Maharashtra State Board of Technical Education, Mumbai
Laboratory Plan (LP-PR)/ Course Information Sheet (CIS)

K-2

Academic Year: 2025-26 **Date:** 01/07/2026
Institute Name: K. K. Wagh Polytechnic, Nashik **MSBTE Code:** 0078
Program and Code: Computer Technology (CM) **Course Code &. Abbr.:** 313316(OOP)
Course Name: Object Oriented Programming(OOP) **Name of Faculty:** Mrs.S.S.Gaikwad
Class: SYCM-Win **Semester:** 3rd **Scheme:** K **Course Index:** CI304 **Learning Hrs:** 32

• Teaching-Learning & Assessment Scheme:

Title	Course Code / Abbr	Course Category	Learning Scheme					Credits	TH Paper Duration (Hrs.)	Assessment Scheme										
			Actual Contact Hrs/Week			SLH	NLH			Theory				Based on LL & TSL Practical				Based on SL		Total Marks
			CL	TL	LL					FA TH	SA TH	Total		FA-PR		SA-PR		SLA		
										Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
Database Management System	313304/ OOP	SEC	3	2	4	1	10	5	3	30	70	100	40	50	20	25@	10	25	10	200

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 & Practical

By learning course Object Oriented Programming (OOP-313316) Second Year students will be able to:

CO No.	Course Outcomes (COs) / Unit Outcomes (UOs)
CO304.1(CO1)	Write C++ programs using classes and objects.
CO304.2(CO2)	Develop C++ programs using constructors.
CO304.3(CO3)	Implement Inheritance in C++
CO304.4(CO4)	Implement Polymorphism in C++.
CO304.5(CO5)	Develop C++ programs to perform file operations.

• COs, Practical Laboratory Learning Outcome (LLOs) and Mapping:

Pr. No	COs	LLO	Practical -Laboratory Learning Outcome (LLO)
PR 1	CO304.1 (CO1)	LLO 1.1	Develop program to evaluate expressions using various operators
PR 2	CO304.2 (CO2)	LLO 2.1	Develop C++ program using special type of operators.
PR 3	CO304.3 (CO3)	LLO 3.1	Develop programs to implement type casting.
PR 4	CO304.3 (CO3)	LLO 4.1	Implement classes and objects to define the function inside class.
PR 5	CO304.3 (CO3)	LLO 5.1	Implement classes and objects to define function outside class.
PR 6	CO304.3 (CO3)	LLO 6.1	Implement programs using inline function.
PR 7	CO304.3 (CO3)	LLO 7.1	Implement friend function using different classes.
PR 8	CO304.3 (CO3)	LLO 8.1	Develop program using static data member.
		LLO 8.2	Develop program using static member function.
PR 9	CO304.3 (CO3)	LLO 9.1	Implement programs to show the use of array of objects.
PR 10	CO304.3 (CO3)	LLO 10.1	Implement the concept of constructor and destructor.
PR 11	CO304.3 (CO3)	LLO 11.1	Implement Single level inheritance.
		LLO 11.2	Implement multilevel inheritance.
PR 12	CO304.3 (CO3)	LLO 12.1	Develop program using multiple inheritance.
PR 13	CO304.3 (CO3)	LLO 13.1	Develop program using hierarchical inheritance.
PR 14	CO304.3 (CO3)	LLO 14.1	Implement virtual base class in a program.
PR 15	CO304.3 (CO3)	LLO 15.1	Implement constructors in derived class in a program.
PR 16	CO304.3 (CO3)	LLO 16.1	Implement pointer arithmetic in a program.
		LLO 16.2	Implement pointer to object in a program.
		LLO 16.3	Implement 'this' pointer in a program.
PR 17	CO304.3 (CO3)	LLO 17.1	Implement program to use pointer to derived class.

