

K-1

Class: SYAN-Nova

CO No.	TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
CO303.1		Develop Python Program using basic Syntactical Constructs.
	TLO 1.1	Describe the given variables, keywords and constants in Python
	TLO 1.2	Use indentation, comments in the given program.
	TLO 1.3	Use different types of operators for writing arithmetic expressions.
	TLO 1.4	Write Python programs using control flow.
CO303.2		Perform operations on sequence structures in Python
	TLO 2.1	Develop Python program to manipulate lists for the given problem.
	TLO 2.2	Develop Python program to manipulate tuples for the given problem.
	TLO 2.3	Write Python program to manipulate sets for the given problem.
	TLO 2.4	Write Python program to manipulate dictionaries for the given problem.
	TLO 2.5	Develop relevant user defined functions for the given problem.
CO303.3		Implement module packages in Python for given problem.
	TLO 3.1	Create Python module for the given problem.
	TLO 3.2	Develop Python package for the given problem.
	TLO 3.3	Use NumPy for performing mathematical operations on arrays.
CO303.4		Design Classes for given problem.
	TLO 4.1	Apply the basic concepts of object oriented programming to define classes and objects.
	TLO 4.2	Implement the concept of polymorphism
	TLO 4.3	Create Python program using inheritance for the given problem
CO303.5		Implement Linear Data Structure in Python

	TLO 5.1	Describe linear data structures in Python.
	TLO 5.2	Develop Python code using arrays for given problem.
	TLO 5.3	Write Python code to implement link list for given problem..
	TLO 5.4	Implement stack in Python program.
	TLO 5.5	Implement queues in Python program
CO303.6		Develop Python program to implement tree data structure
	TLO 6.1	Implement various types of trees using Python code.
	TLO 6.2	Perform various operations on trees using Python code.

● Teaching Plan:

Unit No. (Allotted Hrs.) Marks	Theory Learning Outcomes (TLO)	Title/Topic Details and Course Outcome [CO]	Plan (From -To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Teaching Method/ Media/ Tools	Remark
01 (06) 12	1	Unit - I Introduction and Control Flow statements in Python[CO303.1]				
	1.1	1.1 Features of Python - interactive, object oriented, interpreted, platform independent	03/07/2026 (01)		Chalk Board, PPT+ LCD	
	1.2	1.2 Python building blocks - identifiers, keywords, indentation, variables, comments.	04/07/2026 (01)		Chalk Board, PPT+LCD	
	1.3	1.3 Python data types: numbers, string, tuples, lists, dictionary.	06/07/2026 (01)		Chalk Board, PPT+ LCD	
	1.4	1.4 Basic operators: arithmetic, comparison/ relational, assignment, logical, bitwise, membership, identity operators, Python operator precedence.	10/07/2026 (01)		Chalk Board, PPT+LCD MKCL ERA	
	1.5	1.5 Control flow: conditional statements (if, if else, nested if), looping in python (while loop, for loop, nested loops) loop manipulation using continue, pass,	11/07/2026 To 13/07/2026 (02)		Chalk Board, PPT+LCD MKCL ERA	
02 (07) 12	2	Unit-II Python specific Data Structures and functions [CO303.2]				
	2.1	2.1 Lists: Defining lists, accessing values in list, deleting values in list, updating lists, basic list operations, built - in list functions.	17/07/2026 (01)		Chalk Board, PPT+LCD	
	2.2	2.2 Tuples: Accessing values in tuples, deleting values in tuples, and updating tuples, basic tuple operations, built - in tuple functions.	18/07/2026 (01)		Chalk Board, PPT+LCD MKCL ERA	
	2.3	2.3 Sets: Accessing values in set, deleting values in set and updating sets, basic set operations, built - in set functions.	20/07/2026 (01)		Chalk Board, PPT+LCD	
	2.4	2.4 Dictionaries: Accessing values in dictionary, deleting values in dictionary and updating dictionary, basic dictionary operations, built- in dictionaries functions.	25/07/2026 (01)		Chalk Board, PPT+LCD MKCL ERA	

