Maharashtra State Board of Technical Education, Mumbai

LABORATORY PLAN (LP)

K-2

Academic Year: 2026-27 **Date: 01/07/2026**

Institute Name: K. K. Wagh Polytechnic, Nashik **Institute Code**: 0078

Programme and Code: Artificial Intelligence and Machine Learning (AN) **Course Index:** 303

Course Name: Data Structure using Python **Course Abbr. Code**: DSP-313306

Semester: IIIrd **Scheme**: ‘K’ **Allocated Hrs:** 60 **Name of Faculty**: Mrs.RP.Shinde

Class: SYAN

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Course Outcomes (COs): Theory & Practical:

By learning course Data Structure using Python (DSP-313306), Second Year students will be able to:

- **CO303.1 -** Develop Python program using basic syntactical constructs.
- **CO303.2 -** Perform operations on sequence structures in Python.
- **CO303.3 -** Implement Modules, Packages in Python for given problem.
- **CO303.4 -** Design classes for given problem.
- **CO303.5 -** Implement Linear Data Structure in Python.
- **CO303.6** - Develop Python program to implement tree data structure.

• Teaching and Examination Scheme:

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme											Total Marks
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL		
															Practical						
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
313306	DATA STRUCTURE USING PYTHON	DSP	DSC	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175

Abbreviations: CL- Classroom Learning , LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, SLA - Self Learning Assessment

Legends: @ Internal Assessment

• Laboratory Learning Outcome (LLO):

LLO 1.1 Install Python integrated development environment.

LLO 2.1 Implement basic operators in Python.

LLO 3.1 Implement control flow operations for solving given task.

LLO 4.1 Implement while control loop for solving iterative problems.

LLO 5.1 Implement for loop for solving iterative problems.

LLO 6.1 Perform basic operations on the lists.

LLO 7.1 Execute various tuple operations.

LLO 8.1 Implement various set operations.

LLO 9.1 Execute various operations on dictionaries.

LLO 10.1 Use built-in math functions in Python.

LLO 11.1 Create user-defined functions to solve the given task

LLO 12.1 Apply built-in mathematical modules from python.

LLO 13.1 Write user-defined module in Python.

LLO 14.1 Apply built-in packages from Python.

LLO 15.1 Create user-defined packages in Python.

LLO 16.1 Implement the concept of polymorphism in Python.
LLO 17.1 Implement the concept of inheritance in Python.
LLO 18.1 Execute the array operations using Python.
LLO 19.1 Implement the linked list operations using Python.
LLO 20.1 Implement the queue operations using Python.
LLO 21.1 Implement searching techniques in Python.
LLO 22.1 Implement sorting techniques in Python.
LLO 23.1 Implement stack data structure in Python.
LLO 24.1 Implement sorting techniques in Python.

- **Laboratory Plan:**

Sr. No.	Course Outcomes	LLO	Name of Practical	Planned Date		Actual Date		Remark/ Assessment Date with Staff sign
				From	To			
1.	CO303.1	1.1	a) Install and configure Python IDE . b) Write Python program to display message on screen	A: 03/07/2026 B- 07/07/26 C-02/07/26	A: 06/07/2026 B-10/07/26 C-04/07/26			
2.	CO303.1	2.1	Write simple Python program using operators: Arithmetic operators Logical operators Relational operators Conditional operators Bitwise operators Ternary operator	A: 06/07/26 B- 07/07/26 C-04/07/26	A:08/07/26 B-10/07/26 C-09/07/26			
3.	CO303.1	3.1	Write simple Python program to demonstrate use of conditional statements : If, if…else, Nested if, Switch case	A-08/07/26 B-10/07/26 C-09/07/26	A-13/07/26 B-14/07/26 C-11/07/26			
4.	CO303.1	4.1	Develop a simple Python program to demonstrate use of control loop: while	A-13/07/26 B-14/07/26 C-11/07/26	A-15/07/26 B-17/07/26 C-16/07/26			
5.	CO303.1	5.1	Create a simple program to demonstrate use of for loop in Python (e. g : various pattern building, printing multiplication table, checking palindrome number etc.)	A-15/07/26 B-17/07/26 C-16/07/26	A-20/07/26 B-21/07/26 C-18/07/26			
6.	CO303.2	6.1	Write Python program to perform following operations on lists :Create Access, Update, Delete elements in list	A-20/07/26 B-21/07/26 C-18/07/26	A-22/07/26 B-24/07/26 C-23/07/26			
7.	CO303.2	7.1	Develop Python program to perform following operations on tuples: Create, Access, Update Delete tuple elements	A-27/07/26 B-24/07/26 C-23/07/26	A-29/07/26 B-28/07/26 C-25/07/26			
8.	CO303.2	8.1	Write Python program to perform following operations on set :	A-29/07/26 B-28/07/26 C-25/07/26	A-03/08/26 B-31/07/26 C-30/07/26			