PR 18	CO304.4 (CO4)	LLO 18.1	Implement function overloading in a program.
PR 19	CO304.4 (CO4)	LLO 19.1	Implement unary operator overloading using member function.
		LLO 19.2	Implement unary operator overloading using friend function.
PR 20	CO304.4 (CO4)	LLO 20.1	Implement binary operator overloading using member function.
		LLO 20.2	Implement binary operator overloading using friend function.
PR 21	CO304.4 (CO4)	LLO 21.1	Develop program using virtual function.
PR 22	CO304.4 (CO4)	LLO 22.1	Develop program using pure virtual function.
PR 23	CO304.4 (CO4)	LLO 23.1	Implement read and write operations from/to file using
		LLO 23.2	Implement read and write operations from/to file using open().
PR 24	CO304.4 (CO4)	LLO 24.1	Use formatted Input / Output functions to format the contents.
PR 25	CO304.4 (CO4)	LLO 25.1	Implement get() and put() functions on file.
PR 26	CO304.4 (CO4)	LLO 26.1	Implement input/ output operations on binary file.

- **Practical Plan**:

Sr No	COs and LLOs	Practical Titles	Planned Dates		Remark & Faculty Sign with Assessment Date
			From	To	
1	CO1 LLO 1.1	*Write programs to evaluate any expression using Input / Output functions	A-2/07/2026 B-3/07/2026 C-4/07/2026	A-5/07/2026 B-6/07/2026 C-7/07/2026	
2	CO1 LLO 2.1	*Write programs using -Scope resolution operator -Memory management operator -Manipulators	A-7/07/2026 B-8/07/2026 C-9/07/2026	A-10/07/2026 B-11/07/2026 C-12/07/2026	
3	CO1 LLO 3.1	Write programs to demonstrate use of -Implicit type casting -Explicit type casting	A-10/07/2026 B-11/07/2026 C-13/07/2026	A-13/07/2026 B-14/07/2026 C-15/07/2026	
4	CO1 LLO 4.1	Write programs to show use of classes and objects to define the function inside the class	A-13/07/2026 B-14/07/2026 C-15/07/2026	A-15/07/2026 B-16/07/2026 C-17/07/2026	
5	CO1 LLO 5.1	*Write programs to define the function outside the class.	A-18/07/2026 B-24/07/2026 C-18/07/2026	A-19/07/2026 B-24/07/2026 C-18/07/2026	
6	CO2 LLO 6.1	*Write programs to implement inline function	A-23/07/2026 B-27/07/2026 C-22/07/2026	A-23/07/2026 B-27/07/2026 C-22/07/2026	
7	CO2 LLO 7.1 LLO 7.2	*Write programs to implement friend function using- -Two different classes -External function	A-30/07/2026 B-31/07/2026 C-25/07/2026	A-30/07/2026 B-31/07/2026 C-25/07/2026	
8	CO2 LLO 8.1 LLO 8.2	*Write programs to implement- -Static data member -Static member function	A-01/08/2026 B-03/08/2026 C-01/08/2026	A-01/08/2026 B-03/08/2026 C-01/08/2026	
9	CO2 LLO 9.1	*Write programs to create array of objects	A-06/08/2026 B-07/08/2026 C-05/08/2026	A-06/08/2026 B-07/08/2026 C-05/08/2026	
10	CO2 LLO10.1	*Write programs for-Default constructor -Parameterized constructor -Copy constructor -Multiple constructor in one class	A-08/08/2026 B-10/08/2026 C-08/08/2026	A-08/08/2026 B-10/08/2026 C-08/08/2026	
11	CO3 LLO 11.1 LLO 11.2	Write programs using- -Single level inheritance -Multilevel inheritance	A-13/08/2026 B-14/08/2026 C-12/08/2026	A-13/08/2026 B-14/08/2026 C-12/08/2026	

