ATME College of Engineering

# Department of Computer Science & Engineering (Data Science)

## Lesson Plan &Work-done Diary for AY: 2024-25, EVEN Semester

| **Course with Code:** Exploratory Data Analysis- **BDS613B** | | | | **Faculty: Dr Anitha D B** | | | **Semester & Section:** 6A | |
|---|---|---|---|---|---|---|---|---|
| **Class No.** | **Date planned (DD/MM)** | **Topics to be covered** | **TLP Planned** | **Class No.** | **Date of Conduction (DD/MM)** | **Topics Covered** | **TLP Executed** | **Remarks if any deviation** |
| **MODULE 1- Introduction to Python and NumPy** | | | | | | | | |
| 1. | | Getting Started in IPython | Chalk & Talk PPT, Jupyter | | | | | |
| 2. | | Getting Started in Jupyter | Chalk & Talk PPT, Jupyter | | | | | |
| 3. | | Enhanced Interactive Features | Chalk & Talk PPT, Jupyter | | | | | |
| 4. | | The Basics of NumPy Arrays | Chalk & Talk PPT, Jupyter | | | | | |
| 5. | | Sorted Arrays | Chalk & Talk PPT, Jupyter | | | | | |
| 6. | | Structured Data | Chalk & Talk PPT, Jupyter | | | | | |
| 7. | | NumPy’s Structured Arrays | Chalk & Talk PPT, Jupyter | | | | | |
| 8. | | Revision, Quiz | Chalk & Talk PPT, Jupyter | | | | | |

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| **MODULE 2- Data Manipulation with Pandas - I** | | | | | | | | |
| 9 | | Introducing Pandas Objects, Handling Missing Data, Hierarchical Indexing, Pivot Tables. | Chalk & Talk PPT, Jupyter | | | | | |
| 10 | | Pandas Objects: Series objects, Constructing Series objects | Chalk & Talk PPT, Jupyter | | | | | |
| 11 | | The Pandas DataFrame Object, Constructing DataFrame objects,The Pandas Index Object | Chalk & Talk PPT, Jupyter | | | | | |
| 12 | | **Handling Missing Data-** Trade-Offs in Missing Data Conventions, Missing Data in Pandas | Chalk & Talk PPT, Jupyter | | | | | |
| 13 | | Operating on Null Values | Chalk & Talk PPT, Jupyter | | | | | |
| 14 | | Hierarchical Indexing- A Multiply Indexed Series, Methods of MultiIndex Creation, Multiply indexed DataFrames | Chalk & Talk PPT, Jupyter | | | | | |
| 15 | | Multi-Indices, Rearranging Multi-Indices, **Index setting and resetting**<br>Data Aggregations on Multi-Indices | Chalk & Talk PPT, Jupyter | | | | | |
| 16 | | Pivot Tables. Pivot Tables by Hand, Pivot Table Syntax,Multi-level pivot tables | Chalk & Talk PPT, Jupyter | | | | | |

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| **MODULE 3 - Data Manipulation with Pandas - II** | | | | | | | | |
| 17 | | **Vectorized String Operations**: Introducing Pandas String Operations, Tables of Pandas String Methods, | Chalk & Talk PPT, Jupyter | | | | | |
| 18 | | Methods using regular expressions | Chalk & Talk PPT, Jupyter | | | | | |
| 19 | | Vectorized item access and slicing, A simple recipe recommender | Chalk & Talk PPT, Jupyter | | | | | |
| 20 | | **Working with Time Series:** Dates and Times in Python, Dates and times in pandas: best of both worlds, Pandas Time Series: Indexing by Time | Chalk & Talk PPT, Jupyter | | | | | |
| 21 | | Pandas Time Series Data Structures, Resampling, Shifting, and Windowing, Resampling and converting frequencies, Time-shifts, Rolling windows,example. | Chalk & Talk PPT, Jupyter | | | | | |
| 22 | | **High Performance Pandas:** Motivating **query()** and **eval()**: compound Expressions**,** Operations supported by pd.eval(), DataFrame.eval() for Column-Wise Operations, | Chalk & Talk PPT, Jupyter | | | | | |
| 23 | | Assignment in DataFrame.eval(),Local variables in DataFrame.eval(), DataFrame.query() Method, Performance: When to Use These Functions | Chalk & Talk PPT, Jupyter | | | | | |

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| **MODULE 4 - Data Visualization with MatPlotlib** | | | | | | | | |
| 24 | | General Matplotlib Tips | Chalk & Talk PPT, Jupyter | | | | | |
| 25 | | **Simple Line Plots:** Adjusting the Plot: Line Colors and Styles, | Chalk & Talk PPT, Jupyter | | | | | |
| 26 | | Adjusting the Plot: Axes Limits**,** Labeling Plots | Chalk & Talk PPT, Jupyter | | | | | |
| 27 | | **Simple Scatter Plots:** Scatter Plots with plt.plot, Scatter Plots with plt.scatter, | Chalk & Talk PPT, Jupyter | | | | | |
| 28 | | plot Versus scatter: A Note on Efficiency | Chalk & Talk PPT, Jupyter | | | | | |
| 29 | | **Visualization with Seaborn**: Seaborn Versus Matplotlib, Exploring Seaborn Plots, Histograms, KDE, and densities | Chalk & Talk PPT, Jupyter | | | | | |
| 30 | | Pair plots, Faceted histograms, Factor plots, Bar plots,,Example | Chalk & Talk PPT, Jupyter | | | | | |

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| **MODULE 5 - Introduction to Machine Learning** | | | | | | | | |
| 31 | | **Machine Learning:** What Is Machine Learning?, Categories of Machine Learning, Qualitative Examples of Machine Learning Applications, Regression: Predicting continuous labels, | Chalk & Talk PPT, Jupyter | | | | | |
| 32 | | Clustering: Inferring labels on unlabeled data, Dimensionality reduction: Inferring structure of unlabeled data | Chalk & Talk PPT, Jupyter | | | | | |
| 33 | | **Introducing Scikit-Learn :** Data Representation in Scikit-Learn, Scikit-Learn's Estimator API, Supervised learning example: Iris classification | Chalk & Talk PPT, Jupyter | | | | | |
| 34 | | Unsupervised learning example: Iris dimensionality, Unsupervised learning: Iris clustering, Application: Exploring Hand-written Digits | Chalk & Talk PPT, Jupyter | | | | | |
| 35 | | **Hyperparameters and Model: Validation**. Thinking about Model Validation, Model validation the wrong way, Model validation the right way: Holdout sets, Model validation via cross-validation**,** | Chalk & Talk PPT, Jupyter | | | | | |
| 36 | | Selecting the Best Model, Validation curves in Scikit-Learn, Learning Curves, Learning curves in Scikit-Learn, Validation in Practice: Grid Search | Chalk & Talk PPT, Jupyter | | | | | |

| | Activity | Planned | Actual | Remarks |
|---|---|---|---|---|
| **1** | Theory Classes + Practical Classes | 40L+0P | | |
| **2** | Assignments/ Quizzes/ Self-study/Programs | 2 | | |
| **3** | Tutorials/ Extra classes | 4 | | |
| **4** | Internal Assessments | 3 | | |
| **5** | ICT based Teaching(% of usage in Curriculum) | 90% | | |
| **Planning** | | | **Execution** | |
| **Faculty Signature:** | | | **Faculty Signature:** | |
| **HoD Signature:** | | | **HoD Signature:** | |