**High Impact Skills Development Program**

**in Artificial Intelligence, Data Science, and Blockchain**

**Module 3: Data Visualization**

Lab 1: Introduction to Data Visualization using MS Excel

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# Objective:

In this lab, you will learn how to create and customize basic data visualizations using MS Excel. You will also learn how to apply pivot tables for exploratory data analysis.

# Materials Needed:

* MS Excel 2016 or later (MS Excel 365 is preferred)

# Datasets:

* Basic Sales Dataset
* Detailed Sales Dataset

# Lab Work:

## Task 1: Create a Simple Bar Chart

* Open MS Excel
* Import data from Basic-Sales.csv
* Highlight *Products* and *Total Sales* columns
* Insert a Bar Chart:
  + Go to the *Insert* ribbon tab.
  + Click on the *Bar Chart* icon and select *Clustered Bar* from the dropdown menu in the *2-D Column* section.
* Customize the Chart:
  + Add chart title: Click on the chart title and enter "Product Sales".
  + Label the axes: Click on the horizontal axis title and enter "Products". Click on the vertical axis title and enter "Sales".

## Task 2: Design a Pie Chart

* Using the same dataset generate a Pie Chart
* Move the pie chart to a new worksheet by right-clicking it and selecting *Move Chart*
* Customize the Chart:
  + Use the Chart Tools to change the slice colors for better visualization
  + Change the position of the Legend to the Left of the chart
  + Add Data Labels to the slices
  + Explore predefined chart styles

## Task 3: Generate a Line Chart and a Scatter Plot

* Generate a line chart and scatterplot using the attributes of your own choice
* Experiment with different chart types and their customizations and styles to understand how small changes can impact the visualization's effectiveness.

## Task 4: Using Pivot Tables

**What are Pivot Tables?**

A pivot table is a statistics tool that summarizes and reorganizes selected columns and rows of data in a spreadsheet or database table to obtain a desired report. The tool does not actually change the spreadsheet or database itself, it simply “pivots” or turns the data to view it from different perspectives.

Pivot tables are especially useful with large amounts of data that would be time-consuming to calculate by hand. A few data processing functions a pivot table can perform include identifying sums, averages, ranges, or outliers. The table then arranges this information in a simple, meaningful layout that draws attention to key values.

**Instructions:**

* Open a new Workbook
* Import data from Detailed-Sales.csv
* Select the Data:
  + Highlight the whole data range
* Insert a Pivot Table:
  + Go to the Insert tab.
  + Click on PivotTable
  + Choose to place the Pivot Table in a new worksheet
* Build the Pivot Table:
  + Select the required fields from the PivotTable Fields List on the right.
* Generate a bar chart of the sales of the products
* Explore how to do filtering, sorting, and creating calculated fields

# Additional Resources for Self-Learning:

* [Data Visualization in Excel](https://www.geeksforgeeks.org/data-visualization-in-excel/)
* [Creating a Bar Chart in Excel](https://vizzlo.com/data-viz-guide/bar-chart/how-to-create-a-bar-chart-in-excel)
* [A Step-by-Step Guide to Advanced Data Visualization](https://policyviz.com/wp-content/uploads/woocommerce_uploads/2017/07/A-Guide-to-Advanced-Data-Visualization-in-Excel-2016-Final.pdf)