

Maharashtra State Board of Technical Education, Mumbai

TEACHING PLAN (TP-TH)/ Course Information Sheet (CIS)

K-1

Academic Year: 2026-27

Institute Name: K. K. Wagh Polytechnic, Nashik

Program and Code: Computer Technology (CM)

Course Name: Data structure using C (DSU)

Class: SYCM-Win **Semester:** 3rd **Scheme:** K

Date: 01/07/2026

MSBTE Code: 0078

Course Code & Abbr.:313301(DSU)

Name of Faculty: Mr.S.K.Mahajan

Course Index:CI302 **Learning Hrs:**45

● Teaching and Examination Scheme:

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs/Week			SLH	NLH			Theory				Based on LL & TSL Practical				Based on SL		
				CL	TL	L L					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
													Max	Min	Max	Min	Max	Min	Max	Min	
313334	Data Structure Using C	DSU	DSC	3	1	4	-	8	4	3	30	70	100	40	50	20	25#	10	-	-	175

Abbreviations: CL- Class Room Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

● Course Outcomes (COs): Theory

SYCM-Mac students will be able to achieve & demonstrate the following COs on completion of course based learning

CO/ TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
C0302.1(CO1)	Perform basic Operation on Data Structure
TLO 1.1	Classify the given type of Data Structures based on their characteristics and space
TLO 1.2	Perform operations on the given type of Data Structure
C0302.2(CO2)	Apply different Searching and Sorting methods.
TLO 2.1	Develop algorithm to search the given key using different Searching Techniques
TLO 2.2	Create algorithm to sort data using a given method
C0302.3(CO3)	Implement basic operations on Linked List.
TLO 3.1	Differentiate between Static and Dynamic Memory Allocation.
TLO 3.2	Create a suitable structure using a Linked List to represent a Node
TLO 3.3	Create Algorithm to add or remove a specified item from a Linear Linked List
C0302.4(CO4)	Perform operations on Stack using Array and Linked List Implementations
TLO 4.1	Represent Stack using Array and Linked List
TLO 4.2	Create Algorithm to carry out the PUSH and POP operations in a Stack
TLO 4.3	Use Stack to transform the given expression from Infix to Postfix
TLO 4.4	Evaluate Postfix Expression
C0302.5(CO5)	Perform operations on Queue using Array and Linked List Implementations
TLO 5.1	Evaluate Postfix Expression
TLO 5.2	Explain the characteristics of different types of Queue
TLO 5.3	Create Algorithm to carry out the INSERT and DELETE Operations on a Queue
C0302.6(CO6)	Create and Traverse Tree to solve problems.
TLO 6.1	Describe the given Tree Terminology.
TLO 6.2	Create a Binary Search Tree based on the provided data.
TLO 6.3	Create Algorithms to Traverse the Tree using the given method.
TLO 6.4	Create an Expression Tree
TLO 6.5	Create Heap.

● **Teaching Plan:**

Unit No. (Learning Hrs.)	TLOs	Title/Topic Details with CO	Plan (From-To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Teaching Method/ Media	Remark
01 (02) (04)	CO1 TLO- 1.1, 1.2, 1.3,	Unit - I Introduction to Data Structures 1.0 Overview of the Course, Prerequisites, Scope, Skills, Career & Opportunities, MNCs 1.1 Introduction: Concept and Need of Data Structure, Definition, Abstract Data Type 1.2 Types of Data Structures: (i) Linear Data Structures (ii) Non-Linear Data Structures 1.3 Operations on Data Structures: (i) Traversing (ii) Insertion (iii) Deletion	02/07/2026 To 07/07/2026 (04)		Chalkboard, PPT, MKCL ERA	
02 (08) (12)	CO1 TLO- 2.1, 2.2	Unit - II Searching and Sorting 2.1 Searching: Searching for an item in a data set 2.2 (i) Linear Search 2.3 (ii) Binary Search 2.4 Sorting: Sorting of data set in an order (i) Bubble Sort 2.5 (ii) Selection Sort 2.6 (iii) Insertion Sort 2.7 (iv) Quick Sort 2.8 (v) Merge Sort	09/07/2026 To 13/07/2026 (03)		Chalkboard, PPT, MKCL ERA, Online Demo	
03 (12) (16)	CO1 TLO- 3.1, 3.2, 3.3	Unit - III Linked List 3.1 Difference between Static and Dynamic Memory Allocation. 3.2 Introduction to Linked List, 3.3 Terminologies: Node, Address, Pointer, 3.4 Information field / Data field, Next pointer, 3.5 Null Pointer, Empty List. 3.6 Type of Lists: Linear List, 3.7 Circular List, 3.8 Representation of Doubly Linked List. 3.9 Operations on a Singly Linked List: Creating a Linked List, Inserting a new node in a Linked List, 3.10 Deleting a node from a Linked List, 3.11 Searching a key in Linked List, Traversing a Singly Linked List. 3.12 Applications of Linked List.	23/07/2026 To 28/07/2026 (04)		Chalkboard, PPT, MKCL ERA Online Demo	
04 (08) (12)	CO1 TLO- 4.1, 4.2, 4.3, 4.4	Unit – IV Stack 4.1 Introduction to Stack: Definition, Stack as an ADT , 4.2 Operations on Stack-(Push, Pop), Stack Operations 4.3 Conditions – Stack Full / Stack Overflow, Stack Empty / Stack Underflow. 4.4 Stack Implementation using Array and Representation using Linked List. 4.5 Applications of Stack: Reversing a List, Polish Notations, 4.6 Conversion of Infix to Postfix Expression, 4.7 Evaluation of Postfix Expression. 4.8 Recursion: Definition and Applications.	17/08/2026 To 21/08/2026 (04)		Chalkboard, PPT, MKCL ERA Online Demo	
			24/08/2026 To 28/08/2026 (04)		Chalkboard, PPT, MKCL ERA Online Demo	