12	CO3 LLO 12.1	*Write programs to implement multiple inheritance	A-14/08/2026 B-17/08/2026 C-19/08/2026	A-14/08/2026 B-17/08/2026 C-19/08/2026	
13	CO3 LLO 13.1	Write programs to implement hierarchical inheritance	A-22/08/2026 B-24/08/2026 C-26/08/2026	A-22/08/2026 B-24/08/2026 C-26/08/2026	
14	CO3 LLO 14.1	*Write programs to implement virtual base class.	A-27/08/2026 B-28/08/2026 C-29/08/2026	A-27/08/2026 B-28/08/2026 C-29/08/2026	
15	CO3 LLO 15.1	Write programs which show the use of constructors in derived class	A-03/09/2026 B-04/09/2026 C-02/09/2026	A-03/09/2026 B-04/09/2026 C-02/09/2026	
16	CO4 LLO 16.1 LLO 16.2 LLO 16.3	*Write programs to implement-Pointer to object -'this' pointer	A-05/09/2026 B-11/09/2026 C-05/09/2026	A-05/09/2026 B-11/09/2026 C-05/09/2026	
17	CO4 LLO 17.1	*Write programs for- -Pointer to derived class in single inheritance -Pointer to derived class in multilevel inheritance	A-10/09/2026 B-14/09/2026 C-12/09/2026	A-10/09/2026 B-14/09/2026 C-12/09/2026	
18	CO4 LLO 18.1	Write programs which show the use of function overloading	A-12/09/2026 B-18/09/2026 C-19/09/2026	A-12/09/2026 B-18/09/2026 C-19/09/2026	
19	CO4 LLO 19.1 LLO 19.2	*Write programs to overload unary operator using- -Member function -Friend function	A-19/09/2026 B-21/09/2026 C-23/09/2026	A-19/09/2026 B-21/09/2026 C-23/09/2026	
20	CO4 LLO 20.1 LLO 20.2	Write programs to overload binary operator using- -Member function -Friend function	A-24/09/2026 B-25/09/2026 C-26/09/2026	A-24/09/2026 B-25/09/2026 C-26/09/2026	
21	CO4 LLO 21.1	*Write programs to implement virtual function	A-26/09/2026 B-28/09/2026 C-30/09/2026	A-26/09/2026 B-28/09/2026 C-30/09/2026	
22	CO4 LLO 22.1	Write programs to implement pure virtual function	A-01/10/2026 B-05/10/2026 C-03/10/2026	A-01/10/2026 B-05/10/2026 C-03/10/2026	
23	CO5 LLO 23.1 LLO 23.2	*Write programs to read and write from/to file using-Constructor - open()	A-03/10/2026 B-09/10/2026 C-07/10/2026	A-03/10/2026 B-09/10/2026 C-07/10/2026	
24	CO5 LLO 24.1	*Write programs to copy the content of one file into another file using formatted input/output functions	A-08/10/2026 B-16/10/2026 C-10/10/2026	A-08/10/2026 B-16/10/2026 C-10/10/2026	
25	CO5 LLO 25.1	Write file programs to implement sequential input and output operations on file	A-10/10/2026 B-13/10/2026 C-14/10/2026	A-10/10/2026 B-13/10/2026 C-14/10/2026	
26	CO5 LLO 26.1	Write programs to perform input / output operations on binary files.	A-11/10/2026 B-15/10/2026 C-14/10/2026	A-11/10/2026 B-15/10/2026 C-14/10/2026	

- ## Formative & Summative Assessment Criteria:

a) Theory Assessment:

- **Formative Assessment (FA-TH) :**
  - Two offline class tests each of 30 marks will be conducted as per MSBTE guidelines. The average of two class test marks will be consider for final FA-TH(Average) out of 30 marks.
- **Summative Assessment (SA-TH) :**
  - The comprehensive End Semester Theory Examination of 70 marks will be conducted by MSBTE at the end of the semester. The schedule of MSBTE Examinations will be announced by MSBTE on the official website -https://msbte.org.in
  - Final Theory Score out of 100 Marks will be derived as the total score as below:

    SA-TH [out of 70] + FA-TH [Average out of 30] = 100 Marks

b) Practical Assessment:

- Formative Assessment (FA-PR) of each practical/experiment will be performed progressively for 50 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 50 marks is calculated based on scores in Formative Assessment for all practicals/experiments as:
  *Term Work Marks(FA-PR)=((Total Marks Obtained in F.A.)/(50*Total Number of Experiments))*50*

- A Summative (comprehensive) Assessment (SA-PR) of Practical will be performed as End Semester Examination (ESE). The Final SA-PR of 25 Marks will be conducted with MSBTE guidelines at the end of semester. The schedule of MSBTE Practical (SA-PR) will be display on Notice board prior to examination.

c) Self-Learning Activities:

- Self-learning Activities (SLA) includes Micro project / Assignment / other activities related to subject/course and it will be evaluated out of 25 Marks.

