Government of Maharashtra
GOVERNMENT POLYTECHNIC, NAGPUR
(An Autonomous Institute of Govt. of Maharashtra)
Near Mangalwari Bazar, Sadar, Nagpur-440001

COURSE CURRICULUM

Program	:	Diploma in IT
Course Category	:	SEC
Course Code	:	IT351H
Course Title	:	Python Programming

I Rationale:

Python is commonly used for developing websites and software, task automation, data analysis, and data visualisation. Since it's relatively easy to learn, Python has been adopted by many non-programmers, such as accountants and scientists, for a variety of everyday tasks, like organising finances.Engineering students should know the basics of python programming in open source environment. Python lab course is designed for students to enrich the knowledge of different Python terminology. After this course students can build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions. Also students can work with user input to create fun and interactive programs.

II Industry Identified Competency:

The Student will be able to do in Industry at entry level:

Develop the ability to build, deploy, and maintain dynamic, scalable Python applications using Python built in Libraries.

III Course Outcomes (COs):

After completing this course students will be able to:

CO1: **Use** the Pandas library to develop program in python.

CO2: **Use** the SciPy library to develop program in python.

CO3: **Develop** GUI base python application using tkinter library.

CO4: **Develop** programs for String Handling and Text Processing.

CO5: **Develop** program for File Handling and Serialization using io, csv and pickle library.

CO6: **Develop** application for Math and Scientific Computation using math,cmath and random library.

IV Learning Scheme:

Classroom Learning (CL)	Tutorial Learning (TL)	Laboratory Learning (LL)	Self-Study Learning (SL)	Notional Learning Hours (NLH)	Credits
-	-	4	-	4	2

V Assessment Scheme:

Classroom Learning				Tutorial/Laboratory Learning				Self-Study Learning	
FA	SA	Total		FA		SA		SA	
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min
-	-	-	-	50	20	50+	20	-	-

VI Classroom Learning Content:

VII Laboratory Learning Content:

Unit No	Specific Learning Outcomes (SLO) (In Psychomotor Domain)		Hours	Aligned COs
I	1	Develop a program to create and display a DataFrame using Pandas.	2#	CO1
I	2	Develop a program to sort a DataFrame by column values.	2	CO1
I	3	Develop a program to handle missing data in a DataFrame.	2#	CO1
II	4	Develop a program to merge two DataFrames using Pandas.	2#	CO1
II	5	Develop a program to read an Excel file using Pandas.	2	CO1
II	6	Develop a program to perform numerical integration using SciPy.	2#	CO2
II	7	Develop & Execute a program to find the inverse of a matrix using SciPy.	2#	CO2
II	8	Develop & Execute a program to compute statistical measures (mean, median, mode) using SciPy.	2#	CO2
III	9	Develop a program to add a label widget to a Tkinter window.	2	CO3
III	10	Develop & Execute a program to add a button widget and display a message on click.	2#	CO3
III	11	Develop & Execute a program to create a simple login form using Tkinter.	2#	CO3
III	12	Develop & Execute a program to create a simple calculator using Tkinter.	2#	CO3

III	13	Develop a program to create a stopwatch using Tkinter.	2#	CO3
III	14	Develop a program to create a digital clock using Tkinter.	2#	CO3
III	15	Develop a program to create a user registration form using Tkinter.	2	CO3
IV	16	Develop a program to check if a string contains only alphabets using the string library.	2#	CO4
IV	17	Develop a program to check if a string contains only digits using string.digits	2#	CO4
IV	18	Develop a program to convert a string to lowercase and uppercase using string methods.	2#	CO4
IV	19	Develop a program to check if a string contains only whitespace characters using string.whitespace.	2#	CO4
IV	20	Develop a program to wrap a long string into multiple lines using textwrap.wrap().	2	CO4
IV	21	Develop a program to fill a paragraph with a fixed width using textwrap.fill().	2#	CO4
V	22	Develop & Execute a program to create and read from an in-memory text stream using io.StringIO().	2#	CO5
V	23	Develop a program to create and write to a CSV file using csv.writer().	2#	CO5
V	24	Develop a program to read a CSV file using csv.reader().	2#	CO5
V	25	Develop a program to serialize (save) a Python object using pickle.	2#	CO5
V	26	Develop a program to deserialize (load) a Python object using pickle.	2#	CO5
VI	27	Develop a program to find the square root of a number using math.sqrt().	2#	CO6
VI	28	Develop a program to compute the factorial of a number using math.factorial()	2	CO6
VI	29	Develop a program to compute the sine, cosine, and tangent of a complex number using cmath.sin(), cmath.cos(), and cmath.tan().	2#	CO6
VI	30	Develop a program to generate a random integer between two numbers using random.randint().	2#	CO5

