DEPARTMENT OF BACHELOR OF COMPUTER APPLICATIONS

COURSE MODULE: Introduction to Data Analytics using Python

Course Coordinator: Prof. Prashant R Kaigaddi				Academic Year:**2025-26**	
Department: Bachelor of Computer Application					
Course Code	**Course Title**	**Core/Elective**	**Prerequisite**	**Contact Hours** L:T: P:S	**Total Hrs/ Sessions**
BBCA403	Introduction to Data Analytics using Python	PCC		3:0:0:0	40-45(TH)

Course Learning Objective:

1. To introduce the data analytics lifecycle and equip students with a foundational understanding of Python as a tool for data analysis.
2. To develop proficiency in using Python data structures such as strings, lists, sets, tuples, and dictionaries for managing and processing data.
3. To enable students to apply NumPy and pandas libraries for numerical computation, data manipulation, statistical analysis, and handling missing data.
4. To teach techniques for loading, storing, and transforming data from various sources, including files, databases, and web APIs, along with string manipulation and data wrangling.
5. To equip students with the ability to visualize and summarize data through charts, plots, and grouped operations using libraries like matplotlib and pandas.

Teaching-Learning Process (General Instruction):

1. Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations.
2. Adopt collaborative (Group Learning) Learning in the class.
3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information.

Module-1

Introduction to Data Analytics: Life Cycle, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize. Data Analytics using

Python: Python for Data Analysis, Python as Glue, Solving the "Two-Language" Problem, Essential Python Libraries, Installation and Setup, Integrated Development Environments (IDEs).

TLP: Power Point Presentation, Chalk and Talk

Module-2

Python Data Structures:

Strings- Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings,

Lists-Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods. Sets, Tuples and Dictionaries

TLP: Power Point Presentation, Chalk and Talk

Module-3

NumPy Basics: The NumPyndarray, Universal Functions, Data Processing Using Arrays, File Input and Output with Arrays, Linear Algebra, Random Number Generation.

Pandas: Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics, Handling Missing Data, Hierarchical Indexing

TLP: Power Point Presentation, Chalk and Talk.

Module-4

Data Loading, Storage, and File Formats: Reading and Writing Data in Text Format, Binary Data Formats, Interacting with HTML and Web APIs, Interacting with Databases,

Data Wrangling: Combining and Merging Data Sets, Reshaping and Pivoting, Data Transformation, String Manipulation

TLP: Power Point Presentation, Chalk and Talk

Module-5

Plotting and Visualization: A Brief matplotlib API Primer, Figures and Subplots, Plotting Functions in pandas, Plotting Maps

Data Aggregation and Group Operations: GroupBy Mechanics, Data Aggregation, Group-wise Operations and Transformations, Pivot Tables and Cross-Tabulation

TLP: Power Point Presentation, Chalk and Talk

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No. Description Blooms Level

CO 1. Explain the data analytics lifecycle and use Python programming as a tool for data analysis

CO 2. Apply basic Python data structures such as strings, lists, sets, tuples, and dictionaries for efficient data handling and manipulation.

CO 3. Implement data analysis techniques using NumPy and pandas libraries for data processing, array operations, descriptive statistics, and handling missing data.

CO 4. Perform data loading, storage, file handling, web API interaction, and apply data wrangling techniques such as combining, reshaping, and transforming datasets.

CO 5. Create effective data visualizations using matplotlib and pandas, and perform data aggregation and group operations like pivot tables and cross-tabulation.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The
minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the
maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the

credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum
total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:
Three Unit Tests each of **20 Marks**
Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**
to attain the COs and POs
The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:
The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
The question paper will have ten full questions carrying equal marks.
Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions)from each module.
Each full question will have a sub-question covering all the topics under a module.

Suggested Learning Resources:
Books
1. Python for Data Analytics, Wes McKinney, O'Reilly, ISBN: 978-1-449-31979-3

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Subject Code:BBCA403				TITLE: Introduction to Data Analytics using Python			Faculty: PRASHANT R KAIGADDI				
List of Course Outcomes	Program Outcomes										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	2		2	2							
CO-2	2	3	2		3							
CO-3	2	3	2	3	3							
CO-4	2	2	3	3	3							
CO-5	2	2	2	3	3							
Total	9	12	9	11	14	0	0	0	0	0	0	0

Note: 3 = Strong Contribution 2 = Average Contribution 1 = Weak Contribution - = No Contribution