

Devi Ahilya University, Indore, India Institute of Engineering & Technology				III Year B.E. (Information Technology (Full Time)			
Subject Code & Name	Instructions Hours per Week			Credits			
6ITRE1 Data Analytics	L	T	P	L	T	P	Total
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- Understanding of descriptive statistics such as mean, standard deviation, covariance, and correlation to analyze data.
- Proficiency in Python programming, data structures, and libraries such as NumPy and Pandas for numerical operations and data manipulation.
- Ability to use data visualization tools like Matplotlib and Seaborn packages to plot different types of graphs.
- Knowledge of SQL commands, keys, and statements such as Create table, Drop table, Insert Statement, Delete Statement, Update statement, Merge Statement, and Clause: INSERT, SELECT, WHERE, ORDER BY, GROUP BY, HAVING, and DELETE.
- Familiarity with Tableau and its features such as data connection, aggregation, charts, functions, and data blending for effective data visualization.

UNIT – I

Introduction to Data Analytics, What is Data Analysis, Advantages of data analysis and visualization. Descriptive Statistics – Mean, Standard Deviation, Covariance and Correlation, Confidence intervals.

UNIT – II

Python Concepts, Data Structures and Map function, lambda function and list comprehensions in Python, Numpy Library for Numerical operations, Numpy arrays, Pandas Series and Data frames, Data Manipulation with Pandas -Missing Values, Outlier and Error. Visualization tool in Python: Matplotlib and Seaborn Package – Plotting Graph - Controlling Graphs – Adding Text – More Graph Types.

UNIT – III

Keys in SQL - Primary Key, Foreign Key, Candidate Key, Super Key. SQL Commands - Create table, Drop table and Alter Table. Insert Statement, Multiple Inserts, Delete Statement, Delete with conditions, Update statement, Update with Conditions. Merge Statement, Clause: INSERT, SELECT, WHERE, ORDERBY, GROUPBY, HAVING, DELETE; Order of execution.

UNIT – IV

Multi table Queries – Joins, correlated subqueries, SELF JOIN, EQUI JOIN, CROSS JOIN, NATURAL JOIN and USING clause. Analytical Functions – OVER and PARTITION with ORDER BY, Slicing

windows and filtering with analytical functions, Rank, Dense rank, Lead and Lag functions. Views, Hierarchical queries, inline queries, flashback queries COALESCE function.

UNIT – V

What is data visualization? What is Tableau? Why tableau?, Advantages of Tableau , Connecting to data ,Joins , filters , hierarchies , groups , Time series , Aggregation, Charts –bar chart, heat map, scatter plot, area chart , dual axis chart , bubble chart , maps. Data blending in tableau ,Functions – string functions, number functions , date functions, type conversion functions , aggregate functions , Data Joining –left , right , inner , Joining on multiple fields. Parameters.

REFERENCES

- [1].1 Date C J, “An Introduction To Database System”, Pearson Educations
- [2].Korth, Silbertz, Sudarshan, “Fundamentals of Database System”, McGraw Hill
- [3].Elmasri, Navathe, “Fundamentals of Database Systems”, Pearson Educations
- [4].Rob, “Database System: Design Implementation & Management”, Cengage Learning
- [5].Atul Kahate, “Introduction to Database Management System”, Pearson Educations
- [6].Python Data Science Handbook, Jake VanderPlas, O'Reilly
- [7].Paneerselvam, “Database Management System”, PHI Learning
- [8].Oracle 9i Database Administration Fundamental-I, Volume I, Oracle Press, TMH
- [9]. dev.mysql.com

List of practicals:

- 1) Descriptive statistics practical: Analyzing a dataset and calculating its mean, standard deviation, covariance, and correlation using Python.
- 2) Data manipulation practical: Cleaning and manipulating data using Pandas library in Python, including handling missing values, outliers, and errors.
- 3) Data visualization practical: Creating various types of graphs using Matplotlib and Seaborn packages in Python, such as bar charts, scatter plots, and heat maps.
- 4) SQL practical: Writing SQL queries to create tables, alter tables, insert and delete data, and use clauses such as WHERE, ORDER BY, and GROUP BY.
- 5) Tableau practical: Using Tableau to connect to data, create visualizations such as bar charts, line charts, and maps, and perform data blending on multiple data sources