DATA ANALYSIS

Excel, SQL, Python, Power BI

CONTENTS

DATA ANALYSIS COURSE OVERVIEW

This course will teach students how to carry out data analysis using spreadsheets, power bi and python. It also introduces databases and teaches structured query language (SQL).

At the end of the course the student will be confident in working with spreadsheets, handling data analysis tasks and can take on related projects.

SECTION 1

ADVANCED MICROSOFT EXCEL

MODULE	OBJECTIVES	TOPICS
Introduction to Spreadsheet Applications – MS Excel, Google Sheets	At the end of this Module, you will understand the general structure and functions of Excel. What range names are and how to use them.	Introduction Excel Workbooks and Sheets Cells, Tables and Ranges Named Cells, and Ranges
Learning to work with Logical functions	At the end of this Module, you will understand how to work with the logical functions in excel	1. Logical Operators and Functions 2. The IF function 3. Creating nested IF functions 4. AND & OR functions 5. Combining logical functions
Learning to work with LOOKUP and Database formulas	At the end of this Module, you will understand how to use lookup functions to solve problems and also use database functions in excel.	1. Working with lookups, VLOOKUP, HLOOKUP, INDEX & MATCH 2. CONDITIONAL AGGREGATES 3. Using database functions DSUM, DCOUNT, DAVERAGE, DGET
Learning to work with Ranges, List Management and Dropdown Lists.	At the end of this Module, you will understand sorting and filtering and also learn how you can create dropdown list and set criteria to improve you text entry integrity.	1. Adv. List Management and Data Validation 2. Drop Down Lists and Dependent Lists. 3. Data validation
Excel Financial Formulars (PMT, PPMT, IPMT)	At the end of the Module, you will be able to calculate loan repayment using excel formulars.	1. Loan Repayment Formulars
Learning how to work with Pivot Table and Charts	At the end of this Module, you will be able to work with Pivot table, Pivot Charts and Create Slicers	1. Pivot Tables and Pivot Charts 2. Using the PivotTable Wizard 3. Using the PivotTable toolbar 4. Creating Pivot Charts 5. Using Slicers to manipulate PivotTables
Learning how to work with scenarios and Macros	At the end of this Module, you will be able to work with Goal Seek, Solver, Scenario Manager and create Macros	1. Using analytical options 2. Using Goal Seek 3. Using the Solver add-in 4. Working with scenarios 5. Creating and saving scenarios 6. Macros and Intro to VBA

Data Analysis with Excel	At the end of this Module, you will be able to carry out a straight forward data analysis project in Excel.	1. Loading cleaning and transforming data with the Query Editor 2. Simple Dashboarding
Mini Project	Mini Project	Mini Project

SECTION 2

SQL DATABASES

MODULE	OBJECTIVES	TOPICS
Introduction to Databases	Students will understand what databases are and why they are needed.	Understanding the role of databases in data analysis Types of databases (relational, non-relational) Overview of database management systems (DBMS)
Relational Databases and SQL	Students will understand what relational databases are and how to write structured query language	Introduction to relational databases Basics of Structured Query Language (SQL) Writing SQL queries to retrieve data from databases Filtering, sorting, and aggregating data using SQL
Data Manipulation and Transformation	Students will understand how to carry out data transformation using spreadsheets and SQL	Data cleaning and preprocessing techniques Working with missing values and outliers Joining and merging data from multiple tables
Database Design and Normalization	Students will learn how to create relational databases, tables and how to add data into them.	Principles of database design Entity-relationship modeling Normalization techniques to eliminate data redundancy Designing efficient and scalable databases
Advanced SQL Queries	Students will learn some advanced SQL functions and patterns.	Subqueries and nested queries Working with multiple tables and complex joins Using functions, views, and stored procedures

SECTION 3

DATA VISUALIZATION USING POWER BI

MODULE	OBJECTIVES	TOPICS
What is Power BI?	Student will understand why Power BI is important to a Data analyst and its standout features	Power BI and its uses
Components & Architecture of Power BI	To understand the make-up and different parts of the power BI service	Features of Power BI Structure of Power BI
Building Blocks of Power BI	This will ensure understanding of the Power BI services, their connectivity and various functions in a data analysis project	Breaking Down Power BI Setup and Installation
Getting Started with Power BI	This will acquaint student with the interface and navigation of Power BI application	Power BI interface Ribbons Views – data,report,model
Import Data	Student will learn how to import data from several sources into Power BI	Import Data from excel files, csv json files. Import from SQL databases Import from Web urls
Power BI Charts	Creating and modelling chart to for effective visualization will be understood here.	Creating Charts Editing Charts Chart Filters Custom Charts
Data Modelling	Student will learn and understand how to clean, transform and modify data for effective visualization and analysis	Data Cleaning Data Transformation Data Modelling
DAX functions	Understanding and using DAX formulas for in-depth analysis	DAX formula syntax Calculated columns
Power BI KPI	Understanding KPIs and how to adequately represent it on Power BI	What is KPI Power BI KPI capabilities
Power BI Reports	Report creating process	Sheets creation Storytelling with visualization

Power BI Dashboards	Students will learn how to create and publish a captivating and insightful dashboard	Creating a Power BI dashboard Publishing Dashboard
Power BI AI Capabilities	Student will learn how to leverage the AI capabilities of power BI e.g Question and Answer Function (QnA)	Power BI Q n A Smart Narrative Decomposition Tree etc.
Power BI Apps	Student will understand what a Power BI App is and how to create it.	What is a Power BI App Creating Power BI Apps

SECTION 4

PYTHON FOR DATA ANALYSIS

Python can be used for Web development, Scientific and Numeric Analysis,

Creating programs (GUI Interfaces), Software Development, ML&AI etc.

Software Installation

Python 3.11.1 and above

IDE- Anaconda (jupyter notebook), PyCharm, VScode(jupyter notebook)

Virtual Environments

Create different virtual environments for code integrity, install specific libraries required for specific applications, prevent system wide installation of libraries or packages.

Introduction to command line

Open the command line by using CMD from your windows key/ search bar.

run CMD with Administrator privileges

Navigation

cd [dir name] - change directory

cd .. - go back to previous directory

dir - list all files in current directory

[program name] - open specific programs

Introduction to Python Programming Language

Python syntax, variables, user input, print

Python data types

Python collections

Python Functions

Python Modules and Libraries

Simple program construction

Python for Data Analysis

Introduction to python for data analysis

Libraries - Numpy, Pandas, MatplotLib, Seaborn

Numpy

ndarray, 1-D arrays, 2-D arrays

Numpy Array Methods, Random Numbers

Pandas

Using Numpy and Pandas

Series and DataFrames

Pandas Methods

Grouping and Pivot Tables

MatPlotLib

Visualization in Python

Matplotlib Object oriented API

Creating Bar charts

Creating Line Plot

Creating other chart types

Customizing Charts

Seaborn

Datasets and Visualization

Loading Seaborn Datasets

Seaborn Charts

EDA - Exploratory Data Analysis

Data Cleaning, Data Munging

Functional Data Exploration

Graphical Data Exploration

Statistics

Measures of Central Tendency

Regression

Encoding, Binning, Normalization

Streamlit

Creating a Data Analysis Application using Streamlit

COURSE DURATION

SECTION	MODULE	No of Hours	No of Days (3hrs per Day)
0	INTRODUCTION TO DATA AND DATA ANALYSIS	3	1
1	ADVANCED MICROSOFT EXCEL	36	12
2	SQL	27	9
3	DATA VISUALIZATION USING POWER BI	36	12
4	PYTHON FOR DATA ANALYSIS	45	15
TOTAL		147	49