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- (Sample) Labs / Assignments

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, 2nd April 2022		
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, 3rd April 2022		
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, 9th April 2022		
3.2	Iterative Executions	T1 : Ch 5, Class Notes
	While loops Infinite loops, break, continue For loops Loop patterns	
<i>Self Study</i>	<i>Object Oriented Features supported by Python</i>	

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, 10th April 2022		
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, 16th April 2022		
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, 17 th April 2022		
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