	2.5	2.5 Use of Python built- in functions (e.g.type/ data conversion functions, math functions etc.)	27/07/2026 (01)		Chalk Board, PPT+LCD	
	2.6	2.6 User defined functions: Function definition, function calling, function arguments and parameter passing, return statement, scope of variables: global	31/07/2026 To 01/08/2026 (02)		Chalk Board, PPT+LCD MKCL ERA	
03 (06) 12	3	Unit - III Python Modules and Packages [CO303.3]				
	3.1	3.1 Modules: writing modules, importing modules, importing objects from modules, Python built- in modules (e.g. numeric and mathematical module, functional programming module).	03/08/2026 To 07/08/2026 (02)		Chalk Board, PPT+ LCD, Demo MKCL ERA	
	3.2	3.2 Python packages: introduction, writing Python packages.	08/08/2026 To 10/08/2026 (02)		Chalk Board, PPT+LCD, Online Demo	
	3.3	3.3 Using standard Numpy: methods in Numpy, creating arrays and initializing, reading arrays from files,special initializing functions, slicing and indexing,	14/08/2026 To 17/08/2026 (02)		Chalk Board, PPT+ LCD, OnlineDemo	
04 (06) 10	4	Unit - IV Object Oriented Programming in Python [CO303.4]				
	4.1, 4.2	4.1Introduction to object oriented programming, creating classes and objects, constructor and destructor in Python. 4.2Data abstraction and data encapsulation.	21/08/2026 To 22/08/2026 24/08/2026 (03)		Chalk Board, PPT+LCD, Demo MKCL ERA	
	4.3, 4.4	4.3 Concept of polymorphism- method overloading and overriding. 4.4 Inheritance and types of inheritance	28/08/2026 29/08/2026 To 31/08/2026 (03)		Chalk Board, PPT+LCD, Demo	
05 (12) 14	5	Unit - V Linear Data Structure Arrays, Link List, Stack and Queues using Python [CO303.5]				
	5.1	5.1Data Structures – definition, linear data structures, non-linear data structures arrays - overview, types of arrays, operations on arrays, arrays vs list	04/09/2026 05/09/2026 07/09/2026 (03)		Chalk Board, PPT+LCD, Demo	
	5.2	5.2 Searching -linear search and binary search, sorting - bubble sort, insertion sort.	11/09/2026 to 12/09/2026 (02)		Chalk Board, PPT+LCD, MKCL ERA	
	5.3	5.3 Linked Lists – singly linked list, doubly linked list, circular linked lists, implementation using Python packages for link list.	14/09/2026 To 18/09/2026 (02)		Chalk Board, PPT+ LCD, MKCL ERA	
	5.4	5.4 Stacks : introduction to stacks, stack applications - expression evaluation, backtracking, traversal - infix, prefix and postfix concepts.	19/09/2026 To 21/09/2026 (02)			

	5.5	5.5 Queues: introduction to queues, queue applications-breadth first search, depth first search.	25/09/2026 26/09/2026 28/09/2026 (03)			
06 (08) 10	6	Unit - VI Non-Linear Data Structure.[CO303.6]				
	6.1	6.1 Trees - tree Terminology, binary trees: implementation, tree traversals, binary search trees	03/10/2026 05/10/2026 09/10/2026 (03)		Chalk Board, PPT+LCD, Demo	
	6.2	6.2 Applications of trees - spanning tree	10/10/2026 to 10/10/2026 (02)		Chalk Board, PPT+LCD, Demo MKCL ERA	
	6.3	Exception Handling in Python	12/10/2026 16/10/2026 17/10/2026 (03)		Chalk Board, PPT+ LCD, Demo MKCL ERA	

● **COs - POs MATRIX FORM:**

Course Outcomes (COs)	Program Outcomes (POs)							Program Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO- 1	PSO- 2
CO1	3	-	-	1	-	-	-	1	-
CO2	2	2	2	1	-	-	1	1	-
CO3	-	2	2	1	-	-	1	2	1
CO4	2	2	2	1	1	2	1	2	-
CO5	2	2	2	1	1	2	1	2	2
CO6	2	2	2	1	-	2	1	2	2
Legends :- High:03, Medium:02,Low:01, No Mapping: - PSO1: Apply fundamental concepts of Computer Engineering and Artificial Intelligence and machine Learning to solve technical problems. PSO2: Implement the domain knowledge to achieve successful career as an engineering professional.									

