

# THE UNIVERSE IT

## Python with Data Science & Machine Learning

**Course Duration:** 64 Hours

**Total Class:** 32

**Tools:** PyCharm, Jupyter Notebook, SQL Server, Git & GitHub

<b>Class #01</b>	<b>Environment Setup, Variable, Data Type &amp; Type Casting</b>
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1. Python environment setup.
2. Basic syntax of python (statements, indentation, comments).
3. Python variable.
4. Data type in python.
5. Type casting in python.

### Assignment- #1:

<b>Class #02</b>	<b>String of Python</b>
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1. Introduction & declaration of string.
2. Accessing values & updating string.
3. String formatters & escape sequences.
4. String functions and operations.
5. Most important built-in methods of string.

### Assignment- #2:

<b>Class #03</b>	<b>Operators &amp; Condition</b>
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1. Operators & Operands.
2. Arithmetic, comparison & logical operators.
3. Assignment, Boolean & membership operators.
4. If, if.... else, & if...elif...else statement.
5. Nested if & nested if. Else statement.

### Assignment- #3:

<b>Class #04</b>	<b>Loops in Python</b>
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1. For loop statement.
2. While loop statement.
3. Infinite & nested loop statement.
4. Break, continue & pass statement.

**Assignment- #4:**

<b>Class #05</b>	<b>Built-in Data Structure in Python</b>
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1. List in python.
2. Indexing, slicing & negative indexing in python.
3. Tuple & sets in python.
4. Dictionary in python.

**Assignment- #5:**

<b>Class #06</b>	<b>Functions in Python</b>
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1. Define a function.
2. Function arguments.
3. Recursion in python.
4. Built-in python.
5. Anonymous function or lambda expression.

**Assignment- #6:**

<b>Class #07</b>	<b>File &amp; Exception Handling</b>
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1. Open, read & write a file.
2. Managing director, & rename a file.
3. Errors vs exception.
4. Try...except & try...except...else statement.
5. Try...except...finally statement.

**Assignment- #7:**

<b>Class #08</b>	<b>Module &amp; Package</b>
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1. Module vs package.
2. Create & uses a module.
3. Built-in modules (datetime module).
4. Create & uses package.
5. pip & PyPI.

**Assignment- #8:**

<b>Class #09</b>	<b>Class, Objects &amp; Inheritance (OOP)</b>
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1. Class & objects.
2. Methods vs functions & magic (under) methods.
3. Inheritance in python.
4. Polymorphism in python.
5. Constructors & Destructors in python.

**Assignment- #9:**

<b>Class #10</b>	<b>Git &amp; GitHub</b>
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1. Git vs GitHub.
2. Install & configure git.
3. Create GitHub account.
4. Create repository & deploy on GitHub.
5. Fundamental bash commands.

**Assignment- #10:**

<b>Class #11</b>	<b>SQL-1</b>
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1. The Relational Database Management System (RDBMS): An Overview.
2. Normalization of Databases.
3. Databases Without SQL.
4. Statement of Selection.
5. Using the WHERE Clause to Filter and Join Multiple Conditions.
6. Sort by: distinct, top, like, etc.
7. Modifying Syntax.

**Assignment- #11:**

<b>Class #12</b>	<b>SQL-2</b>
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1. SQL server join types.
2. Data Analysis using NumPy.

**Assignment- #12:**

<b>Class #13</b>	<b>Data Analysis using NumPy</b>
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1. A concise introduction.
2. Installation instructions.
3. NumPy arrays.
4. Built-in methods.
5. Array methods and attributes.
6. Indexing and slicing.
7. Broadcasting.
8. Layout.
9. Boolean masking.
10. Arithmetic operations.
11. Universal functions.
12. Overview of exercises.
13. Solutions to exercises.

**Assignment- #13:**

<b>Class #14</b>	<b>Pandas(part-1)</b>
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1. An overview in brief and guidelines for installation.
2. Introduction to Pandas.
3. Data Structures for Pandas – Series.
4. Data Frame: Pandas Data Structures.

**Assignment- #14:**

<b>Class #15</b>	<b>Pandas(part-2)</b>
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1. Hierarchical Indexing.
2. Handling Missing Data.
3. Data Wrangling.
4. Useful Methods and Operations.

**Assignment- #15:**

<b>Class #16</b>	<b>Data Analysis Project Using NumPy and Pandas</b>
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1. Project One (Which we will download a csv file from kaggle website).

**Assignment- #16:**

<b>Class #17</b>	<b>Statistics Part-1</b>
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1. Quantitative Analysis.
2. Frequency Distribution.
3. Data Presentation: Bar Graph versus Histogram.
4. Methods of Central Tendency (Mean, Median, Mode).
5. Methods of Dispersion Measurement.
6. Range, Variance, Standard Deviation.
7. Quartiles, Deciles, Percentiles, Coefficient of Variation.
8. Five-Number Summary and Box Plot.

**Assignment- #17:**

<b>Class #18</b>	<b>Statistics Part-2</b>
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1. Coefficient of Correlation.
2. Standard Scores: Z-Score, T-Score.
3. Normal Distribution.
4. Hypothesis Testing: Z-Test, T-Test.

**Assignment- #18:**

<b>Class #19</b>	<b>Matplotlib for Exploratory Data Visualization</b>
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1. Generating Multiple Plots on a Single Canvas.
2. Employing Matplotlib's Object-Oriented Approach.
3. Crafting Inset Plots.
4. Generating Figures and Subplots.
5. Saving and Enhancing Figures.

