**\*\*Building ML-Models:- scikit-learn, Tensorflow, or Pytorch to train AI models for predictions, classifications, and recommendations.**

**Data Preprocessing: Use Pandas & NumPy to clean, transform, and analyze datasets before training AI models.**

**PYTHON**

**SESSION-1**

**Installation and Jupyter Notebook Introduction:-**

1. Anaconda Navigator and Python sw, and Terminal Installation.

2. Jupyter Notebook intro.

3. Printing the hello world and some basic introduction on IDL.

4. About code, markdown and raw.

5. Printing different datatypes like string,num,Boolean and float etc.. as an experimental thing.

**SESSION-2**

**LAGS:-**

1. ABOUT LIST’S AND OBJECTS/ DICTIONARY’S.

2. COPY AND DEEP COPY FUNCTION.

3. SPLIT AND JOIN.

4. ADDITION AND SUBSTRACTION OF LIST NUMBERS.

5. MAX, MIN, AND SORTED.

6. NESTED LIST.

7. OPERATORS IN PYTHON.

8.

SYNONIMS:-

1. Append and Add(difference).

SESSION-3

##ADVANCED DATA STRUCTURES AND FILE HANDLING

>> Mutable and immutable difference?

>> Tuple (Difference between the list and tuple).

>> Nested Tuple?

>> Why we need to use Tuple, even we are having the List?

>> What kind of functions we do like slicing and adding items in Tuple?

>> Tuple <> Lists <> Set’s <> Dictionary

>> Difference between the dictionary & Set Syntax?

>> Different ways of creating tuples like Parantheses, Function, empty, Single element, String, Dictionary.

>> Tuple Operations:-

-- Addition Operator

-- Multiplication Operator

-- Membership Operator. Etc……

>> Tuple Methods:-

-- Count etc..

>> Immutable In Tuple.

>> \*\*\*Tuple Unpacking

>>> \*\*\*DICTIONARIES and Tuple in Dictionaries.

> lists and tuples are ordered or sequential.

> Dictionaries are not ordered or not sequential.

> Dictionaries are mutable.

> Using Zip to create Dictionaries.

> Using dict to create dictionaries.

> .get (to get the values from the dictionary).

> deleting the keys from the dictionary. (del(command)).

> Adding(append), Updating and Clear the elements from the dictionary.

> Get the keys, values, items, and copy the items as whole.

> Iterating through the keys and values: keys and values separately and combindly.

> DICTIONARY COMPREHENSION, range(command).

>>> SET’S(unordered collection of unique elements) :- types of sets we can use as command

>> set cannot support the indexing and slicing, because they are unordered.

>> set’s Intersection, Union, Difference.

>> adding, Updating, Removing(clear, pop, discard), Clearing elements from the set’s.

>> Set operators.(eg: issubset())

>> PRACTICAL SCENARIO’S OF SET:-

> To remove duplicates from the list.

> Check for common elements in two lists.

> Checks if the value exists or not.

> unique word in a sequence.

> Eliminate stop words from the Text Processing.

>>> FUNCTION’S:----(Function is a re-usable code block, helps in performing specific task’s.) (It is for better modality, reusability and redability.)

>> Function Definition, Function Calling, Function Arguments.

>> What is Recursive function?

>> LAMBDA FUNCTION(It’s an one-line anonymous function, having no ‘def’ function command).

>> MAP FUNCTION:- Applies a given function to all items in an input(or any other iterables)

> By using map, we can iterate through all the values one by one and performs the action

>> FILTER FUNCTION:- This function will helps in filtering the values based on the condition.

>> REDUCE FUNCTION: reduce( )

TASK’S:--

1. Convert Celsius to Fahrenheit(By using the map function).

- calsius = [1,2,3,4,5]

2. Find max/highest number in the list.(By using the reduce function).

List = [1,2,3,4]

3. Compare map() to loops

Comapare and give a time comparision.

