CAP776:PROGRAMMING IN PYTHON

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: define the basic structure and features of Python programming.

CO2 :: understand the working of object-oriented programming concepts like encapsulation, inheritance and polymorphism.

CO3 :: apply pandas and NumPy libraries for data analysis and visualize results using matplotlib and seaborn.

CO4 :: analyze the situation specific problems and perceive solutions.

Unit I

Python basic : introduction, data types and operators, control statements, functions, strings, lists, sets, tuples and dictionaries

Unit II

OOP concepts : OOP features, encapsulation, inheritance, function overloading, operator overloading and method overriding, Exception handling, catching exceptions, catching multiple exceptions, raising exceptions, custom exception

Unit III

Introduction to NumPy : arrays vs lists, array creation routines, arrays from existing data, indexing and slicing, Operations on NumPy arrays, array manipulation, broadcasting, binary operators, NumPy functions:, mathematical functions, statistical functions, sort, search and counting functions

Unit IV

Handling data with pandas : introduction to pandas, series, dataframe, sorting, working with csv files, operations using dataframe, Data cleanup:, investigation, matching and formatting

Unit V

Data visualization : introduction to matplotlib, line plot, multiple subplots in one figure, bar chart, histogram, box and whisker plot, scatter plot, pie charts, introduction to seaborn, seaborn Vs matplotlib, data visualization using seaborn

Unit VI

Machine learning : introduction, types of machine learning, linear regression, k-nearest neighbours, decision trees, random forests, k-means clustering

List of Practicals / Experiments:

Practical

- Programs based on: variables, expressions and statements
- control statements and functions
- strings
- lists and tuples
- sets and dictionaries
- exception handling
- OOP concepts
- NumPy
- Pandas
- matplotlib and seaborn
- machine learning algorithms

Text Books:

1. PROGRAMMING AND PROBLEM SOLVING WITH PYTHON by ASHOK KAMTHANE, AMIT ASHOK KAMTHANE, M.G.Hills

References:

References:

1. PYTHON: THE COMPLETE REFERENCE by MARTIN C. BROWN, MC GRAW HILL