22DS1L2: OBJECT ORIENTED PROGRAMMING LAB

Course Name	Object Oriented Programming Lab		L	T	P	C	CIA	SEE	TM
Course Code	22DS1L2		0	0	6	3	30	70	100
Year of Introduction: 2020	Year of Offering: 2022	Year of Revision: No Revision	Percentage of Revision: Nil						
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks									

Course Description and Purpose:
Python Programming is a course that illustrates Basic Concepts of *Python Programming*, *Decision Control Statements*, *Functions* and *Modules*, *Python Strings Revisited*, *Data Structures*, *Classes and Objects*, *Inheritance*, *Operator Overloading*, *Pandas*, *Error and Exception Handling*, *File Handling*, *Numpy*, *Matplotlib*.

Course Objectives:
This course will help enable the students t o understand, learn and develop a various *Decision Control Statements*, *Functions & Modules*, *Strings*, *Data Structures*, *Classes and Objects*, *Inheritance*, *Operator Overloading*, *Pandas*, *Error and Exception Handling*, *Handling Files*, *Databases*.

Specific objectives include:
- ✓ To understand *Basics of Python Programming*, *Decision Control Statements*.
- ✓ To know the concepts *of Data Structures*, *Functions and Modules*.
- ✓ To know the concepts of *Classes and Objects*, *Object Oriented Programming*.
- ✓ To apply *Error and Exception Handling*.
- ✓ To implement *Database Access* and *File Handling*.

Course Learning Outcomes:
Upon successful completion of the course, the student will be able to:
CO1: Understand *Basics of Python Programming*, *Decision Control Statements*.
CO2: Know the concepts of *Data Structures*, *Functions and Modules*.
CO3: Know the concepts of *Classes and Objects*, *Object Oriented Programming*.
CO4: Apply *Error and Exception Handling*.
CO5: Implement *Database Access* and *File Handling*.

1. Write a program to find total for given number of tens, number of fives, number of twos and number of ones. (CO1, L1)
2. Write a program to enter a number and display its hex and octal equivalent and its square root. (CO1, L1)
3. Write a program to read and print values of variables of different data types. (CO1, L1)
4. Write a program to calculate the distance between two points. (CO1, L1)
5. Write a program to calcuate area of troangle using Heron's formula. (CO1, L1)
   (Hint: Heron's formula is given as: area=sqrt(S*(S-a)*(S-b)*(S-c)))
6. Write a program to calculate the distance between two points. (CO1, L1)
7. Write a program to perform addition, subtraction, multiplication, division, integer division. (CO1, L1)
8. Write a program to find the greatest number from three numbers. (CO1, L1)
9. Write a program to calculate tax given the following conditions: (CO1, L1)
   If income is less than 1,50, 000 then no tax
   If taxable income is Rs.1,50,001 - Rs.300,000 then charge 10% tax
   If taxable income is Rs.3,00,001 - Rs.500,000 then charge 20% tax
   If taxable income is above Rs.5,00,001 then charge 30% tax

10. Write a program to calculate roots of quadratic equcation. (CO1, L1)
11. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, and display the grade obtained by the student. If the student scores an aggregate garter than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then grade is First Division. If the aggregate is 50>= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the garde is Third Division. Else the grade is Fail. (CO1, L1)
12. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by the user. (CO1, L1)
13. Write a program to find whether the given number is an *Amstrong Number* or *not*. (CO1, L1)
14. Write a program to enter a Decimal Number. Calculate and display its Binary Equivalent. (CO1, L1)
15. Write a program to demonstrate List Operations. (CO2, L1)

- Access List Items
- Change Item Value
- Appended Items
- Remove Specified Item
- Loop Through a List
- List Comprehension
- Sort List Alphanumerically
- Copy a List
- Join Two Lists
- List Methods

16. Write a program to demonstrate Tuple Operations. (CO2, L1)

- Access Tuple Items
- Negative Indexing
- Range of Indexes
- Range of Negative Indexes
- Check if Item Exists
- Update Tuples
- Add Items
- Remove Items
- Unpacking a Tuple
- Using Asterisk*
- Loop Through a Tuple
- Loop Through the Index Numbers
- Using a While Loop:
- Python - Join Tuples
- Join Two Tuples
- Multiply Tuples

17. Write a program to demonstrate Set Operations. (CO2, L1)
- Access Set Items
- Add Set Items
- Loop Sets
- Join Two Sets
- Keep ONLY the Duplicates
- Keep All, But NOT the Duplicates

18. Write a program to demonstrate Dictionary Operations. (CO2,L1)
- Ordered or Unordered?
- Changeable
- Duplicates Not Allowed
- Accessing Items
- Change Values
- Update Dictionary
- Adding Items
- Remove Dictionary Items
- Loop Through a Dictionary
- Copy a Dictionary
- Nested Dictionaries

19. Write a program to enter a number and then calculate the *Sum of Its Digits*. (CO2,L1)
20. Write a program to print the *Reverse Number*. (CO2,L1)
21. Write a program to calculate GCD of two numbers. (CO2,L1)
22. Write a program that prompts users to enter numbers. The process will repeat until user enters -1. Finally, the program prints the count of prime and composite numbers entered. (CO2,L1)
23. Write a program (CO2,L1)

(a) To calculate the factorial of number recursively.

