BITS Pilani
Pilani | Dubai | Goa | Hyderabad

Introduction to Python for Data Science

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Course Objectives

CO1	Introduce students with fundamental programming concepts of Python
CO2	Enable students to solve data problems using Python

Text and References

T1	Charles Severance: Python for Everybody, Exploring Data in Python 3, CreativeCommons, 2016
T2	Jake VanderPlas: Python Data Science Handbook, Essential Tools for Working withData, O'Reilly Media, 2016
T3	Edouard Duchesnay: Statistics and Machine Learning in Python Release 0.2, 2018
T4	Wes McKinney: Python for Data Analysis, Agile Tools for Real World Data, O'ReillyMedia, 2013

Additional Reading

1. **Python 3.* documentation**
2. **Numpy Documentation**
3. **Pandas Documentation**
4. **Matplotlib documentation**
5. **seaborn: statistical data visualization documentation**
6. **Scikit-learn documentation**

Modular Content Structure

Session	Topics	Reference
	Saturday, 16th Oct 2021	
1	**Python Basics**	
1.1	**Setting up Python Environments**	**Python Documentation**
	Anaconda Distribution Spyder IDE Jupyter Notebooks Input / Output with Python	
1.2	**Getting familiarity with basic code constructs**	**T1 : Ch 2, Class Notes**
	Package imports Data Types & Type Casting Variables, Expressions & Statements	
	Sunday, 17th Oct 2021	
2	**Python Data Structures**	
2.1	**Immutable Data Structures**	**T1 : Ch 6, 10, Class Notes**
	Immutable Data Structures Strings Operations on String Familiarity with Tuples	
2.2	**Mutable Data Structures**	**T1 : Ch 8, 9, Class Notes**
	List List operations Familiarity with Sets Dictionary operations	
3	**Python Programming Constructs**	
3.1	**Expressions, Operations, and Decision Structures**	**T1 : Ch 2, 3, Class Notes**
	Boolean Expressions and Logical Operators Conditional and Alternative execution Chained and Nested execution Catching Exceptions with try and except	
	Saturday, 23rd Oct 2021	
3.2	**Iterative Executions**	**T1 : Ch 5, Class Notes**
	While loops Infinite loops, break, continueFor loops Loop patterns	
Self Study	*Object Oriented Features supported by Python*	

4	**Functions and Files**	
4.1	**Functions**	**T1 : Ch 4, Class Notes**
	Functions calls Built in Functions Custom Functions Parameters and Arguments	
4.2	**Files**	**T1 : Ch 7, Class Notes**
	Opening files Reading files Operation on content of files Writing files	
	Sunday, 24th Oct 2021	
5	**SciPy Ecosystem**	**SciPy Documentation**
	Familiarity with SciPy Ecosystem NumPy Library SciPy Library Matplotlib library	
5.1	**Multidimensional Arrays with NumPy**	**T2 : Ch 2, Class Notes**
	Basics of NumPy Arrays Computation on NumPy Arrays Aggregations Structured Arrays	
5.2	**Data Exploration with Pandas**	**Pandas Documentation**
	Pandas Objects Data Indexing and Selection Reading files with PandasDataset Merges	
	Saturday, 30th Oct 2021	
5.3	**Data Exploration II**	**T2 : Ch 3, Class Notes**
	Data Cleaning Data Transformation Data Filtering Aggregation and Grouping	
6	**Data Visualizations**	
6.1	**Visualizations with MatplotLib**	**Documentation, Class Notes**
	Basic Plotting Life cycle of a Plot Subplots Plotting visuals	

Sunday, 31st Oct 2021		
6.2	**Visualizations with Seaborn**	**Documentation, Class Notes**
	Visualizing statistical relations Plots for univariate and multivariate analysis Visualizing distributions Linear relationships with plots	
Recorded Videos for future use		
	Introduction - Machine Learning with Python	
Basic Machine Learning Example with Python		
	Introducing Machine Learning Familiarity with Scikit-learn library Linear Regression - Handcoding Linear Regerssion – with Scikit-learn	**Scikit-learn documentation** **T2 : Ch 5, Class Notes**

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