

R Programming Course Outline (Python Style)

Course Information

Course: Python Programming for Data Science

Version: 1.0

Effective From: January 2024

Online Hours: 36

Self-Study Hours: 12

Weeks: 6

Sessions per Week: 3

Total Sessions: 18

Project Sessions: S1 to S6

Week-wise Session Schedule

Week 1: PY - TL1, PY - TL2, PY - TL3

Week 2: PY - TL4, PY - TL5, PY - TL6

Week 3: PY - TL7, PY - TL8, PY - TL9

Week 4: PY - TL10, PY - TL11, PY - TL12

Week 5: PY - TL13, PY - TL14, PY - TL15

Week 6: PY - TL16, PY - TL17, PY - TL18

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Session Coverage

PY - TL1: Course Overview, Python for Data Science, Applications of Python

PY - TL2: Python Basics: Variables, Data Types, Operators, Control Structures

PY - TL3: Lab: Python Basics

PY - TL4: Data Structures in Python: Lists, Tuples, Sets, Dictionaries

PY - TL5: Lab: Python Data Structures

PY - TL6: Data Visualization using matplotlib and seaborn

PY - TL7: Introduction to Statistics, Hypothesis Basics

PY - TL8: Lab: Basic Hypothesis Testing

PY - TL9: Advanced Hypothesis Testing: t-test, chi-square, ANOVA

PY - TL10: Lab: Advanced Hypothesis Testing

PY - TL11: Regression Analysis: Linear, Multiple, Polynomial

PY - TL12: Lab: Regression Analysis

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PY - TL13: Classification Algorithms: Logistic Regression, KNN, SVM

PY - TL14: Lab: Classification I

PY - TL15: Classification Continued: Decision Trees, Random Forests

PY - TL16: Lab: Classification II

PY - TL17: Clustering and Association Rule Mining (Apriori in Python)

PY - TL18: Lab: Clustering & Association Rule Mining

Module Resources

Videos: Concept and skill demos using Python

Datasets: For use in Python labs and projects

Installation Guide: Python setup (Anaconda, Jupyter, pip)

Lab Guide: Hands-on exercises in Python

Projects: Project guidelines and solutions using Python

Assessments

Practice Projects: Assigned for post-class work

Final Assessment:

- Duration: 2 hours
- Questions: 102 (Multiple Choice)

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- Features: Can pause/restart; time deducted accordingly

Library References

1. Python for Data Analysis by Wes McKinney
2. Python Crash Course by Eric Matthes
3. Think Python by Allen B. Downey
4. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow by Aurélien Géron