Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari College of Computer Application
Semester-5 (BCA)

Subject: Python Programming

Type of course: Minor Stream

Prerequisite: Basic Concept of Programming Language

Rationale:

Python is an open-source, high-level, general-purpose programming language used for software development. It is one of the most popular programming languages in the world today and known for its simplicity as well as rich library. It is a widely used programming language in various domains, such as Automation, Server-side Web Development, Tools Development, Game Programming, Block chain, Data Science, Artificial Intelligence, Machine Learning, Big Data etc. It's relatively easy to learn to use and incredibly versatile. This course aims to teach the basics of Python programming. The course focuses on how to use the building blocks of Python programming to solve different problems. At the end of the course, students will be able to develop simple applications using Python programming.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	Theory	Practical	MSE	LWA	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs.	Weightage %
1	**Introduction to Python:** Introduction, Installation and working with Python, History and Features of Python, Writing and Running Python Programs, Input and output, Understanding Python Syntax Variables and Data Types Perform, computations and create logical statements using Python's operators: Arithmetic, Assignment, Comparison, Logical, Membership, Identity, Bitwise operators, list, dictionary, tuple, Set and string operations, Type Casting: Implicit Type and Explicit Type Comments in Python (Single-line & Multi-line).	10	25%
2	**Python Decision making and Functions:** Write conditional statements using If statement, if ...else statement, elif statement and Boolean expressions, While loop, For loop, range statement, Nested Loop, Infinite loop, Break statement, Continue statement, Pass statement, Plotting data Functions in python : Defining and Calling Functions, Function Arguments and Return Values ,Lambda (Anonymous) Functions and map, Recursive Functions.	9	25%
3	**File Handling and Modules:** Working with Files, Opening and closing files, Reading and writing text files, Exception handling for file operations, Introduction to Modules, Importing modules, Creating and using custom modules.	6	17%
4	**Object-Oriented Programming:** Introduction to OOP Concepts (Class, Object, Methods, and Properties),Constructors (__init__ method),Inheritance (Single, Multiple, Multilevel, Hierarchical),Polymorphism (Method Overloading & Method Overriding)	10	17%
5	**Advanced Topics: Database and Framework :** Introduction to Databases, Connecting Python with MySQL using , Executing SQL Queries (Create, Insert, Update, Delete, Select). **Modules, Database Connectivity in Python: Libraries, and Packages:** Built-in Python Modules (math, random, datetime, os, sys),Introduction to External Libraries (numpy, pandas, matplotlib),Installing and Managing Packages using pip,Understanding __name__ == '__main__' **Introduction to web frameworks :**Flask, Django	10	16%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Debugging :** Student will be assign a code containing error, student need to Identify error, correct and upload on GMIU web portal .	10
2	**Code Wars:** Compare any four programming language with minimum 10 points or features, prepare a documents and upload on GMIU web portal.	10
3	**Interview Preparation:** The faculty will prepare students for Python technical interview-related questions, and afterward, all questions will be uploaded by students on the GMIU web portal.	10
4	**Agile Sprint Challenge:** Students will collaboratively outline a step-by-step Agile process for developing a project and prepare documents upload on GMIU web portal.	10
5	**Mini Project:** Student has to prepare a mini-project on given definition or they can choose its own definition. Student have to upload abstract and project in GMIU web portal (Group of Four or Individual) (Framework Flask, Django).	10
	Total	50

Suggested Specification table with Marks (Theory):75

	Distribution of Theory Marks (Revised Bloom's Taxonomy)					
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	25%	45%	15%	15%	-	-

Course Outcome:

| After learning the course, the students should be able to:	
CO1	Understand fundamentals of Python programming, including installation, syntax, data types, operators, collections, type casting, and input/output handling.
CO2	Build efficient Python programs by utilizing conditional statements, loops, control flow constructs, and defining functions including lambda and recursive functions for problem-solving.
CO3	Implement file handling in Python programming by performing essential operations such as opening, reading, writing, and closing text files in an organized and efficient manner.
CO4	Describe and use fundamental concepts of Object-Oriented Programming including classes, objects, methods, and properties.
CO5	Develop database-driven applications and Utilize Python libraries, package management, web frameworks such as Flask and Django in python programming.

List of Practical

Sr.No	Descriptions	Unit No	Hrs
1	(i)Installation of python IDLE, Print Hello, World! Program. (ii) Write a python program to create a simple calculator (addition, subtraction, multiplication, division).	1	2
2	Write a python program to sort list of dictionary by values using lambda function and perform following method get(),keys(),values(),items(),update(),find(),count().	1	2
3	Write a python program to use basic string operations (concatenation, slicing)and perform following methods : upper(),lower(),strip(),split(),join(),repace(),insert(),remove().	1	2
4	Write a python program to create a shopping list using a list. append(),extend(),pop(),index(),sort(),reverse().	1	2
5	Write a python program to create a tuple of student information (name, age, grade).	1	2
6	(i) Write a python program to find the maximum and minimum of two numbers using if-else. (ii) Write a python program to calculate the factorial of a number using function.	2	2
7	(i)Write a python program that check a number is even or odd. (ii) Write a python program to create a function to check if a number is prime or not. (iii) Write a python program to create a function to calculate the area of a rectangle.	2	2
8	(i)Write a program to implement readline(), readlines() and writeline() and Writelines() using file handling context of a text file. (ii) Write a python program to create a simple calculator using module (add, subtract, multiply).	3	2
9	Write a python program to create a class for representing a bank account.	4	2
10	Write a python program to Design a Rectangle class with default attributes for length and width set to 1. Include methods to set these attributes and calculate the area.	4	2
11	Write a python program to create Student Grade Calculator: Implement a Student class with attributes for name and a list of marks. Include a method to calculate the average and determine the grade.	4	2
12	Write a python program to create a class representing a shopping cart, include methods for adding and removing items , and calculating the total price.	4	2
13	Develop Web Database Application named "Students Registration " that can perform operations like Add/insert a record,Update a record,Delete a record	4	2
14	Installation Flask and create simple webpage for Student Registration form.	5	2
15	Installation Django and create simple webpage for E-Commerce .	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 blackboard, may also use any of tools such as demonstration, role-play, Quiz, brainstorming, MOOCsetc. From the content 10% topics are suggested for flipped mode instruction.
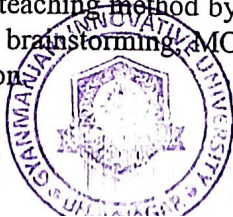
Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

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

Reference Books:

1. **Introduction to computation and programming using python** -John V. Guttag ,PHI Learning Pvt. Ltd, Second Edition
2. **Scripting Language Python** – Jitendra B.Patel, Sanjay A.Valaki, Atul Prakashan
3. **Fluent Python by Luciano Ramalho-** O'Reilly Media, 2nd Edition
4. **Web Development with Django Cookbook by Jake Kronika-** Jake Kronika **and** Aidas Bendoraitis, **Packt Publishing**