

GUJARAT TECHNOLOGICAL UNIVERSITY



Program Name: Diploma in Engineering

Level: Diploma

Branch: Computer Engineering / Computer Science and Engineering

Course / Subject Code : DI02C00101(Only for C to D Students)

Course / Subject Name : Scripting Language

W.E. F. Academic Year:	2024-2025
Semester:	2 nd
Category of the Course:	PCC

Prerequisite:	Basic computer literacy, Logical Thinking and Basic Mathematics
Rationale:	Python is an open-source, high-level programming language known for its simplicity and versatility, making it one of the most popular languages worldwide. Renowned for its straightforward syntax and extensive library ecosystem, Python is used across a broad range of fields, including automation, server-side web development, tools development, game programming, block chain, data science, artificial intelligence, machine learning, and big data, among others. Its accessibility makes it easy to learn, while its power and flexibility make it suitable for diverse applications. This course is designed to teach the fundamentals of Python programming, focusing on using core Python constructs to solve a variety of problems. By the end of the course, students will be able to create simple applications using Python, providing them with a strong foundation to explore Python's advanced applications across these many domains.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Create and implement basic Python programs by utilizing suitable data types, constants, and literals.	Apply
02	Apply operators and control flow structures to design and implement solutions for the given problems.	Apply
03	Utilize data structures such as lists, tuples, sets, and dictionaries to develop efficient solutions for the given problems.	Apply
04	Apply Python's built-in functions, file handling features, and user-defined functions to develop effective solutions for the given problems.	Apply
05	Apply Python modules and packages to efficiently solve the given problems.	Apply

**Revised Bloom's Taxonomy (RBT)*



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Course / Subject Code : DI02000101

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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction and Syntax of Python Programming: Introduction to Python, History of Python, Python Features, Python Applications, Installing Python, Basic Structure of Python program, Keywords and Identifiers, Variables, Type Casting, Input-Output functions: input, print, Data types: Number, String, Set, Tuple, List and Dictionary, Declaration and use of data types, Literals, Constants, Identifiers Program Solving practice on the above concept	07	15
2.	Operators and Control Flow Structures: Basic Operators: Arithmetic, Logical, Comparison, Assignment, Bitwise, Membership, Identity Operator, Python Operator Precedence Control Flow: Concept of Indentation and if, if...else, if...el if...else statement with examples, While loop, for loop, range () function, break and continue, pass & return statements and Nesting of loops Program Solving practice on the above concept	08	18

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3.	<p>Data Structure in Python:</p> <p>Lists: Defining Lists, accessing values in Lists, deleting values in Lists, updating values in Lists, Basic List operations, Built in List functions</p> <p>Tuples: Defining Tuples, accessing values in Tuples, deleting values in Tuples, updating values in Tuples, Basic Tuple operations, Built in Tuple functions</p> <p>Sets: Defining Sets, accessing values in Sets, deleting values in Sets, updating values in Sets, Basic Sets operations, Built in Sets functions</p> <p>Dictionaries: Defining Dictionary, accessing values in Dictionary, deleting values in Dictionary, updating values in Dictionary, Basic Dictionary operations, Built in Dictionary functions</p> <p>Program Solving practice on the above concept</p>	08	18
4.	<p>Python Functions and File Handling Functions</p> <p>Built-in Functions – Type/ Data Conversion functions- int(), float(), str(), bool(), list(), tuple(), dict(), set(), frozenset(), bytes(), bytearray(), complex(), math functions- abs(), round(), pow(), divmod(), sum(), min(), max() and String functions- len(), max(), min(), isalnum(), isalpha(), isdigit(), isidentifier(), islower(), isupper(), and isspace(), endswith(), startswith(), find(), rfind(), count(), capitalize(), lower(), upper(), title(), swapcase(), replace(), lstrip(),rstrip(), strip(), format(), center(), ljust(), rjust()</p> <p>File handling Functions- read(), readline(), readlines(), Writing functions: write(), append(), writelines()</p> <p>User defined Functions: Introduction to Python User defined Function, function definition, function calling, Passing parameters to a function and returning values from a function, Recursion, Scope of variables- Local variable and Global variable</p> <p>Program Solving practice on the above concept</p>	12	27

