

SEMESTER-II

COURSE 3: PYTHON FOR DATA SCIENCE

Theory

Credits: 3

3 hrs/week

Course Objective:

The objective of this course is to study main elements of python programming and perform data analysis using data structures and tools in python.

Course Outcomes:

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO1	To Understand Features and basic concepts of python.	PO5, PO7
CO2 ₂	To learn control structures in python and apply them to real world problems.	PO5, PO7
CO3 ₃	To implement functions and modules in python.	PO5, PO7
CO4 ₄	To understand data structures in python. oops concepts	PO5, PO7
CO5 ₅	To construct data and perform data analysis.	PO5, PO7

UNIT-1: Basics of Python

Features of python, literal constants-numbers, variables, identifiers, data types, input operation, comments, operators, operations on strings, other data types, type conversion.

Selection or conditional branching statements-if, if else , nested if, if elif else, loops or iterative statements-while, for, nested loops, break, continue, pass, else statement with loops.

UNIT-2: Functions and Modules

Functions-Definition and call, return statements, anonymous function- LAMBDA, recursive functions. **Modules**-Using existing modules, making own modules, packages in python, Names of standard library modules.

UNIT-3: Data Structures

List-Accessing lists, updating lists, nested lists, basic list operations, list methods, loops in lists.

Tuples-Creation, Accessing, updating, deletion in tuples and basic tuple operations.

Sets-creation, set operations.

Dictionaries - creation, accessing, adding and modifying items, deleting items.

UNIT-4: Object Oriented Programming concepts

Oops concept- Introduction, Classes and Objects, Class method Inheritance Introduction Inheriting classes in python Types of Inheritance, Error and Exception Handling

UNIT-5: Data Analysis

Data preparation using pandas and series: pandas data frame basics, Creating your own data , Series, Data frames, Making changes to series and data frames

Plotting: Matplotlib Introduction, Univariate plots-Histograms

Text Books:

1. **Python Programming Using Problem Solving Approach** –Reema Thareja , Oxford University Press, ©2017
2. **Pandas for Everyone (Python data Analysis)**-Daniel Y.Chen, Pearson Addison Wesley Data and Analytics series,©2018.

Recommended Co – Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted;

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work.

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SEMESTER-II

COURSE 3: PYTHON FOR DATA SCIENCE

Practical

Credits: 1

2 hrs/week

COURSE OUTCOME NO	Upon successful completion of this course, students should have the knowledge and skills to:	PROGRAM OUTCOME NO
CO ₁	Implement a given problem as a python program.	PO5, PO7
CO ₂	To write loops and decision statements in Python	PO5, PO7
CO ₃	To implement functions and modules in Python.	PO5, PO7
CO ₄	To implement different data structures in python	PO5, PO7
CO ₅	To implement data analysis using pandas and graphs	PO5, PO7

Experiments List

1. Write a program to read and print values of variables of different data types.
2. Write a program to find the roots of quadratic equations.
3. Write a program to find the largest of 3 numbers.
4. Write a program to check whether a given number is prime or not.
5. Write a program to generate Fibonacci series.
6. Write a program to find whether a given number is Armstrong or not.
7. Write a program using functions to swap two numbers.
8. Write a program to find factorial of a number using recursion .
9. Write a program to find square root of a given number using math module.
10. Write a program to generate 10 random numbers between 1 to 100 using random module.
11. Create a list and perform different operations on it.
12. Create a tuple and perform different operations on it.
13. Create a set and perform different operations on it.
14. Create a dictionary and perform different operations on it.
15. Import pandas and create a dataframe and perform operations on it.
16. Generate histogram using Matplotlib.
17. Generate scatter plot using Matplotlib.
18. Generate box plot using Matplotlib.

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