PROBLEM SOLVING USING PYTHON

Course Code: 25ENUEC158	Course Type: IPCC
Teaching Hours/Week (L: T: P: S): 3:0:2	Credits: 4
Total Teaching Hours: 40+0+26	CIE + SEE Marks: 40+60
Teaching Department: Artificial Intelligence & Machine Learning	

COURSE OBJECTIVES:
- Make use of python operators for manipulating lists, dictionaries and files.
- Design function-based Python programs.
- Design list, tuple related programs in Python
- Write string handling programs in python.
- Make use of python operators for manipulating lists, dictionaries and files.

UNIT-I	
Introduction to Python and Functions	10 Hours
Python Concepts: Introduction to Python, Variables, Keywords, Identifiers, Literals, Operators, Comments . **Control Statements:** if, if-else, elif, nested if, for loop, while loop, break, continue, pass, **Functions:** Overview, arguments and return values, formal vs actual arguments, named arguments, Recursive Functions, Lambda Functions, **Modules:** Importing and using built-in and user-defined modules	
UNIT-II	**10 Hours**
Data Structures and Files	
Strings: Creation, indexing, slicing, methods. Lists, Tuples, Sets, Dictionaries: Creation and basic operations. Object-Oriented Concepts: Introduction to Class and Object. **File Handling:** Creating files, reading and writing to text files, working with CSV files	
UNIT-III	
Exception Handling and Libraries	10 Hours
Exception Handling: Introduction to exceptions and errors, Handling exceptions using try-except-else-finally, Introduction to Pandas: Data Frames and Series, basic operations, Reading CSV files using Pandas.	
UNIT-IV	
Data Visualization and Practice	10 Hours
Data Visualization using Matplotlib: Line plots, bar graphs, pie charts. Customizing plots: Titles, labels, legends, colors. Mini project / Hands-on exercises integrating Python functions, data structures, files, Pandas, and visualization	
Suggested List of Experiments **PART A** 1. Write a program to display all prime numbers within a range. Hint: Use range function for-loop and while loop. 2. A library charges a fine for every book returned late. For first 5 days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a Python program to accept the issue date and return date and calculate the fine or the appropriate message. Assume the due date as 15 days from the date of issue. 3. Create a list with random numbers. Iterate the list and count the occurrence of each element and create a dictionary to show the count of each element.	

4. Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate of Rs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work for fractional part of an hour.
5. Create a dictionary called Student info which contains students name and Register number. Read student's Register number and check if the record exists or not. Display the students list in sorted order
6. Write a Python program to divide two numbers. Handle the case where the user tries to divide by zero and provide a custom error message.
7. Write a program to design a shopping cart with the following options (i). Add item to the cart (ii). view cart (iii). delete item from the cart Tables: cart table: p_id, p name, quantity, price Product: id, p_name, price.
8. Write a Python program to display the number of projects undertaken by students in different departments using a pie chart.
9. Write a Python program using **Matplotlib** to plot monthly sales of a product for a year. Label the axes, add a title, and show gridlines.
10. Write a Python program to read names and grades of students and display a **bar chart**. Add labels, colors, and a legend.

Course Outcomes: At the end of the course student will be able to
1. Experiment with the basics of python programming like data types and looping.
2. Apply the concept of functions for solving real-world problems.
3. Apply the operations for manipulating strings, lists, tuples and dictionaries.
4. Demonstrate the File Systems handling using program.
5. Illustrate the basic knowledge on Exception handling and plotting graphs.

TEXTBOOKS:
1. Kenneth A. Lambert, "The Fundamentals of Python: First Programs", Cengage Learning, 2nd Edition, 2019.
2. Yashwanth Kanetkar, Adithya Kanetkar, "Let us Python", 3rd Edition.

REFERENCE BOOKS:
1. Mark Summerfield, "Programming in Python 3 - A Complete Introduction to the Python Language", Second Edition, Addison-Wesley, 2009.
2. Y. Daniel Liang, "Introduction to Programming Using Python", Pearson, 2018.

E Books / MOOCs/ NPTEL
1. https://www.w3schools.com/
2. https://www.programiz.com/python-programming/guide