Note: # Compulsory

VIII Self-Study Learning (SLO in Cognitive/Psychomotor/Affective Domain)

IX Specification Table for Classroom Learning Assessment:

X Question Paper Format for Summative Assessment (SA):

XI Scheme of Laboratory Formative Assessment (FA):

S.N.	Criteria	Max. Marks
1	Selection of Python IDE and importing appropriate Module or Library.	10
2	Execution and debugging of program	20
3	Result, Ploting Graphs, DB operation (if any)	10
4	Viva Voce	10
	TOTAL	50

XII Scheme of Self-Learning Summative Assessment (SA):

XIII COs-POs/PSOs Mapping Matrix:

Course Outcomes	Program Outcomes							Program Specific	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	-	3	3	3	-	3	3	-	3
CO2	-	3	3	3	-	3	3	-	3
CO3	-	3	3	3	-	3	3	-	3
CO4	-	3	3	3	-	3	3	-	3
CO5	-	3	3	3	-	3	3	-	3
CO6	-	3	3	3	-	3	3	-	3

XIV Textbooks, BIS Codes References:

S.N.	Title	Author, Publisher, Edition and Year of Publication	ISBN Number
1	Python Crash Course: A Hands-On, Project-Based Introduction to Programming	Eric Matthes, Nostarch Press, 2nd Edition, 2019	13: 9781593279288
2	Learning Python	Mark Lutz, O'Reilly, 5th Edition, 2013	13 : 9780596158064
3	Python Programming	Dr. A R Mahajan, Lambert Academia, 1st edition	13: 9786200652034
4	Head-First Python	Paul Barry, O'Reilly, 2nd Edition, 2016	13: 9781491919538
5	Learn Web Development with Python: Get hands-on with Python Programming and Django web development	Fabrizio Romano, Packt, 1st edition, 2018	13: 9781789953299

XV e-References:

1. https://www.guru99.com/python-tutorials.html Accessed on 20 Feb. 2024
2. https://docs.python.org/3/tutorial/ Accessed on 14 Feb.. 2024
3. https://www.tutorialspoint.com/python/index.htm Accessed on 28 Jan. 2024
4. https://nptel.ac.in/courses/106/106/106106145/ Accessed on 25 Jan. 2024
5. https://www.udemy.com/course/python-the-complete-python-developer-course/ Accessed on 2 Jan. 2024
6. https://www.javatpoint.com/python-tutorial Accessed on 20 Feb. 2024

XVI List of Major Equipment/Machineries with Specification:

1. Computer (Dual Core or above)
2. Network printer.
3. COLAB (Open Source)
4. Any Python IDE

XVII List of Industry Experts and Faculties who contributed for this curriculum:

S.N.	Name	Designation	Institute / Industry
1	Dr. A. R. Mahajan	HOD, Information Technology	Government Polytechnic, Nagpur
2	Mr. Dipak Dhote	Opeaations Manager	IT- Networkz Infosystem Pvt. Ltd. Nagpur
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4	Mrs.V. A. Raje	System Analyst	MSBTE, RO, Nagpur
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6	Mr. R.L. Meshram	Lecturer in Information Technology	Government Polytechnic, Nagpur

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