



Python Programming For II-II-EEE

Lecture	Topic	Description	Time	Skill Enhancement Course LAB	Training Programs	Student Practice Problems
Programming Constructs	Python Basic Constructs	History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook. Identifiers, Keywords, Statements and Expressions, Comments, Operators, Input and Output, Type conversion in python	WEEK-1	<ol style="list-style-type: none"> Write a program to swap two numbers without using a temporary variable. Demonstrate the following Operators in Python with suitable examples. <ol style="list-style-type: none"> Arithmetic Operators Relational Operators Assignment Operators Logical Operators Bit wise Operators Bitwise Operators Membership Operators Identity Operators Write a program to find the largest element among three Numbers. 	<ol style="list-style-type: none"> Write a program to Convert Fahrenheit to Celsius and vice-versa. Finding the square root of a given number Finding compound interest Area of a triangle using heron's formulae Write a program to find the max and min of four numbers using if-else. 	<ol style="list-style-type: none"> greatest number among 3 numbers swap with out temporary variable area of rectangle , circle Fizz buzz Check the numbr is power of 2 Happy Birthday
	Python Flow Control	if...else, nested-if, else-if laddur, Switch-Case , Example programs	WEEK-2	<ol style="list-style-type: none"> Write a Program to display all prime numbers within an interval Write a program to add and multiply complex numbers Write a program to print multiplication table of a given number. 	<ol style="list-style-type: none"> Write a Program to check whether given number is a Armstrong or not Write a Program to compute sine and cosin series Write a program to print first n terms of a fibonacci 	<ol style="list-style-type: none"> factors of a number print even number series upto N sum of digits up to single digit find GCD , LCM count set bits reverse a number strong number
	Loops	while loop, for loops, for-else, break, continue statement, Catching Exceptions Using try and except Statement. Math Problems using				
	Patterns ,Series	Introduction to patterns & Series, Series Programs, Basic Patterns, Square Patterns, Triangular Patterns, Character Patterns, Reverse Triangle, Inverted patterns, Isosceles triangles	WEEK-3	<ol style="list-style-type: none"> Write a program to check whether given number is Perfect or not. Write a program to print rightTriangle stars print square rectangle ' * ' square pattern print primes in range 	<ol style="list-style-type: none"> Write a program to check whether given number is Perfect or not. Write a program to print rightTriangle stars print square rectangle ' * ' square pattern print primes in range 	<ol style="list-style-type: none"> factors of a number print even number series upto N sum of digits up to single digit find GCD , LCM reverse a number strong number convert binary to decimal convert decimal to octal Inverted Right-Angled Triangle '*'

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	Function	Functions:Introduction to function,Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function,Scope of Variable in Python,Function Arguments,*args and **kwargs in Python,Command Line Arguments.Packing and Unpacking Arguments in Python,Lambda Expresion	WEEK-4	1.Write a program to define a function with multiple return values. 2. Write a program to define a function using default arguments.	1)Convert Decimal to Binary 2)Convert Binary to Hexadecimal 3)Write a program to calculate factorial of a given number using recursive function. 4)Check the number is power of 3 5)Write a recursive function to generate Fibonacci series. 6)Write a recursive function to find the lcm of two numbers	1))print odd number series upto N 2)check harshad number 3)cyclic sum of digits 4)Find sum of digits using recursion 5)Find GCD using recursion
	Recursion	Introduction to recursion, Principle of mathematical induction, Fibonacci numbers				
Problem Solving Techniques	Time and space comple	Theoretical Time and Space complexity analysis, Time and Space complexity analysis of non-recursive and recursive algorithms	WEEK -5	1. Write a program to perform the given operations on a list: i. additionii. insertioniii. slicing 2. Write a program to perform any 5 built-in functions by taking any list.	1)Write a program to find the min and max of a 1D integer array 2)Write a program to reverse of a 1D integer array. 3)find second smallest of 1D array	1)Find pair whoes sum is target in array 2)Max in Matrix 3)sum of all odd numbers in array
	LIST	Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.				
Python Data Structures	TUPLE and SET	Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions	WEEK-6	1. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples. 2. Write a program to check if a given key exists in a dictionary or not. 3. Write a program to add a new key-value pair to an existing dictionary. 4. Write a program to sum all the items in a given dictionary.		
	DICTIONARY	Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statemen, Relation between Tuples and Dictionaries, Using zip() Function.				

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ARRAYS	Introduction to 1D arrays	Introduction to arrays, How arrays are stored in memory, Passing arrays to functions, Problems on 1D array	WEEK-7	1. Write a program to add, transpose and multiply two matrices	1)find second largest of 1D array 2) find missing number in array 3)Print Sum of Both Diagonals of a Matrix 4) Print Row wise Sum of Matrix	1)Adjacent Zeros 2)Rotate Array K elements to Right 3)check High Fever employees in COVID 4)Cumulative Sum of elements 5) Lucky Numbers in a Matrix 6)Find Winner on a Tic Tac Toe
	2D Arrays	2D arrays, Storage of 2D arrays, Example problems using 2D Arrays, Recursion using in 2D array problems				
	Searching	Understanding & Analysis of Linear Search, Binary Search, Problems on Searching	WEEK-8		1)Write a program to perform Linear search on 1D array. 2)Write a program to perform Binary search on 1D array. 3)Search Insert Position 4)implement bubble sort 5)implement selection sort	1)Find Smallest Letter Greater Than Target 2)Find First and Last Position of Element in Sorted Array 3)How Many Numbers Are Smaller Than the Current Number 4)Sort the People
	Sorting	Understanding & Analysis of Selection sort, Bubble sort, Insertion sort, Quick sort, Merging two sorted arrays, Merge sort, Problems on Sorting				
Strings	Strings	Introduction to strings, storage of strings and their inbuilt functions, Problems on Strings , Recursion using in string problems	WEEK-9	1. Write a program to count the number of vowels in a string (No control flow allowed). 2. Write a program to find the length of the string without using any library functions. 3. Write a program to check if the substring is present in a given string or not. 4. Write a program to find the length of the string without using any library functions.		1)Words in Sentence 2)Remove Special Characters from a String 3)upper case and lower case conversion 4)Replace Each Vowel with the Next Character 5)Find the First Repeating Character
Files and OOPs	Files	Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.	WEEK-10 WEEK-11	1. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered. 2. Python program to print each line of a file in reverse order. 3. Python program to compute the number of characters, words and lines in a file. 4. Write a program to create, display, append, insert and reverse the order of the items in the array.		
	OOPs	Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.				

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Data Science	Data Science ,JSON and XML	Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.	WEEK-12	<ol style="list-style-type: none"> 1. Python program to check whether a JSON string contains complex object or not. 2. Python Program to demonstrate NumPy arrays creation using array () function. 3. Python program to demonstrate use of ndim, shape, size, dtype. 4. Python program to demonstrate basic slicing, integer and Boolean indexing. 5. Python program to find min, max, sum, cumulative sum of array 6. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows: <ol style="list-style-type: none"> a) Apply head () function to the pandas data frame b) Perform various data selection operations on Data Frame 7. Select any two columns from the above data frame, and observe the change in one 		