05 (06) (10)	CO1 TLO- 5.1, 5.2, 5.3	Unit – V Queue 5.1 Introduction to Queue: Queue as an ADT, 5.2 Queue representation in memory using Array and representation using a Linked List. 5.3 Types of Queues: Linear Queue, Circular Queue, Concept of Priority Queue, Double-Ended Queue.	01/09/2026 To 08/09/2026 (03)		Chalkboard, PPT, MKCL ERA Online Demo	
		5.4 Queue Operations: INSERT , DELETE 5.5 Queue Operation Conditions: Queue Full, Queue Empty. 5.6 Applications of Queue.	10/09/2026 To 18/09/2026 (03)		Chalkboard, PPT, MKCL ERA	
06 (09) (16)	CO1 TLO- 6.1, 6.2, 6.3, 6.4, 6.5	Unit - VI Tree 6.1 Introduction to Trees Terminologies: Tree, Degree of a Node, Degree of a Tree, 6.2 Level of a node, Leaf Node, Depth / Height of a Tree, In-Degree and Out Degree, Path, 6.3 Ancestor and Descendant Nodes.	21/09/2026 To 25/09/2026 (03)		Chalkboard, PPT, MKCL ERA Online Demo	
		6.4 Tree Types and Traversal methods, 6.5 Types of Trees: General Tree, Binary Tree, 6.6 Binary Search Tree (BST).	28/09/2026 To 05/10/2026 (03)			
		6.7 Binary Tree Traversal: In-Order Traversal, 6.8 Preorder Traversal, Post-Order Traversal. 6.9 Expression Tree, Heap	08/10/2026 To 10/10/2026 (03)			

• Chapter wise CO-PO Mapping:

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes PSOs	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PSO-1	PSO-2
CO1	2	--	--	1	--	--	1		
CO2	2	2	2	1	--	--	1		
CO3	2	2	2	1	1	1	1		
CO4	2	2	2	1	--	1	1		
CO5	2	2	2	1	--	1	1		
CO6	2	2	2	1	--	1	1		

• **Legends:-** High:03, Medium:02, Low:01, --:No Mapping

Sr. No.	Programme Outcomes (POs)	Programme Specific Outcomes (PSOs)
1.	PO-1 Basic and Discipline Specific Knowledge	PSO1 Apply acquired skills of programming, networking, hardware & database for computer based problem solving and software development.
2.	PO-2 Problem Analysis	
3.	PO-3 Design/ Development of Solution	PSO-2 Pursue higher studies in the field of Computer Science / Computer Engineering /Information Technology.
4.	PO-4 Engineering Tools	
5.	PO-5 Engineering Practices for Society, Sustainability and Environment	
6.	PO-6 Project Management	
7.	PO-7 Life Long Learning	

• Weightage to Learning Efforts & Assessment Purpose (Specification Table)

Unit No.	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Introduction to Data Structures	CO1	2	2	2	0	4
2	Searching and Sorting	CO2	8	2	2	8	12
3	Linked List	CO3	12	2	4	10	16
4	Stack	CO4	8	2	4	6	12
5	Queue	CO5	6	2	2	6	10
6	Tree	CO6	9	2	4	10	16
		Total	45	12	18	40	70

Learning Levels with reference to Bloom's Taxonomy: R Level: Remember, U Level: Understand, A-Level: Apply

• Formative & Summative Assessment Criteria:

• Theory Assessment:

a) Formative assessment (TH-FA) :

- Two offline class tests each of 30 marks will be conducted as per MSBTE guidelines. The average of two class test marks will be considered for final TH-FA (Average) out of 30 marks.

b) Summative Assessment (TH- SA) :

- The comprehensive End semester assessment will be done by MSBTE by a Theory written Examination for 70 marks. Question Paper and Assessment is performed by MSBTE.
- Final Theory Score out of 100 Marks will be derived as the total score as below:

$$\text{TH-SA [out of 70]} + \text{TH-FA [Average out of 30]} = 100 \text{ Marks}$$