(b) To calculate GCD using the recursive functions.

24. Write a program (CO2,L1)

(a)To calculate exp(x,y) using recursive functions

(b) To print the Fibonacci Series using Recursion.

25. Write a program make a *Simple Calculator*. (CO2,L1)
26. Write a program that defines a function large in a module which will be used to find large of two values and called from a code in another module. (CO2,L1)
27. Write a program that demonstrate the use of method __init__ . (CO3,L1)
28. Write a program to illustrate the modification of instance variable. (CO3,L1)
29. Write a program for modifying a mutable type attribute. (CO3,L1)
30. Write a program to demonstrate the use of inheritance. (CO3,L1)
31. Write a Program to demonstrate Polymorphism. (CO3,L1)

32. Write a program to demonstrate Polymorphism using Function Overloading. (CO3,L2)
33. Write Program to demonstrate Method Overriding with arguments. (CO3,L2)
34. Write a python program to demonstrate multilevel inheritance. (CO3,L2)
35. Write a program to demonstrate Multipath Inheritance (or) Hybrid Inheritance. (CO3,L2)
36. Write a program to demonstrate Multi Level Inheritance (A person is teacher & having designation HOD) (CO3,L2)
37. Write a program to demonstrate *Multi-Path Inheritance*. (CO3,L2)
38. Write a program to illustrate the concept of Abstract Class. (CO3,L2)
39. Write a program to overload the + operator on a complex object. (CO3,L2)
40. Write a program to handle Divide by Zero Exception. (CO4,L2)
41. Write a program to handle Multiple Errors with One Except statement. (CO4,L2)
42. Write a program with Multiple Except Blocks. (CO4,L2)
43. Write a program to demonstrate else statement in exception handling. (CO4,L2)
44. Write a python program to illustrate the try...catch...finally in exception handling. (CO4,L2)
45. Write a program to demonstrate Regular Expression Functions. (CO2,L2)

- findall()
- Search
- Split
- sub()

46. Write a program Demonstrate Regular Expression Meta Characters. (CO2,L2)

- Python program to match string using metacharacter []
- Program to find digits in character using metacharacter \
- Program for sequence that starts with "he", followed by two (any) characters using metacharacter ..
- Program to check if the string starts with 'hello' using metacharacter ^
- Program to check the string ends with 'world' using metacharacter $
- Program to check the string contains "ai" followed by 0 or more "x" characters
- Program to check the string contains "ai" followed by 1 or more "x" characters
- Program to check if the string contains "a" followed by exactly two "l" characters
- Program to check if the string contains either "falls" or "stays" using meta character |

47. Write a program to demonstrate Regular Expression Sequences. (CO2,L2)

- Program to check if the string starts with "The"
- Program to check if "ain" is present at the begining of a word
- Program to check if "ain" is present at the end of a word.
- Program to check if "ain" is present, but NOT at the begining of a word.
- Program to check if "ain" is present, but NOT at the end of a word.
- Program to Check if the string contains any digits (numbers from 0-9).
- Program to return a match at every no-digit character.
- Program to return a match at every white-space character.

- Program to return a match at every NON white-space character.
- Program to return a match at every word character (characters from a to Z, digits from 0-9, and the underscore _ character)
- Program to return a match at every NON word character (characters NOT between a and Z. Like "!", "?" white-space etc.)
- Program to check if the string ends with "Spain".

48. Write a program to demonstrate Regular Expression Sets. (CO2,L2)

- Program Check if the string has any a, r, or n characters.
- Program to Check if the string has any characters between a and n.
- Program to Check if the string has other characters than a, r, or n.
- Program to check if the string has any 0, 1, 2, or 3 digits.
- Program to check if a string has any digits.
- Program to check if the string has any two-digit numbers, from 00 to 59.
- Program to Check if the string has any characters from a to z lower case, and A to Z upper case.
- Program to check if the string has any + characters.

49. Write a program to (CO5,L2)

- Create EMP table with attributes ENO,ENAME and ESAL into PBS database.
- Insert rows into EMP table of PBS database.
- Update rows of EMP table of PBS database.
- Delete rows from EMP table of PBS database.
- Drop EMP table of PBS database.

50. Write a program to open the file and count the number of times a character appears in the file. (CO5,L1)