4. Create a list of Dictionaries for a class of students.

Name, age, maths and science. (dictionary elements)

- filter students > 80 marks in maths

- filter students > 80 marks in maths & > 80 marks in science.

\*\*\*\*\*INTRO TO THE NUMPHY AND PANDA, AND INTRO THE LANGCHAIN AND THEIR COMPONENTS.

SYNONYMS:--

1. Demographics=

**SESSION-4**

**Introduction To NumPhy and Pandas.**

1.Why Numphy?

2.Numpy library installation

>> %pip install numpy

>> import numpy as np

>>%pip install –upgrade numpy

>> print(np.\_\_version\_\_)

>>print(np.show\_config\_\_)

3.Why numpy, even we are having Lists in python.

>> Difference.

4.Array attributes(shape, size, and dtype(data\_type))

5.Number of dimensions(.ndim)

6.Memory Size (.nbytes)

7.Creating an array(.full)

8.Creating array with custom data\_type.

9. Creating array with the secquences.( .arange(start, stop, step))

**PANDAS**

**SESSION-5**

**INTRODUCTION TO PANDAS**

\*\* %pip install pandas

\*\* %pip uninstall pandas

\*\* import pandas as pd

\*\* iloc and loc

**SESSION-6**

**EDA(Exploratory Data Analysis)**

\*\* Grouping and Summerising DataFrames.

\*\*

PYTHON MASTRY(BATCH-1)

**SESSION-1**

1. High level language

\*\*Flask and Django(web-development)

\*\*Scrapy and selenium for data\_scraping(Automation’s)

\*\*By using python, we can make API calls(helps in integrating the applications with the external world.

\*\*AI-Chatbots,Recommendation engine, image and video recognition, we can build llm’s and applications/services of different sectors.

>>Encode, Decoder and Transformars(for transforming one language into another language).

SESSION-2 topics is same as the topics covered in the session-2 of batch-2, it involves printing, variables initiation, declaration and storing. Chages in the variable like memory location and various data types stored in same variables etc…

>>Intro to the integer(int), float and some library commands.

**SESSION-3**

**Datastructures**

>>>Discussed about the List’s, Dictionaries , Set’s and Range as a basic level.

>>Format of the data\_structures and the methods involved in those.

>> Characteristics of the lists,dictionaries and sets.

\*\*\*This is as same as the session-3 of batch-2.

SESSION-4

Control structures,Function, lambda function and import module

\*\*FUNCTIONS

>>>Functions are the block of code, which is reuseable in the big/whole code.

>>>Simplifies the debugging and more readable.

>>> Performs Arthmetic operations, logging, Generate reports, Adding new items to the existing items etc…

\* Basic function

\* Multiple parameters function

\* Positional Argument and Default Argument function.

\* Combining keyword and positional Argument.

\* Calculations using functions and conditionl’s(controls).

\* Inventory management of the company problem or scenario using functions.

\*\*LAMBDA FUNCTION:- It’s a small anonymous function.

>>>Syntax:--- lambda arguments: expression

>> It’s a simple/one line function.

>> It’s an explicitly return the expression.

>>> Map, Filter, and sorted methods of lambda functions.

\*\*FILE HANDLING/ FILE INPUT&OUTPUT OPERATIONS (File I O):-

>> It reads the file and writes data to the files within a program.

>> It makes it possible to store data and retrieve data.

>> ‘r’(reads the file), ‘w’(write’s to the file), ‘a’(append to the file), ‘r+’(read and write the file), ‘rb’(read file in a binary), ‘wb’(write the file in binary).

\*\*NUMPY(Intro…)

>>

**SESSION-5**

**EXPLORATORY DATA ANALYSIS**

\*\*\*EXPLORE ABOUT THE PANDAS.

\*\*PANDAS:- It’s a library, built by using the numpy.

>> Used to analyse the data and manipulate the data.

>> What is DATASTRUCTURE?

