**1. Introduction to Data Analysis and Python Basics**

* Overview of Data Analysis
* Introduction to Python and its ecosystem
* Setting up Python environment (Anaconda, Jupyter Notebooks)
* Basic Python syntax
  + - Identifier
    - Variable
    - Keyword
    - Operator
      * Arithmetic Operator
      * Comparison Operators
      * Logical Operators
      * Bitwise Operators
      * Assignment Operators
      * Identity Operators
      * Membership Operators
* Data types
  + - Primitive Data Type
      * Integer
      * Float
      * String
      * Boolean
    - Non Primitive Data Type
      * Array
      * List
      * Tuple
      * Dictionary
      * Sets
* Control flow
  + - Conditional Statements
      * If
      * If-else
      * If-elif-else
      * Nested if
    - Loops
      * While
      * For
      * Break
      * Continue
      * Pass
* Functions and modules
  + - User Define Function
    - Built in Function
* Lambda Functions
  + - Map
    - Filter
    - Reduce
* Oops
  + - Class
    - Object
    - Encapsulation
    - Inheritance
    - Polymorphism
* Exception Handling
  + - try
    - try-except
    - try-except-else
    - try-except-else-finally
* Regular Expression
* File Handling
  + - Opening a File
    - Reading from a File
    - Writing to a File
    - Closing a File
    - File Modes

**2. Numpy**

* Introduction to NumPy for numerical operations
* Hands-on

**3. Web Scraping with Python**

* Introduction to web scraping
* BeautifulSoup for HTML parsing
* Scrapy framework
* Data retrieval

**4. Data Manipulation with Pandas**

* Introduction to Pandas library
* Working with Series and Data Frames
* Data cleaning and pre-processing
  + - * Dealing with duplicate data
      * Handling outliers
      * Feature scaling and normalization
      * Encoding categorical variables
* Indexing and selecting data
* Handling missing data

**5. Data Visualization with Matplotlib and Seaborn**

* Introduction to data visualization
* Matplotlib for basic plotting
* Seaborn for statistical data visualization
* Customizing plots and charts
* Exploratory Data Analysis (EDA)

**6. Exploratory Data Analysis (EDA)**

* Univariate, bivariate analysis and Multivariate Analysis
* Summary statistics and distribution analysis
* Outlier detection
* Feature engineering

**7. Final Project**

* Apply learned concepts to a real-world dataset
* Create a complete data analysis project
* Present findings and insights

|  |  |
| --- | --- |
| **1. Introduction to Data Analysis and Python Basics** | **(14 Class)** |
| * Overview of Data Analysis * Introduction to Python and its ecosystem * Setting up Python environment (Anaconda, Jupyter Notebooks) * Basic Python syntax   + - Identifier     - Variable     - Keyword     - Operator * Data types   + - Primitive Data Type     - Non Primitive Data Type * Control flow   + - Conditional Statements     - Loops * Functions and modules * Lambda Functions | (1st & 2nd Assignment) |
| (3rd Assignment) |
| (4th Assignment) |
| **2. Numpy** | **(4 Class)** |
| * Introduction to NumPy for numerical operations * Hands-on | (5th Assignment) |
| **3. Data Manipulation with Pandas** | **(3 Class)** |
| * Introduction to Pandas library * Working with Series and Data Frames * Data cleaning and pre-processing * Indexing and selecting data * Handling missing data | (6th Assignment) |
| **4. Data Visualization with Matplotlib and Seaborn** | **(3 Class)** |
| * Introduction to data visualization * Matplotlib for basic plotting * Seaborn for statistical data visualization * Customizing plots and charts * Exploratory Data Analysis (EDA) | (7th Assignment) |
| **5. Statistic** | **(4 Class)** |
| * Data * Variable * Data Cleansing * Distribution * Descriptive Statistics * Inferential Statistics | (8th Assignment) |
| **5. Exploratory Data Analysis (EDA)** | **(10 Class)** |
| * Univariate, bivariate analysis and Multivariate Analysis * Summary statistics and distribution analysis * Outlier detection * Feature engineering |  |
| **6. Final Project** |  |
| * Apply learned concepts to a real-world dataset * Create a complete data analysis project * Present findings and insights | (Final Project) |