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5.	Python Modules and Packages Modules: Introduction to python module, Writing Module, Importing Module , importing objects from module, Built-in Modules- Numeric and Mathematic module Packages: Introduction to Packages, Writing Packaging, Matplotlib Package:- plot(),show(), xlabel(), ylabel(),grid(),bar(), hist(), subplot(), pie(), savefig() Numpy Package:- Creating Numpy arrays, Array attributes (shape, ndim, size, dtype, itemsize), Array Initialization, indexing and Slicing, Array Operations, Basic Numpy math and statistic Function- np.sum(), np.min(), np.max(), np.mean(), np.std(), np.var(), np.dot(), np.cross(), np.matmul() Program Solving practice on the above concept	10	22
Total		45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
12	16	42	0	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Charles Dierbach, "Introduction to Computer Science Using Python: A Computational Problem-Solving Focus", John Wiley & Sons (25 January 2013), ISBN-10: 0470555157, ISBN-13: 978-0470555156
2. John Zelle, "Python Programming: An Introduction to Computer Science", Franklin, Beedle & Associates Inc; Pap/Cdr edition (1 December 2003), ISBN-10 : 1590280288, ISBN-13 : 978-1887902991
3. Liang Y. Daniel, "Introduction to Programming Using Python", Pearson Education; First edition (26 February 2017), ISBN-10: 9332551847, ISBN-13: 978-9332551848
4. R. Nageswara Rao, "Core Python Programming", Dreamtech Press (1 September 2021), Delhi; ISBN-10: 9390457157, ISBN-13: 978-9390457151
5. Paul Barry, "Head First Python", Shroff/O'Reilly; Second edition (1 December 2016)., ISBN-10: 9789352134823, ISBN-13: 978-9352134823



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6. Lutz M, "Learning Python", Shroff; Fifth edition (1 January 2013), ISBN-10:7301152519, ISBN-13:7301152519-799

(b) Open source software and website:

1. <https://www.python.org>
2. <https://www.learnpython.org>
3. <https://www.python-course.eu>
4. <https://nptel.ac.in>
5. <https://www.youtube.com>
6. <https://www.edx.org>
7. <https://www.coursera.org/in>
8. <https://www.udemy.com>
9. <https://www.programiz.com/python-programming/online-compiler/>
10. https://www.onlinegdb.com/online_python_compiler
11. <https://www.online-python.com>

Suggested Course Practical List:

1. Install and configure the Python environment. Run basic Python commands to verify the Python environment.
2. Design and Test Python program to read your name, contact number, email, and birth-date and print those details on the screen.
3. Design and Test Python Program to perform create access, update and delete operation on List, Tuple, Sets and Dictionary.
4. Design and Test Python Program to demonstrate use of conditional statements: if, if...else, if...elif...else statement.
5. Design and Test Python Program to demonstrate use of Operators: Arithmetic, Logical, Comparison, Assignment, Bitwise, Membership and Identity Operator.
6. Design and Test Python Program to demonstrate use of looping statement: while, for, and Nested loop.
7. Design and test a Python program using user defined function for given problem.
8. Design and Test Python Program to demonstrate use of math and string in-built functions.
9. Design and Test Python Program to demonstrate use of built in modules and user defined modules.
10. Design and Test Python Program to demonstrate use of built in packages and user defined packages.
11. Design and Test Python Program to demonstrate use of string processing functions.
12. Design and Test Python Program to demonstrate use of basic file functions.



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List of Laboratory/Learning Resources Required:

1. Computer with basic configuration with windows or unix os
2. Text Editor (VS Code, Sublime Text, Atom, Vim or any other editor) or Python IDE (IDLE, PyCharm, PyDev, Spyder or any other IDE)
3. Python Interpreter (Versions: 3.6.x or higher)
4. Jupyter Notebook (Optional)

Suggested Project List:

1. Create a basic calculator application to practice functions and control structures.
2. Develop a number-guessing game using loops and conditional statements.
3. Create a system for managing books, including features for adding, updating, and deleting records.
4. Create a program to plot sine and cosine waves using Matplotlib.
5. Use dictionaries and inheritance to manage employee details and calculate salaries.
6. Design an application to manage daily expenses, storing data in a file.
7. Create a program that uses modules to fetch and display weather data for a given location.

Suggested Activities for Students:

- a) <https://www.codechef.com/> , in this website very elementary programs are available, students are expected to solve those programs
- b) <https://code.org/>, an hour of coding event may be organized and students are encouraged to participate.
- c) Students are encouraged to register themselves in various MOOCs such as: Swayam, edx, Coursera, Udemy etc to further enhance their learning.
- d) Encourage students to participate in different coding competitions like Hackathon, online competitions on codechef etc.
- e) Encourage students to form a coding club at institute level.