• Practical Assessment:

- Formative Assessment (FA) of each practical/experiment will be performed progressively for 25 marks. The assessment will be performed based on the Regularity in Practical Performance, Tool Selection Ability, Use of Appropriate tool to perform the Identified tasks, Algorithm/Solution developed, Quality of output achieved, Answer to sample questions and Submit report in total time.
- Final Term Work(FA-PR) of 25 marks is calculated based on scores in Formative Assessment for all practical's/experiments as:

$$\text{Term Work Marks} = \frac{\text{Sum of Total Marks Scored in FA}}{(25 \times \text{Total Number of Experiments})}$$
- Self-learning Activities (SLA) includes Micro project / Assignment / other activities related to subject/course and it will be evaluated out of 25 Marks.
- A Summative (comprehensive) Assessment (SA-PR) of Practical will be performed as End Semester Examination (ESE). The SA-PR will be before 25 Marks with MSBTE guidelines at the end of semester. The schedule of MSBTE Practical ESE will be display on Notice board prior to examination.

• References:

1. Learning Materials / Books

Sr. No.	Title of Book	Author	Publication
01	Data Structure Using C	ISRD Group New Dehli	Tata McGraw-Hill
02	Data Structure Using C	Reema Thareja	OXFORD University Press
03	Introduction to data structures in C	Ashok Kamthane	Pearson
04	C & Data Structures	Prof. P.S. Deshpande, Prof D.G. kakde	Dream Tech press
05	Data structures & Algorithms Using C	Amitava Nag & Jyoti Prakash Singh	Vikas
06	Data Structures with 'C' (SIE) (Schaum' s Outline Series)	Lipschutz	McGraw Hill Education, New Delhi ISBN:978-0070701984
07	Data Structures using 'C'	Balgurusamy , E.	McGraw Hill Education, New Delhi 2013,ISBN: 978- 1259029547
08	Understanding Pointers in C	Yashwant Kanetkar	BPB ISBN 8170298911

2. Learning Websites & Portal

Sr. No	URL	Description
1	https://www .javatpoint.com/data-structure-introduction	For All Contents
2	https://www .geeksforgeeks.org/introduction-to-data-structures/	For All Contents
3	https://studytonight.com/data-structures/	For All Contents
4	https://www.tutorialspoint.com/data_structures_algorithms/	For All Contents
5	https://www .w3schools.in/data-structures/	For All Contents
6	https://www .mygreatlearning.com/blog/data-structure-tutorial-for-beginners/	For All Contents
7	https://byjus.com/gate/introduction-to-data-structure-notes/	For All Contents

3. Video reference URL

Sr. No	URL	Description
1	https://youtu.be/C46QfTjVCNU	Linear Search
2	https://youtu.be/V_T5NuccwRA	Binary Search Algorithm with example
3	https://youtu.be/o4bAoo_gFBU	Bubble Sort Algorithm
4	https://youtu.be/bxRVz8zkIWM	Stack in Data Structure
5	https://youtu.be/PAceaOSnxQs	Infix to Postfix using Stack
6	https://youtu.be/ygK0YON10sQ	Recursion and Stack
7	https://youtu.be/dq3F3e9o2DM	Insertion of a Node in Linked List(at Beginning, End, Specified Position)with Code
8	https://youtu.be/v4szCPs9yEY	Insertion in Doubly Linked List(beginning, end, specific position)
9	https://youtu.be/fmfx1C4TTxw	Circular Linked List in Data Structure
10	https://youtu.be/ReGglEXEH08	Insertion in Circular Linked List
11	https://youtu.be/EkE6RHuMx3I	Deletion of a Node from Circular Linked List(beginning, end, given position)
12	https://youtu.be/-b2lciNd2L4	Binary Tree Traversals (Inorder, Preorder and Postorder) Data structures and algorithms
13	https://youtu.be/cySVml6e_Fc	Binary Search Trees (BST) - Insertion and Deletion
14	https://youtu.be/vf-cxgUXcMk	BFS and DFS Graph Traversals
15	https://youtu.be/84BsI5VJPq4	Evaluation of Postfix Expression
16	https://youtu.be/op_NxwPY6II	Evaluation of Prefix expression
17	https://youtu.be/ygK0YON10sQ	Recursion and Stack
18	https://youtu.be/v9BMdz5m5Vo	Linear Queue Implementation - Array

4. Tools to Use for Teaching-Learning, Assessment and Evaluation:

- **Turbo C** – *To and execute C program as well as to debug the program.*
- **Google Classroom** – *To share E-materials and all the required documents for preparing assignments and self learning activities.*
- **MKCL LMS Era** -*To share E-materials, PPTs, Videos, assignments, Online Quiz etc.*

Mr. S.K.Mahajan
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CC-

- DSU-313314 Course File
- Notice Board / ERP
- Institute Website / CIAAN Coordinator