

As Per NEP 2020

University of Mumbai



Syllabus for Basket of Minor	
Board of Studies in Information Technology	
UG First Year Programme	
Semester	II
Title of Paper	Credits 2/ 4
I. IT_Fundamentals of Python Programming(Minor)	2
II.	
From the Academic Year	2024-2025

Name of the Course: IT_Fundamentals of Python Programming

Sr.No.	Heading	Particulars
1	Description the course : Including but Not limited to:	This course aims at introducing one of the fastest growing programming language of current time and enables learners to understand the fundamentals of programming with Python. Learners will be able to write programs to solve real-world problems, and produce quality code. It will help to develop strong skills of programming for implementing applications for emerging fields including data science and machine learning
2	Vertical:	Minor
3	Type :	Theory
4	Credits:	2 credits (1 credit = 30 Practical Hours in a semester)
5	Hours Allotted :	60 Hours
6	Marks Allotted:	50 Marks • Practical Evaluation Internal (20 Marks) • Practical Evaluation External (30 Marks) A certified copy of journal is essential to appear for the practical examination.
7	Course Objectives(CO): CO 1. To learn how to design and program Python applications. CO 2. To explore the innards of Python Programming and understand components of Python Program CO 3. To define the structure and components of a Python program CO 4. To learn how to write loops and decision statements in Python CO 5. To learn about inbuilt input/output operations and compound data types in Python	
8	Course Outcomes (OC): OC 1. Ability to store, manipulate and access data in Python OC 2. Ability to implement basic Input / Output operations in Python OC 3. Ability to define the structure and components of a Python program OC 4. Ability to learn how to write loops and decision statements in Python. OC 5 : Ability to learn how to write functions and pass arguments in Python.	
9	Modules:- Module 1: Overview of Python: History & Versions, Features of Python, Execution of a Python Program, Flavours of Python, Innards of Python, Python Interpreter, Memory Management in Python, Garbage Collection in Python, Comparison of Python with C and Java, Installing Python, Writing and Executing First Python Program, Getting Help, IDLE Data Types, Variables and Other Basic Elements: Comments, Docstrings, Data types- Numeric Data type, Compound Data Type, Boolean Data type, Dictionary, Sets, Mapping, Basic Elements of Python, Variables	

Operators: Arithmetic operators, Assignment operators, Unary minus operator, Relational operators, Logical operators, Bitwise operators, Membership operators, Identity operators, Precedence of Operators, Associativity of Operators Input and Output Operations: Input Function, Output Statements, The print() function, The print("string") function, The print(variables list) function, , The print(object) function, The print(formatted string) function, Command Line Arguments Control Statements: The if statement, The if ... else Statement, The „if ...elif ... else“ Statement, Loop Statement- while loop, for loop, Infinite loop, Nested loop, The else suite, break statement, continue statement, pass statement, assert statement, return statement Practical (more programs can be undertaken to complete the requisite hours) 1. Write a Python Program to Print Hello world! 2. Write a Python Program to Add Two Numbers 3. Write a Python Program to Find the Square Root 4. Write a Python Program to Calculate the Area of a Triangle 5. Write a Python Program to Check if a Number is Odd or Even 6. Write a Python Program to Check Leap Year 7. Write a Python Program to Find the Largest Among Three Numbers 8. Write a Python Program to Check Prime Number 9. Write a Python Program to Find the Factorial of a Number 10. Write a Python Program to convert kilometres to miles
Strings: Creating Strings, Functions of Strings, Working with Strings, Length of a String, Indexing and Slicing, Repeating and Concatenating Strings, Checking Membership, Comparing Strings, Removing Spaces, Finding Substrings, Counting Substrings, Immutability, Splitting and Joining Strings, Changing Case, Checking Starting and Ending of a String, Sorting Strings, Searching in the Strings, Testing Methods, Formatting Strings, Finding the Number of Characters and Words, Inserting Substrings into a String Practical (more programs can be undertaken to complete the requisite hours) 1. Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise. 2. Define a function that computes the length of a given list or string. 3. Python program to check whether the string is Symmetrical or Palindrome 4. Write a Python Program to Reverse words in a given String 5. A pangram is a sentence that contains all the letters of the English alphabet at least once, for example: The quick brown fox jumps over the lazy dog. Your task here is to write a function to check a sentence to see if it is a pangram or not.
Module 2: List and Tuples: Lists, List Functions and Methods, List Operations, List Slices, Nested Lists, Tuples, Functions in Tuple Dictionaries: Creating a Dictionary, Operators in Dictionary, Dictionary Methods, Using for Loop with Dictionaries, Operations on Dictionaries, Converting Lists into Dictionary, Converting Strings into Dictionary, Passing Dictionaries to Functions, Sorting the Elements of a Dictionary using Lambda, Ordered Dictionaries Arrays: Creating Arrays, Indexing and Slicing of Arrays, Basic Array Operations, Arrays Processing, Mathematical Operations on Array, Aliasing Arrays, Slicing and Indexing in

	NumPy Arrays, Basic slicing, Advanced Indexing, Dimensions of Arrays, Attributes of an Array, The ndim Attribute, The shape Attribute, The size Attribute, The item size Attribute Functions: Function definition and call, Returning Results, Returning Multiple Values from a Function, Built-in Functions, Difference between a Function and a Method, Pass Value by Object Reference, Parameters and Arguments, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Arbitrary Arguments, Recursive Functions, Anonymous or Lambda Functions, Using Lambda with the filter() Function, Using Lambda with the map() Function, Using Lambda with the reduce() Function Modules: Introduction to Modules in Python Practical (more programs can be undertaken to complete 30 hours) 1. Write a program that takes two lists and returns True if they have at least one common member. 2. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements. 3. Write a Python program To create an array of numeric values 4. Write a Python script to sort (ascending and descending) a dictionary by value. 5. Write a Python script to concatenate following dictionaries to create a new one. Sample Dictionary : dic1={1:10, 2:20} dic2={3:30, 4:40} dic3={5:50,6:60} Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60} 6. Write a Python program to sum all the items in a dictionary 7. Write a Python Program to Find LCM and HCF 8. Write a Python Program To Find ASCII value of a character 9. Write a Python Program to Make a Simple Calculator 10. Write a python program to access a range of items in an array by using the slicing operator	
10	Text Books 1. Practical Programming: An Introduction to Computer Science Using Python 3, Paul Gries , Jennifer Campbell, Jason Montojo, Pragmatic Bookshelf, 2nd Edition, 2014 2. Programming through Python: M. T Savaliya, R. K. Maurya& G M Magar, Sybgen Learning India, 2020	
11	Reference Books 1. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018 2. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017 3. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018 4. Python Programming: Using Problem Solving Approach, ReemaThareja, Oxford Univeristy Press, 2017 5. Let Us Python, Yashwant. B. Kanetkar, BPB Publication, 2019	
12	Practical Evaluation Internal: 40%	Practical Evaluation External : 60%

13	Practical Internal Evaluation Format:20 Marks 1. Performance during all practical sessions – 10 Marks 2. Problem Solving with the acquired programming skills and Viva– 10 Marks	Practical External Evaluation Format: 30 Marks
14	Format of Question Paper: Duration 2 hours. Certified copy of Journal is compulsory to appear for the practical examination Practical Slip: Q1. From Module 1 13 marks Q2. From Module 2 12marks Q3. Journal and Viva 05 marks	

Sign of Chairperson
Dr. Mrs. R. Srivaramangai
Ad-hoc BoS (IT)

Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology

Sign of Offg. Dean,
Prof. Shivram S. Garje
Faculty of Science &
Technology