Devi Ahilya University,Indore,India Institute of Engineering &Technology				**III Year B.E. (Information Technology(FullTime)**			
Subject Code & Name	**InstructionsHoursper Week**			**Credits**			
6ITRE1 Data Analytics	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**2**	**3**	**1**	**1**	**5**
DurationofTheoryPaper:3Hours							

Learning Objectives:

- Understandingof descriptivestatisticssuchasmean,standarddeviation,covariance,andcorrelationtoanalyzedata.
- Proficiency in Python programming, data structures, and libraries such as NumPy and Pandasfornumericaloperations anddatamanipulation.
- Ability to use data visualization tools like Matplotlib and Seaborn packages to plot differenttypesofgraphs.
- Knowledge of SQL commands, keys, and statements such as Create table, Drop table, InsertStatement,DeleteStatement,Updatestatement,MergeStatement,andClause:INSERT,SELECT,WHERE,ORDERBY,GROUPBY,HAVING,andDELETE.
- FamiliaritywithTableauanditsfeaturessuchasdataconnection,aggregation,charts,functions,anddata blendingforeffectivedata visualization.

CO-PO Relationship Matrix

CO No.	Course Outcome	Program Outcomes (PO)
CO1	Theoretical Foundations - Acquire a solid understanding of the theoretical foundations of data analytics, including key concepts, techniques, and applications.	PO1, PO2, PO12
CO2	Practical Skills - Develop practical skills in applying data analytics techniques to real-world problems using Python and relevant libraries.	PO2, PO5, PO11, PO12
CO3	Data Visualization - Gain proficiency in using data visualization tools to effectively communicate insights derived from data analysis.	PO3, PO5, PO8
CO4	Statistical Analysis - Apply statistical methods to analyze data and interpret the results to support decision-making processes.	PO1, PO2, PO4
CO5	Problem-Solving - Utilize data analytics methods to solve complex problems in various domains, demonstrating the ability to select and implement appropriate techniques.	PO2, PO3, PO4, PO5, PO6, PO9, PO10

CO-PO Matrix for Data Analytics

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3										2
CO2		2		3	3					3	2	3
CO3			3		2			2				
CO4	3	3		2								
CO5		3	2	2	3	2			2	3		

- 1 → Relevant and small significance
- 2 → Medium or moderate significance
- 3 → Strong significance

UNIT–I

IntroductiontoDataAnalytics,WhatisDataAnalysis,Advantagesofdataanalysisandvisualization.DescriptiveStatistics–Mean,StandardDeviation,CovarianceandCorrelation,Confidence intervals.

UNIT– II

Python Concepts, Data Structures and Map function, lambda function and list comprehensions inPython , 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 GraphTypes.

UNIT–III

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

UNIT– IV

MultitableQueries–
Joins,correlatedsubqueries,SELFJOIN,EQUIJOIN,CROSSJOIN,NATURALJOINandUSINGclause.AnalyticalFunctions–OVERandPARTITIONwithORDERBY,Slicingwindows and filtering with analytical functions, Rank, Dense rank, Lead and Lag functions. Views,Hierarchicalqueries,inline queries,flashbackqueriesCOALESCEfunction.

UNIT–V

What is data visualization? What is Tableau? Why tableau?, Advantages of Tableau , Connecting todata,Joins,filters,hierarchies,groups,Timeseries,Aggregation,Charts–bar chart,heatmap, scatterplot, area chart , dual axis chart , bubble chart , maps. Data blending in tableau ,Functions – stringfunctions, number functions , date functions, type conversion functions ,aggregate functions , DataJoining–left,right,inner,Joiningonmultiplefields.Parameters.

REFRENCES

1. Python Data Science Handbook, Jake VanderPlas, OREILLY
2. Dr Anil Maheshwari, Data Analytics Made Accessible, Publisher: Amazon.comServices LLC
3. Eric Siegel, Predictive Analytics The Power to Predict Who Will Click, Buy, Lie,or Die, 2 nd Ed., Wiley.
4. Jake VanderPlas, Python Data Science Handbook - Essential Tools for Workingwith Data, O'Reily Media Inc., 2016.
5. Zhang.Y, An Introduction to Python and Computer Programming, SpringerPublications, 2016.
6. Ryan sleeper Tableau Desktop Pocket Reference, O'Reilly Media 2021

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 Pandaslibrary in Python, including handling missing values, outliers, and errors.
3) Data visualization practical: Creating various types of graphs using Matplotliband 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 anddelete 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 datasources

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