INT 213: Python Programming

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

Course Outcomes: Through this course students should be able to

CO1: Describe the Python language syntax, including control statements, loops, and functions to write programs for various mathematics, science, and game problems.

CO2: Discuss the core data structures like lists, dictionaries, tuples, and sets in Python to store, process, and sort the data.

CO3: Illustrate the concepts of Object-oriented programming as used in Python using encapsulation, polymorphism, and inheritance

CO4: Identify the external modules for creating and writing data to excel files and inspect the file operations to navigate the file systems.

CO5: justify the use of GUI in different Applications of Python and evaluate different database operations

CO6: Design and develop real-time applications using Python.

UNIT 1

Introduction: python programming language, introduction to program and debugging, formal and natural language
Variables,Expression and Statements : Values and types, variables, variables name and keywords, statements, operators and operand, order of operations, operations on string, composition and comments
Conditionals and Iteration: modulus operator, boolean expressions, logic operators, conditional, alternative execution, nested conditionals and return statements, while statements, encapsulation and generalization
Functions and recursion: function calls, type conversion and coercion, math functions, adding new function, parameters and argument, recursion and its use

UNIT 2

String: string a compound data type, length, string traversal, string slices, comparision, find function, looping and counting
Lists: list values, length, membership, operations, slices, deletion, accessing elements, list and for loops, list parameters and nested list
Tuples and Dictionaries: mutability and tuples, tuple assignment, tuple as return values, random numbers and list of random numbers, counting and many buckets, dictionaries operations and methods, sparse matrices, aliasing and coping

UNIT 3

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 4

Files and Exceptions: text files, writing variables, directories, pickling, exceptions
Regular Expressions – Concept of regular expression, various types of regular expressions, using match function, Web Scraping by using Regular Expressions
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

UNIT 5

Using Databases with Python: Installation of MySQL Database Software, Verifying MySQL in the windows Operating system, Installing MySQLdb Module, Verifying the MySQLdb Interface Installation, Working with MySQl Databse, Using MySQL from python, Retrieving All Rows from a Table, Inserting Rows into a Table, Deleting Rows into a Table, Updating Rows in a Table, Creating Database Tables through python. Creating a GUI that handles an event

UNIT 6

Data visualization with matplotlib: line plot, multiple subplots in one figure, histograms, bar charts, pie charts, scatter plots
Handling data with pandas: series, dataframes, read and write csv file, operations using dataframe
Numpy arrays: numpy - datatype, array operations, statistical functions, broadcasting

List of practical's':

Program 1: Program to enter two numbers and print the arithmetic operations like +,-,*, /, // and %.

Program 2: Write a program to find whether an inputted number is perfect or not.

Program 3: Write a Program to check if the entered number is Armstrong or not.

Program 4: Write a Program to find factorial of the entered number.

Program 5: Write a Program to enter the number of terms and to print the Fibonacci Series.

Program 6: Write a Program to enter the string and to check if it's palindrome or not using loop.

Program 7: Recursively find the factorial of a natural number.

Program 8: Read a file line by line and print it.

Program 9: Remove all the lines that contain the character “a” in a file and write it into another file.

Program 10 Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.

Program 11 Create a binary file with name and roll no. Search for a given roll number and display the name, if not found display appropriate message.

Program 12 Write a random number generator that generates random numbers between 1 and 6(simulates a dice)

Program 13 Write a python program to implement a stack using a list data structure.

Program 14 Take a sample of ten phishing e-mails (or any text file) and find most comm

Program 15 Read a text file line by line and display each word separated by a #

Program 16 Create a student table and insert data. Implement the following SQL commands on the student table:

ALTER table to add new attributes / modify data type / drop attribute

UPDATE table to modify data

ORDER By to display data in ascending / descending order

DELETE to remove tuple(s)

GROUP BY and find the min, max, sum, count and average

Program 17: Integrate SQL with Python by importing the MySQL module

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