\*\* 4-Step process of EDA:--

1. Descriptive Analytics.

2. Diagnostic Analytics.

3. Predictive Analytics.

4. Prescriptive Analytics.

\*\*Viscour=

**SESSION-5**

**EDA(exploratory\_data\_analysis)(Part-2)**

\*\*\*COMPLETELY FOCUSED ON THE OUTLIER DATA MANIPULATION AND TREATMENT.

\*\*4 ways of treating the outlier data:-

1. Descriptive analytics.

2. Diagnose analytics.

3. Predictive analytics.

4. Prescriptive analytics.

\*\*\*\*\* NOMINAL, ORDINAL, INTERVAL and RATIO

\*\*HANDLING THE MISSING VALUES:--

1. Deletion(deleting the complete row)

2. Imputation(Adding the missed value directly to the row)

>>This will be done by using the mean/median/mode.

>> Mean and Median are for numerical in nature values and Mode is used for the categorical values.

**SESSION-6**

**DATA VISUALISATION (PART-1)**

\*\*\* CORELATION HEATMAP.

>>Positive Corelation.

>>Negative Corelation.

>>No Corelation.

>>Paranomic Correlation.(linear and non-linear corelation).

>>Kendall’s tau Correlation.

>Non-Parametric Method:- Ordinal Association between 2-variables.

>Cordant/Dis-Cordant

🡪 Concordant:- It means the Same order in both the variables.

🡪 Discordant: It means there is a different/opposite order in both variables.

🡪 +1—Perfect Concordance.

🡪 -1--- Perfect discordance.

🡪 0 --- Nor correlation/Cordance between the rands.

>>Pearson correlation <> Spearman Correlation <> Kendell correlation.

🡪 Peareson:- Continous and Normally distributed.#Linear relation.#Linear + normal distribution.

🡪 Spearman:- Ordinal and Continous or Interval distribution.#Monotonic relation.#Non-linear + Monotonic data.

🡪 Kendall’s:- Ordinal and Continous.#Rank correlation.#Small sample distribution + Ordinal data.

\*\*CAUSATION :-Cause and Effect

\*\*DATA NORMALISATION:- Normalisation and Scaling.

>>One-hot encoding. 🡪Encoding the variables into the binary for better understanding by the machine.

>>Label-encoding. 🡪 Assigning each variable/category an unique integer(as label) for better understanding of the data by the machine.

\*\*\*\*\*MATPLOTLIB.PYPLOT (Library used for the Data\_Visualisation.)

🡪 import matplotlib.pyplot as plt (to import matplot library into the IDE)

-- Pyplot is a module within the matplotlib for data visualisation.

-- It offers functions to create graphs, charts, and plots.

-- Creating plots of x and y axis and gives names as seprate and title name for the plot.

-- Creating the subplots(two plots at a time)

-- Box Plot, Bar Plot and Scatter Plot.

**SESSION-7**

**DATA VISUALISATION (PART-2)**

Data\_Visualisation(DV) :-- It is an graphical representation of the information and data.

Why DV matters:-

1. Enhances understanding.

2. Identifies Trends and Patterns.

3. Facilitates Decision Making.

\*\*\* DV using SEABORN:-

-🡪 %pip install seaborn

-🡪 import seaborn as sns

\*\*\* Explore different dimensions of plots from all plots, then we will get clarity on the data, which will work and which doesn’t work.

\*\*Seaborn Plots:--

-🡪 Bar Plot

-🡪 Scatter Plot

-- FacetGrid

-- Transparency(alpha) (Gives the overlying points visible,)

-- KDE(kernel density estimate) Plot.

-- Figure(sns.figure(10,6)) # We can adjust the size of the plot by using the figure.

-- Pallete(pallette = set1 or set2 or set3 or lukewarm) # It gives you different colors in the plot.

-🡪 Histogram.

-🡪 Box Plot.

-🡪 Violin Plot.

