INT213:PYTHON PROGRAMMING

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

Course Outcomes: Through this course students should be able to

- analyze real life situational problems and think creatively about solutions of them.
- apply a solution clearly and accurately in a program using python.
- analyze and visualize the data using python libraries.
- apply the concept of dynamic programming to solve the real world problems.

Unit I

Introduction : introduction to python, programming languages, programming errors
Variables, expression and statements : identifiers, variables, assignment statements, expressions, named constant, simultaneous assignment, boolean types, numeric data types, operators, operator precedence and associativity, augmented assignment operators, type conversion and rounding
Conditionals and iteration : conditional expressions, random numbers, minimizing numerical errors, if statement, two way if-else, nested if and multi-way if-elif-else statements, for loop, while loop, nested loops, break and continue
Functions and recursion : defining a function, function call, return values, positional and keyword arguments, passing arguments by reference values, scope of variables, default arguments, returning multiple values, recursion, recursion vs iteration, tail recursion, math functions

Unit II

String : string a compound data type, length, string traversal, string slices, comparison, string functions, the str class.
Lists : list basics, copying lists, passing lists to functions, returning lists from functions, searching and sorting lists, multidimensional list.
Numpy arrays: arrays vs lists, data types, array creation routines, arrays from existing data, indexing and slicing, array manipulation, broadcasting, binary operators, mathematical functions, statistical functions, sort, search and counting functions
Tuples, sets and dictionaries : introduction to tuples, operations on tuples, introduction to sets, set operations, creating dictionary, adding, modifying and retrieving values, deleting items, dictionary methods, operations on dictionary.

Unit III

Handling data with pandas : Introduction to pandas, series, dataframe, descriptive statistics, sorting, working with csv files, operations using dataframes.
Files and exceptions : introduction, text input and output, pickling, exceptions handling, raising exceptions,
Building GUI using python : tkinter programming, tkinter widgets like button, canvas, entry, frame, label, list box, menu, message, scale, text, spinbox, labelframe, tkMessagebox, standard attributes, geometry management, GUI and database with sqlite3

Unit IV

Classes and objects : creating classes, creating instance objects, accessing attributes, overview of OOP terminology
Object oriented programming terminology : Class Inheritance, Overriding Methods, Data Hiding, Function Overloading

Unit V

Data visualization with matplotlib : line plot, multiple subplots in one figure, histograms, bar charts, pie charts, scatter plots
Data visualization with seaborn : seaborn- color palette, histogram, kernel density estimates, plotting categorical data, facet grid and pair grid

Unit VI

Searching and sorting: linear search, binary search, insertion sort, selection sort, merge sort, quick sort
Dynamic programming: introduction, application of dynamic programming: factorial, Fibonacci series, longest common subsequence.

Text Books:

1. INTRODUCTION TO PROGRAMMING USING PYTHON by Y. DANIEL LIANG, PEARSON

References:

1. PYTHON PROGRAMMING: USING PROBLEM SOLVING APPROACH by REEMA THAREJA, OXFORD UNIVERSITY PRESS