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ARTIFICIAL INTELLIGENCE LAB

Course Code: 22CM1103

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COURSE OUTCOMES:

At the end of the course, a student will be able to

CO1: make use of Pandas and Numpy Libraries (L3)
CO2: implement Object Oriented concepts in programming (L3)
CO3: apply exception handling and user defined exception(s) (L3)
CO4: implement Informed Search Strategies (L3)
CO5: implement Uninformed Search Strategies.(L3)

LIST OF PROGRAMS:

(Any **Twelve** programs should be carried out)

1. **Numpy Library**
   a) Create a numpy array from list, tuple with float type
   b) Python program to demonstrate slicing, integer and boolean array indexing
   c) Write a python program to find min, max, sum, cumulative sum of array.
   d) Write a python program to demonstrate use of ndim, shape, size, dtype.
2. **Numpy Library: Linear Algebra**
   a) Write a python program to find rank, determinant, and trace of an array.
   b) Write a python program to find eigenvalues of matrices
   c) Write a python program to find matrix and vector products (dot, inner, outer, product), matrix exponentiation.
   d) Write a python program to solve a linear matrix equation, or system of linear scalar equations.
3. **Numpy Advanced**
   a) Create a white image using NumPy in Python and
   b) Convert a NumPy array to an image and Convert images to NumPy array?
   c) Perform Sorting, Searching and Counting using Numpy methods.
   d) Write a program to demonstrate the use of the reshape() method.
4. **Pandas Library**
   a) Write a python program to implement Pandas Series with labels.
   b) Create a Pandas Series from a dictionary.
   c) Creating a Pandas DataFrame.

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d) Write a program which make use of following Pandas methods

i) describe()

ii) head()

iii) tail()

iv) info()

5. Pandas Library: Selection

a) Write a program that converts Pandas DataFrame and Series into numpy.array.

b) Write a program that demonstrates the column selection, column addition, and column deletion.

c) Write a program that demonstrates the row selection, row addition, and row deletion.

d) Get n-largest and n-smallest values from a particular column in Pandas dataFrame

6. Pandas Library: Visualization

a) Write a program which use pandas inbuilt visualization to plot following graphs:

i. Bar plots

ii. Histograms

iii. Line plots

iv. Scatter plots

b) Write a program to demonstrate use of groupby() method.

c) Write a program to demonstrate pandas Merging, Joining and Concatenating

d) Creating dataframes from csv and excel files.

7. Object Oriented Programming: basic

a) Write a Python class named Person with attributes name, age, weight (kgs), height (ft) and takes them through the constructor and exposes a method get_bmi_result() which returns one of "underweight", "healthy", "obese"

b) Write a python program to demonstrate various kinds of inheritance.

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8. Object Oriented Programming: advanced

a) Write a python program to demonstrate operator overloading.

b) Write a python program to create abstract classes and abstract methods.

9. Exception Handling and User defined exception(s)

a) Write a python program to catch following exception

i) Value Error

ii) Index Error

iii) Name Error

iv) Type Error

v) DivideZero Error

b) Write a python program to create user defined exceptions.

c) Write a python program to understand the use of else and finally block with try block.

d) Write a python program that uses raise and exception class to throw an exception.

10. Write a python program to implement a Water Jug Problem?

11. Write a program to Implement Breadth First Search using Python.

12. Write a program to Implement Depth First Search using Python.

13. Write a python program to implement A* algorithm. (Ex: find the shortest path)

14. Write a python program to implement the alpha-beta pruning (Ex: Tic-Tac-Toe game).

15. Implement the Constraint Specific Problem (Ex: crossword puzzle).

16. Design of Intelligent systems. (Ex: to control the VACUUM Cleaner moves)

17. Write a program to implement odd and even magic squares of nxn dimension.

18. Write a python program to implement the n-queens problem.

19. Design a planning system. (Ex: an elevator problem to move a passenger from the 1st floor to the 4th floor in a building)

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2. Dr.Nilakshi Jain, *Artificial Intelligence: Making a System Intelligent*, Wiley Publications,1st Edition,2019.
3. Martin C. Brown (Author), "*Python: The Complete Reference*" McGraw Hill Education, Fourth edition , 2018
4. R. Nageswara Rao , "*Core Python Programming*" Dreamtech Press India Pvt Ltd 2018.

WEB REFERENCES:

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2. https://swayam.gov.in/nd1_noc19_me71/preview