			Create ,Access, Update Delete access set elements					
9.	CO303.2	9.1	Create a program to perform following operations on dictionaries in Python: Create, Access, Update, Delete, Looping through dictionary	A-03/08/26 B-31/07/26 C-30/07/26	A-05/08/26 B-04/08/26 C-06/08/26			
10.	CO303.2	10.1	Apply math built - in function in Python.	A-05/08/26 B-04/08/26 C-06/08/26	A-10/08/26 B-07/08/26 C-08/08/26			
11.	CO303.2	11.1	Develop user defined Python function for given problem: write a function with minimum 2 arguments	A-10/08/26 B-07/08/26 C-08/08/26	A-12/08/26 B-11/08/26 C-13/08/26			
12.	CO303.3	13.1	Write program to create a user - defined module (e. g : building calculator) in Python.	A-12/08/26 B-11/08/26 C-13/08/26	A-17/08/26 B-14/08/26 C-15/08/26			
13	CO303.4	14.1	Develop Python program to demonstrate use of NumPy packages for creating , accessing and performing different array operations.	A-17/08/26 B-14/08/26 C-15/08/26	A-19/08/26 B-18/08/26 C-20/08/26			
14	CO303.4	17.1	Develop program in Python to demonstrate following operations: Single inheritance Multilevel inheritance Multiple inheritance Hybrid inheritance Hierarchical inheritance	A-19/08/26 B-18/08/26 C-20/08/26	A-24/08/26 B-21/08/26 C-22/08/26			
15	CO303.5	18.1	Write a program in Python for handling array to demonstrate following operations :Array declaration ,Insertion, Deletion, Append, Index, Reverse	A-24/08/26 B-21/08/26 C-22/08/26	A-31/08/26 B-25/08/26 C-27/08/26			
16	CO303.5	19.1	Write a program in Python for linked list to demonstrate following operations :Insertion, Deletion, Updating Merging to list	A-31/08/26 B-25/08/26 C-27/08/26	A-02/09/26 B-28/08/26 C-29/08/26			
17	CO303.5	20.1	Write a program in Python to demonstrate queue data structure operations : Enqueue, Dequeue, Display	A-31/08/26 B-28/08/26 C-29/08/26	A-02/09/26 B-01/09/26 C-03/09/26			
18	CO303.5	21.1	Use the searching techniques in data structures: Linear Search Binary Search	A-02/09/26 B-01/09/26 C-03/09/26	A-07/09/26 B-04/09/26 C-05/09/26			
19	CO303.5	22.1	Write a Python program to implement following sorting techniques: Bubble	A-07/09/26 B-04/09/26 C-05/09/26	A-09/09/26 B-08/09/26 C-10/09/26			

			Sort Insertion Sort					
20	CO303.6	23.1	Write a program in Python to evaluate an expression.	A-09/09/26 B-08/09/26 C-10/09/26	A-16/09/26 B-18/09/26 C-17/09/26			

- **Direct Assessment Criteria:(Practical)**

Formative assessment (Assessment for Learning)

1. Continuous Assessment based on Process and Product related Performance Indicators. Each Practical will be assessed considering: 60% weightage is to Process. 40% weightage is to Product.
2. Formative assessment of each practical is based on Process related (15 marks) and Product related (10 marks) - Total out of 25 marks as per the assessment scheme prescribed in manual given by MSBTE.

Sr. No.	**Weightage- Process related (Marks-10)**	**40%**
1.	Logic Formation	20%
2.	Debugging Ability	10%
3.	Follow Ethical Practices:	10%
	Weightage- Product related (Marks-15)	**60%**
4.	Expected Output	25%
5	Timely Submission	25%
6.	Answer to Sample questions	10%
	Total (25 Marks)	**100%**

3. The Performance Indicators of each practical is assessed according to product and process related skills.(Sample format is as given in above table). Final assessment of 25 Marks for all practicals.
4. Following is the distribution of 75 Marks – Final Formative Assessment (F.A.) of 25 marks is calculated as follows:
   i. Formative assessment (FA-PR) will carry 25 Marks
      FA Marks = ((Total obtained marks)*25)/ (25*Total Number of parcticals)
   ii. Summative Assessment (SA-PR) for 25Marks will be conducted by MSBTE after the completion of the term.
   iii. Self-learning assessment(SLA) will carry 25 Marks
5. A comprehensive Final Practical End Semester examination (SA-PR of 25 Marks) will be conducted by MSBTE at the end of semester. Examiner for this examination will be External examiner. The schedule of MSBTE Practical Examination will be display on Notice board prior to examination

- **Practical wise LLO-CO Mapping:**

Practical No.	LLO	CO303.1	CO303.2	CO303.3	CO303.4	CO303.5	CO303.6
1.	1.1	✓					
2.	2.1	✓					
3.	3.1	✓					
4.	4.1	✓					
5.	5.1	✓					
6.	6.1		✓				
7.	7.1		✓				
8.	8.1		✓				
9.	9.1		✓				
10.	10.1		✓				
11.	11.1		✓				
12.	13.1			✓			
13.	14.1				✓		
14.	17.1				✓		
15.	18.1					✓	
16.	19.1					✓	
17.	20.1					✓	
18.	21.1					✓	
19.	22.1					✓	
20.	23.1						✓

- **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=PLsyeobzWxl7poL9JTVyndKe62ieoN-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

Mrs. R. P. Shinde
(Name & signature of Staff)

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

Cc: Course File – DSP(313306)