● **Direct Assessment Criteria:**

A. Rules for Theory Assessment:

- Chapter wise Assignments will be solved in class and assessed by subject teacher at the time of Laboratory Manual Assessment.
- Total weightage for this Course is 100 Marks. Out of 100 Marks, 70 Marks are allotted to MSBTE Theory Examination and 30 Marks are allotted to Theory Progressive Assessment (FA-TH).
- Under theory assessment the FA-TH out of 30 Marks are to facilitate integration of COs and this is the average of two test (each of 30 Marks) taken during the semester

4. MSBTE Theory Examination of 70 marks will be conducted by MSBTE at the end of semester. The schedule of MSBTE Examinations will be announced by MSBTE on the website www.msbte.com.

● References:

A. Books:

Sr. No	Author	Title	Publisher with ISBN Number
1	Rao, K. Nageswara Shaikh Akbar	Python Programing	Scitech Publications (India) Pvt. Ltd. ISBN: 9789385983450
2	Michael T. Goodrich, Roberto Tamassia	Data Structures and Algorithms in Python	Wiley publication New Delhi 2016 ISBN: 978-81- 265-5423-2
3	Beazley, David	Python Essential Reference	4th Edition, Addison-Wesley Professional, ISBN: 9780672329784
4	Dr.Basant Agarwal	Hands-On Data Structures and algorithms with Python	3rd Edition, Packt publisher, ISBN : 9781801073448

B. Web sites :

Sr. No	Link / Portal	Description
1	https://onlinecourses.nptel.ac.in/noc22_cs26/preview	Online Learning Initiatives by IIT faculties.
2	https://www.geeksforgeeks.org/graph-data-structure-and-algorithms/	Data structures in Python
3	https://www.freecodecamp.org/news/object-oriented-programming-in-python/	Object Oriented Programming Concepts
4	https://realpython.com/python3-object-oriented-programming/	Basics Object Oriented Programming Concepts.

- C. Tools :**
- 1.Google Classroom to share subject material to students.
 2. Quizes using MKCL ERA LMS login
 3. Google Spreadsheet..

D. URLs of Referred Videos:

Sr. No.	Topic Name	Link
1.	Introductio of Python	https://www.youtube.com/watch?v=rfscVS0vtbw
2.	Control Flow Statements in Python (if, else, loops	https://www.youtube.com/results?search_query=Neso+Academy+Python+Control+Flow
3.	Python Lists, Tuples, Sets and Dictionaries – CodeWithHarry	https://www.youtube.com/playlist?list=PLu0W_9lII9agIcNt8t4iYVSZ3eykIAOME
4.	Python Data Structures	https://www.youtube.com/playlist?list=PLsyebzWxl7poL9JTVyndKe62ieoN-MZ3
5.	Python Modules Tutorial	https://www.youtube.com/watch?v=rfscVS0vtbw
6.	Python Modules and Packages	https://www.youtube.com/playlist?list=PLu0W_9lII9agIcNt8t4iYVSZ3eykIAOME

7.	Python Data Structures (Array, Linked List, Stack, Queue) – Pr ss	https://www.youtube.com/watch?v=_uQrJ0TkZlc
8.	Trees and Graphs in Python	https://www.youtube.com/watch?v=_uQrJ0TkZlc
9.	Object-Oriented Programming in Python	https://www.youtube.com/results?search_query=Neso+Academy+Python+Object+Oriented+Programming

Ms. V.N.Lawand
(Name & signature of Staff)

Mrs.R.Y.Thombare
(Name & signature of HOD)

Cc: Course File – DSP(313306)