks employment but is unsuccessful. It is said to be one of the critical measures of the economy's strength. The unemployment rate is the most generally used method to arbitrate a country's unemployment rate. This can be found by honestly dividing the number of people without jobs by the total population covered in a nation's labor force. National and local governments often effort to offer employment convenience to secure people who meet the acceptability criteria set by them. Commonly, work is availed for groups of particular upon a fixed minimum wage sufficient for bare continuance and provides further chances for them to find permanent jobs. These attempts are made to develop the country's growths and cut down the overall unemployment rate. The rate of unemployment in India has been expanding over the years. The current paper purpose to interpret the element leading to unemployment and its impact on the Indian economy. The study focal point on how employment rate performance a vital role in overall advancement of the economy.

Objectives of the Study

* To study the present Condition of Unemployment in Rural and Urban area.
* To identify the Causes of Unemployment in India.
* To Examine the Government Programmers Unemployment.
* Suggestions and Findings.