

Course code	ECAP776	Course Title	PROGRAMMING IN PYTHON		
			WEIGHTAGE		
			CA	ETE(Th.)	ETE (Pr.)
			30	40	30

Course Outcomes:

- C01:** understand the basic structure and features of Python programming
- C02:** interpret object-oriented programming concepts such as encapsulation, inheritance and polymorphism as implemented in Python
- C03:** apply pandas and NumPy for data analysis
- C04:** implement machine learning algorithms
- C05:** analyze real-life situation specific problems and perceive solutions
- C06:** build exploratory data analysis and visualizations

Unit No.jk.	Contents
Unit- 1	Python basics: introduction, data types and operators, control statements, functions
Unit- 2	Python data structures: strings, lists, sets, tuples and dictionaries
Unit- 3	OOP concepts: OOP features, encapsulation, inheritance
Unit- 4	More on OOP concepts: function overloading, operator overloading and method overriding,
Unit- 5	Exception handling: catching exceptions, catching multiple exceptions, raising exceptions, custom exception
Unit- 6	Introduction to NumPy: arrays vs lists, array creation routines, arrays from existing data, indexing and slicing
Unit- 7	Operations on NumPy arrays: array manipulation, broadcasting, binary operators
Unit- 8	NumPy functions: mathematical functions, statistical functions, sort, search and counting functions
Unit- 9	Handling data with pandas: introduction to pandas, series, Dataframe, sorting, working with csv files, operations using data frame
Unit- 10	Data cleanup: investigation, matching and formatting
Unit- 11	Data visualization: introduction to matplotlib, line plot, multiple subplots in one figure, bar chart, histogram, box and whisker plot, scatter plot, pie charts
Unit- 12	Data visualization: introduction to seaborn, seaborn Vs matplotlib, data visualization using seaborn
Unit- 13	Machine learning: introduction, types of machine learning
Unit- 14	Machine learning algorithms: linear regression, k-nearest neighbours, decision trees, random forests, k-means clustering

LABORATORY WORK:

Implementation of Python programming concepts (control statements, functions, strings, lists, sets, tuples, dictionaries, OOP concepts, exception handling, NumPy arrays and functions, pandas, data visualization, machine learning algorithms)

READINGS:

1. Programming and Problem Solving with Python by Ashok Kamthane, Amit Ashok kamthane, McGraw Hill 2nd Edition
2. Hands-On Data Analysis with NumPy and pandas by Curtis Mille, Kindle Edition
3. Python for Data Analysis by Wes McKinney, O'Reilly Media
4. Machine Learning for Absolute Beginners by Oliver Theobald, Kindle Edition

Course code	ECAP515	Course Title	FUNDAMENTALS OF MACHINE LEARNING		
			WEIGHTAGES		
			CA	ETE(Th.)	ETE (Pr.)
			30	40	30

Course Outcomes:

- C01:** define the concepts of linear algebra and multivariate calculus
- C02:** demonstrate the usage of various python libraries for data handling and visualization
- C03:** explain the concepts of dimensionality reduction using PCA.
- C04:** make use of fuzzy logic to handle uncertainty in data