• References :

1. Suggested Books for Reference:

Sr. No	Author	Title of the Book	Publisher
1.	E Balaguruswamy	Object Oriented Programming with C++	McGraw-Hill Education ISBN-10:0070669074, ISBN13:9780070669079
2.	D Ravichandran	Programming with C++	McGraw-Hill Education ISBN-10: 0070681899, ISBN13: 978-0070681897
3.	Stroustrup B.	The C++ Programming Language	McGraw Hill Education ISBN 10:0070591199
4.	Robert Lafore	Object Oriented Programming in C++	Pearson Education India ISBN-10: 8131722821, ISBN13: 978-8131722824
5.	John R Hubbard	Programming with C++	Tata McGraw-Hill
6.	Yashwant Kanetkar	Let us C++	BPB Publication
7.	Terrence W. Pratt	Programming Languages	PHI Publication

2. Learning Websites & Portals:

Sr. No	Website /Portal Link/URL	Description
1	https://www.w3schools.com/cpp/	C++ Tutorial for all topics
2	https://www.javatpoint.com/cpp-tutorial	C++ Tutorial for all topics
3	https://www.javatpoint.com/cpp-files-and-streams	C++ File Streams
4	https://www.programiz.com/cpp-programming	Inheritance in C++
5	https://www.programiz.com/cpp-programming/online-compiler/	Online Compiler for C++
6	https://www.onlinegdb.com/online_c++_compiler Online	compiler for C++

3. URLs of referred YouTube Videos:

Sr. No	Website /Portal Link/URL	Description
1	https://youtu.be/z_jD2KkjHS4	Procedure and object oriented Programming
2	https://youtu.be/LZ9P4vP4Ymc	Introduction to Object Oriented Programming
3	https://youtu.be/9jbF8EyrT2U	Decision Making Statements in C++
4	https://youtu.be/a7Wim2t053E	C++ Reference Variables & Typecasting
5	https://youtu.be/hAA8FBq2bA4	Constructors & Destructors in C++
6	https://youtu.be/QcLI2zGVYFo	Static Data Member
7	https://youtu.be/7ZfEp71tIec	Inheritance in OOP's
8	https://youtu.be/JU8DbwBvOWE	Virtual Functions & Abstract Classes
9	https://youtu.be/fBlM7pR2r_Q	Introduction to pointer
10	https://youtu.be/uc_Hr10cBBE	Polymorphism in C++
11	https://youtu.be/ULp4eSHL3SM	Unary Operator Overloading
12	https://youtu.be/b3rmSbqpevk	Increment and Decrement Operator

4. Self Prepared Video URLs:

Sr. No	Website /Portal Link/URL	Description
1	https://youtu.be/GN3DMPSo4SE	Polymorphism
2	https://youtu.be/_Qm_1zIL1Hc	File Operation
3	https://youtu.be/UVz23dU_XTc	Inheritance
4	https://youtu.be/zxuugw73yCw	Constructor and Destructor
5	https://youtu.be/r9H0EoXvHC0	Constructor and Destructor
6	https://youtu.be/OrqtMUfAm6g	Array of Object
7	https://youtu.be/AOsFMWg6Qek	Function Definition inside and outside a class
8	https://youtu.be/h3v1nINYIiA	Static member Function
9	https://youtu.be/ZGWJB2UBmSc	Static member Variable
10	https://youtu.be/i1bqRNoZMY0	Memory Allocation for Object
11	https://youtu.be/Zb5KmtVr5ew	Concept of OOP

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

1. TurboC++ – Turbo C++ was a software development tool for writing programs in the C++ language.
2. Google Classroom – Google class room used to share the notes with students, to give some assignments and we also assess it through google classroom..
3. MKCL LMS Era – Google class room used to share the notes with students, to give some assignments, Quiz ,enotes through MKCL LMS Era.

Mrs.S.S.Gaikwad	Mr.A.D.Talole	Prof. M.P.Bhosale
(Faculty Name & signature)	**CIAAN Cordinator**	**(HOD-Computer Tech. Dept.)**

CC-
1.OOP - 313316 Course File
2. Notice Board / ERP
3.Institute Website / CIAAN Coordinator