



Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-4 (Diploma)

Subject: Python Programming-DETCE14208

Type of course: Major (Core)

Prerequisite: Prior knowledge in computer science fundamentals, including programming.

Rationale:

Python is a versatile and powerful programming language that is crucial for developing software applications, data analysis, and automation. This subject covers fundamental programming concepts, object-oriented design, libraries, and frameworks necessary for building efficient and maintainable code. Proficiency in Python is essential for students pursuing careers in software development, data science, machine learning, and automation.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs.	% Weightage
1	Fundamentals of Python: Introduction to Python- Python as scripting Language, Programming language Vs Scripting Language, Python's building blocks- Identifiers, Keywords, Variables, Constants, Indentation, Comments in python, Python's Data Types, Input and Output statements in python, Operators in Python, Type Casting, Installation of python.	5	12%



2	Control Statements in Python: Types of Control Statements – Decision making statements, Looping statement: - while loop, for loop, nested loop, Manipulating Loops: - use of break, continue and pass statements.	9	20%
3	Data Structures in Python: List- Defining List, Creating list, Accessing values from list, Updating the elements of a list, Concatenation of two lists, Tuples- Defining Tuple, Creating Tuples, Accessing the Tuple elements, Inserting elements in a Tuple, modifying elements of a Tuple, Deleting elements from a Tuple, Sets- Defining Set, Creating a Set, Accessing elements from set, Add and update Set, Remove an elements from a Set, Dictionaries- Defining Dictionary, Creating Dictionary, Accessing elements from Dictionary, Add and update Dictionary, Delete an element from a Dictionary.	9	20%
4	Functions and Modules: Python Functions- Use of python built in functions, User defined function- Function definition, function calling, function arguments and parameter passing, Return statement, scope of variables.	11	24%
5	String Processing: Introduction to strings, accessing string elements via index operators, exploring various string functions such as basic functions, testing functions, searching functions, manipulation functions.	11	24%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Debugging Detective: Faculty Provide students with Python program containing deliberate errors containing syntax and logic errors. They must identify and fix the errors to make the code run successfully. This activity enhances students' debugging skills and their understanding of common Python errors. Students need to upload the corrected Python code to the GMIU web portal.	10
2	Python Deep Dive: Interview Intensive Faculty will provide a set of Python interview-style questions covering topics like control flow, data types, functions, and error handling. These questions are designed to help students prepare for job interviews by testing their practical knowledge of Python. Students need to solve the questions individually and submit their answers on the GMIU web portal.	10



3	Code Translation Challenge: Java/C to Python Faculty will provide students with a program written in Java or C. Students will then convert the code into Python using advanced Python libraries and frameworks where applicable. This activity encourages students to understand code structure across languages and utilize Python's powerful libraries for efficient implementation. For marks, students need to upload the converted Python script to the GMIU web portal.	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	30%	40%	20%	10%	-	-

Course Outcome:

After learning the course, the students should be able to:

CO1	Understand the fundamental concepts of Python, including its syntax, structure, and basic programming constructs.
CO2	Apply control structures, loops, and functions to solve programming problems in Python.
CO3	Demonstrate the use of Python's built-in data structures (lists, tuples, sets, and dictionaries) for efficient data management and manipulation.
CO4	Implement modular programs using functions, standard libraries, and user-defined modules in Python.
CO5	Illustrate the process of file handling, string manipulation, and working with external modules in real-world applications.

List of Practical:

Sr. No	Description	Unit No	Hrs.
1	Install and configure the Python environment. Run basic Python, commands to verify the Python environment.	1	2
2	Write a program to read your name, contact number, email, and birthdate and print those details on the screen.	1	1
3	Write a program to convert temperature from Celsius to Fahrenheit. Equation to convert Celsius to Fahrenheit: $F = (9/5) * C + 32$.	1	2



4	Write a program to find a maximum of given three numbers.	1	1
5	A year is a Leap year if it is divisible by 4, unless it is a century year that is not divisible by 400 (1800 and 1900 are not leap years, 1600 and 2000 are leap years). Write a program that calculates whether a given year is a leap year or not.	2	2
6	Write a program to read the marks and assign a grade to a student. Grading system: A (≥ 90), B (80-89), C (70-79), D (60-69), E (50-59), F (< 50). (Use the Switch case)	2	2
7	Write a program to read n numbers from users and calculate the average of those n numbers.	2	1
8	Write a program that prompts the user to enter 10 integers and displays all the combinations of picking two numbers from the 10.	2	2
9	Write a program to perform the below operations on the list: <ul style="list-style-type: none"> • Create a list. • Add/Remove an item to/from a list. • Get the number of elements in the list. • Access elements of the list using the index. • Sort the list. • Reverse the list. 	3	2
10	Write a program to perform below operations on tuple: <ul style="list-style-type: none"> • Create a tuple with different data types. • Print tuple items. • Convert tuple into a list. • Remove data items from a list. • Convert list into a tuple. • Print tuple items. 	3	2
11	Write a program to print Fibonacci sequence up to n numbers using recursion.	4	2
12	Write a program that plays the popular scissor-rock-paper game. (A scissor can cut a paper, a rock can knock a scissor, and a paper can wrap a rock.) The program randomly generates a number 0, 1, or 2 representing scissor, rock, and paper. The program prompts the user to enter a number 0, 1, or 2 and displays a message indicating whether the user or the computer wins, loses, or draws.	4	2
13	Write a program to check whether a given string is palindrome or not.	5	1
14	Write a program to perform the below operations on files: <ul style="list-style-type: none"> • Create a text file and write a string to it. • Read an entire text file. • Read a text file line by line. • Write a string to a file. • Write a list of strings to a file. • Count the number of lines, words in a file. 	5	2
15	Write a program to perform the following operations on matrices: <ul style="list-style-type: none"> • Create two matrices. 	5	2



	<ul style="list-style-type: none"> • Add the matrices. • Subtract the matrices. • Multiply the matrices. • Transpose the matrices. 		
16	Write a program to: <ul style="list-style-type: none"> • Check if a given number is a prime number. • Generate all prime numbers within a given range (input from the user). 	5	2
17	Write a program to perform the following operations on a dictionary: <ul style="list-style-type: none"> • Create a dictionary with at least 5 key-value pairs. • Add a new key-value pair. • Delete a key-value pair. • Access elements using a key. • Update the value of an existing key. • Print all keys, values, and key-value pairs. 	5	2
Total			30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Python for Dummies, Stef Maruch and Aahz Maruch, Wiley India, New Delhi.
- [2] Learning Python, Mark Lutz, O'Reilly Media.
- [3] Python Crash Course, Eric Matthes, No Starch Press.