**Assignment- #19:**

<b>Class #20</b>	<b>Exploratory Data Visualization using Matplotlib &amp; Pandas</b>
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1. Built-in Data Visualization in Pandas.
2. Utilizing Style Sheets.
3. Area Plot, Bar/Horizontal Bar Chart.
4. Histogram, Line Chart.
5. Scatter Plot, Box Plot.
6. Hexagonal Bin Plot, Pie Chart.
7. Kernel Density Estimation Plot (KDE).

**Assignment- #20:**

<b>Class #21</b>	<b>Visualization with Seaborn</b>
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1. Seaborn: Distribution Plot, Lmplot.
2. Jointplot, Pairplot, Kdeplot.
3. Stripplot, Swarmplot, Boxplot.
4. Violinplot, Pointplot.
5. Axis Grids, Matrix Plot, Heatmap.
6. Seaborn Figure Styles.

**Assignment- #21:**

<b>Class #22</b>	<b>Machine Learning Fundamentals</b>
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1. Introduction to Machine Learning: Definition and Importance.
2. Applications of Machine Learning.
3. Supervised Learning.
4. Unsupervised Learning.
5. Understanding Machine Learning Models.
6. Data Splitting: Training and Test Sets.
7. K-Fold Cross-Validation.
8. Addressing Underfitting and Overfitting.
9. Confusion Matrix Metrics: Precision, Recall, F1 Score.

**Assignment- #22:**

<b>Class #23</b>	<b>Feature engineering in scikit-learn</b>
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1. Explore the theory behind Feature Scaling.
2. Get hands-on experience with Feature Scaling techniques.
3. Delve into Principal Component Analysis (PCA).
4. Practice Principal Component Analysis (PCA) with real-world examples.
5. Experience Label Encoding through practical exercises.
6. Apply Ordinal Encoding in hands-on activities.
7. Master One Hot Encoding with practical examples.
8. Learn to remove outliers through hands-on exercises.

**Assignment- #23:**

<b>Class #24</b>	<b>Scikit-learn - Linear Regression Versus Multiple Regression</b>
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1. Linear Regression Theory.
2. Application of Simple Linear Regression Model.
3. Multiple Linear Regression Theory.
4. Application of Multiple Linear Registration Model.
5. Project 01: Overview Data Project.
6. Project 01: Solutions Data Project.

**Assignment- #24:**

<b>Class #25</b>	<b>Scikit-learn: K Nearest Neighbors and Logistic Regression</b>
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1. Binary Logistic Regression Theory.
2. Binary Logistic Regression Algorithm.
3. Hands-on Binary Logistic Regression Model.
4. K Nearest Neighbors Theory.
5. K Nearest Neighbors Algorithm.
6. Pen & Paper Exercise for K Nearest Neighbors.
7. Hands-on with K Nearest Neighbors.
8. Project Overview: K Nearest Neighbors.
9. Solutions for K Nearest Neighbors Project.

**Assignment- #25:**

<b>Class #26</b>	<b>Naive Bayes Classification using Scikit-learn</b>
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1. Saving and Loading Trained Machine Learning Models.
2. Implementing K-Fold Cross Validation.
3. Introduction to Kaggle Platform.
4. Introduction to Google Colab.
5. Naive Bayes Classification Theory.
6. Naive Bayes Classification Algorithm.
7. Pen & Paper Exercise for Naive Bayes Classification.
8. Hands-on with Naive Bayes Classification.

**Assignment- #26:**

<b>Class #27</b>	<b>Scikit-learn: Decision Trees, Random Forests, and Ensemble Learning</b>
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1. Theory of Decision Trees: Entropy, Information Gain.
2. Hands-on with Decision Trees.
3. Introduction to Ensemble Learning: Bagging, Random Forests, Boosting.
4. Hands-on with Bagging.
5. Hands-on with Random Forests.

**Assignment- #27:**

<b>Class #28</b>	<b>Scikit-learn - Support Vector Machines (SVM)</b>
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1. Utilizing Grid Search CV for Finding the Best Model and Hyperparameter Tuning.
2. Theory of Support Vector Machines.
3. Algorithm for Support Vector Machines.
4. Hands-on with Support Vector Machines (SVMs).
5. Project Overview: Support Vector Machines.
6. Solutions for Support Vector Machines Project.
7. Practical Uses of Natural Language Processing (NLP) Overview.

**Assignment- #28:**

<b>Class #29</b>	<b>Scikit-learn - Clustering with K Means</b>
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1. Theory of K-Means Clustering.
2. Algorithm for K-Means Clustering.
3. Modified Algorithm for K-Means Clustering.
4. Pen & Paper Exercise for K-Means Clustering.
5. Hands-on with K-Means Clustering.
6. Projects Overview: K-Means Clustering.
7. Solutions for K-Means Clustering Project.

**Assignment- #29:**

<b>Class #30</b>	<b>Natural Language Processing (NLP)</b>
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1. What is Natural Language Processing.
2. Practical Uses of Natural Language Processing (NLP).
3. Practical Uses of Natural Language Processing (NLP) Overview.

**Assignment- #30:**

<b>Class #31</b>	<b>Deep Learning</b>
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1. Understanding Neurons.
2. Biological Neural Networks (BNNs).
3. Artificial Neural Networks (ANNs).

<b>Class #32</b>	<b>Python with Data Science and Machine Learning Course Overview &amp; Career Path Discussion</b>
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1. Overview the Course.
2. Writing CV.
3. Job Searching.



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THANK YOU!