-🡪 Pair Plot (distinguishs the different elements)

-🡪 Heat map.(explore more to understand this plot)

-🡪

**SESSION-8**

**DATA VISUALISATION (PART-3)**

🡪 Pie\_Chart.

🡪 Dist Plot.

🡪 Strip plot

🡪 go command

**SESSION-9**

**INTR0 TO LINEAR REGRESSION AND MULTIPLE LINEAR REGRESSION**

Machine learning models:-

1. Supervised.

2. Unsupervised.

QUEST’S:--

1. what is regression?

2. what are continuous values or variables?

3. what is the difference between classification and regression?

\* r^2(r-square) = Coeefficient of the determination.

\*\* Coefficient of the x(independent variable) and the co-efficient of the y(target).

\* from sklearn.linear\_model import LinearRegression.

\* from sklearn.model\_selection import train\_test\_split

\* In mchine\_Learning 🡪 we will do Train and Test the data.

\* In Deep learning 🡪 We will Train,Test and Validata the data.

>> Concept of Overfit?(related to LR)

SKLEARN—skikit learn is the robust repository that is developed by the software engineers.

>> What is data leakage in the Linear regression.

>> Concept of Ordinary Least Square(OLS)?  
>> Difference between the Linear regression and Multiple linear regression.

>> Residual analysis/ Assumptions of linear regression.

>> What Is linear and non-linear?

\*\* Linear regression models:- LINE

L🡪 Linearity.

I 🡪 Independence of errors.

N 🡪 Normality.

E 🡪 Equal variance/ Homoscadasticity.

\*\* import statsmodels. api as sm (one of the model for linear regression analysis, like an Skikit learn).

**SESSION-10**

**MULTIPLE LINEAR REGRESSION CASE STUDY**

\*\*About the fundamentals of multilinear regression.

\*\* LINE concept.

\*\* Nominal and Ordinal values difference?

\*\* Explore on the DUMMY VARIABLES TRAP???

>> Checking the null values.

>> Checking the duplicates.

>> Treating methods of Outliers.

🡪 Capping method

>> How to treat the extreme values of the squed data.

PYTHON

**#BEGINNER\_LEVEL CONCEPTS AND INSIGHTS:--**

1. VARABLES

2. STRINGS

3. OPERATORS:-

* Arithmetic Operator.(+,-,\*,\*\*,/,%)

🡪Oprator precedence:- some operstors have more weightage while doing operations.

For example, multiplication(\*) have more weightage then the addition(+).

Order is:- parenthesis(), Exponentiation(\*\*), Multiplication(\*) or Division(/), Addition(+) or Substraction(-).

4. MATH FUNCTIONS:- these are inbuilt functions and method used directly by importing the math library or file

Import math

* .round()
* .abs() it gives the positive number.
* .ceil()
* .floor()

5.STATEMENTS (IF, ELSE IF, ELSE):--

6. LOGICAL OPERATORS:- (AND, OR, NOT)

7. COMPARISION OPERATORS(>,<,>=,<=,!=,==)

* Weight convertor project:-

8. WHILE LOOP:-- While loop will be used to execute the block of code and for loop will be used to iterate over the items.

SYNTAX:-- while condition:

I=1

While I <= 6:

Print(i)

I += 1

9. FOR LOOPS:- Used to iterate over the items.

For items in cart:

Print(items)

10. NESTED LOOPS:- Loops under the loops

For x in list:

For y in list:

Print(f‘{x},{y}’)

11.LISTS:- Lists are collection of items of same datatypes. It is mutable.

List = [‘ven’,33,99.9,True]

METHODS INVOLVED:-

* .append
* .pop
* .remove
* .insert
* .index etcc…

12. TUPLES:- tuples are the collection of items which are immutable in nature, we can only acesses the elements of the tuple.

Tuple = (1,2,3,4,5,6)

\*\* UNPACKING THE ITEMS OF THE LIST OR TUPLE

X,Y,Z = TUPLE/LIST

13.