

Maharashtra State Board of Technical Education, Mumbai

LABORATORY PRACTICAL PLANNING

Academic Year: 2025–2026

K2-A

Academic Year: 2025-26

Date: 10/12/2025

Institute Name & Code: K. K. Wagh Polytechnic, Nashik-3 (0078)

Program & Code: Artificial Intelligence & Machine Learning (AN) Course Code & Abbr.: (314321)MIC

Course Name: Microprocessor Programming

Name of Faculty: Ms. K.J.Patil

Class: SYAN

Course Index: 405

Semester: IV

Scheme: K

Total Hrs: 30

● Course Outcomes (COs):

By learning course Microprocessor Programming (MIC-314321) Second Year students will be able to:

- CO405.1: Analyze the functional block diagram of 8086 microprocessor.
- CO405.2: Use program development tools and assembler directives.
- CO405.3: Use instructions in different addressing modes.
- CO405.4: Develop an assembly language program for a given task using assembler.
- CO405.5: Use procedures and macros to develop an assembly language program for a given problem.

● Teaching-Learning and Assessment Scheme:

Course Title	Course Code / Abbr	Course Category	Learning Scheme					TH Paper Duration (Hrs.)	Assessment Scheme											
			Actual Contact Hrs/Week						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	Min	Max	Min	Max	Min		Max	Min
Microprocessor Programming	314321 / MIC	DSC	3	-	2	1	6	3	3	30	70	100	40	25	10	25@	10	25	10	175

@ indicates Internal Practical Exam.

● Laboratory Learning Outcome (LLO)

LLO	Practical -Laboratory Learning Outcome (LLO)
LLO 1.1	Identification of various blocks in 8086 microprocessor architecture
LLO 2.1	Use assembly language programming (ALP) tools and directives
LLO 3.1	ALP to perform addition and subtraction of two given numbers
LLO 4.1	ALP for multiplication of two signed and unsigned numbers
LLO 5.1	ALP to perform division of two unsigned and signed numbers
LLO 6.1	ALP to add, subtract, multiply and divide two BCD numbers
LLO 7.1	ALP to perform block transfer operation
LLO 8.1	ALP to find sum of series
LLO 9.1	ALP to find smallest and largest number from array of numbers
LLO10.1	ALP to arrange numbers in an array in ascending or descending order

LLO 11.1	ALP to find the length of string and concatenate two strings
LLO 12.1	ALP for string operations such as string reverse and string copy
LLO 13.1	ALP to compare two strings
LLO 14.1	ALP to check a given number is odd or even
LLO 15.1	ALP to check a given number is positive or negative
LLO 16.1	ALP to count number of '0' and '1's in a given number
LLO 17.1	ALP to perform arithmetic operations on given numbers using procedure
LLO 18.1	ALP to perform arithmetic operations on given numbers using macro

● **Lab Plan:**

Sr No	COS	LLOs	Practical Titles	Planned Dates		Remark & Faculty Sign with Assessment Date
				From	To	
1	CO1	LLO 1.1 LLO 1.2	* Identification of various blocks in 8086 microprocessors architecture	A-15/12/25 B 16/12/25 C-17/12/25	A-22/12/25 B-23/12/25 C-24/12/25	
2	CO2	LLO 2.1 LLO 2.2	* Use assembly language programming (ALP) tools and directives	A-22/12/25 B-23/12/25 C-24/12/25	A-29/12/25 B-30/12/25 C-31/12/25	
3	CO3	LLO 3.1 LLO 3.2	* ALP to perform addition and subtraction of two given numbers	A-29/12/25 B-30/12/25 C-31/12/25	A-05/01/26 B-06/01/26 C-07/01/26	
4	CO3	LLO 4.1 LLO 4.2	ALP for multiplication of two signed and unsigned numbers	A-05/01/26 B-06/01/26 C-07/01/26	A-12/01/26 B-13/01/26 C-14/01/26	
5	CO3	LLO 5.1 LLO 5.2	ALP to perform division of two unsigned and signed numbers	A-12/01/26 B-13/01/26 C-14/01/26	A-19/01/26 B-20/01/26 C-21/01/26	
6	CO3	LLO 6.1 LLO 6.2	ALP to add, subtract, multiply and divide two BCD numbers	A-19/01/26 B-20/01/26 C-21/01/26	A-02/02/26 B-27/01/26 C-28/01/26	
7	CO4	LLO 7.1 LLO 7.2	* ALP to perform block transfer operation	A-02/02/26 B-27/01/26 C-28/01/26	A-09/02/26 B-03/02/26 C-04/02/26	
8	CO4	LLO 8.1 LLO 8.2	ALP to find sum of series	A-09/02/26 B-03/02/26 C-04/02/26	A-16/02/26 B-10/02/26 C-11/02/26	
9	CO4	LLO 9.1 LLO 9.2	* ALP to find smallest and largest number from array of numbers	A-16/02/26 B-10/02/26 C-11/02/26	A-23/02/26 B-17/02/26 C-18/02/26	
10	CO4	LLO 10.1 LLO 10.2	ALP to arrange numbers in an array in ascending or descending order	A-23/02/26 B-17/02/26 C-18/02/26	A-02/03/26 B-24/02/26 C-25/02/26	
11	CO4	LLO 11.1 LLO 11.2	* ALP to find the length of string and concatenate two strings	A-02/03/26 B-24/02/26 C-25/02/26	A-09/03/26 B-10/03/26 C-04/03/26	
12	CO4	LLO 13.1 LLO 13.2	ALP to compare two strings	A-09/03/26 B-10/03/26 C-04/03/26	A-16/03/26 B-17/03/26 C-11/03/26	
13	CO4		* ALP to check a given number is odd or even	A-16/03/26	A-23/03/26	

		LLO 14.1 LLO 14.2		B-17/03/26 C-11/03/26	B-24/03/25 C-18/04/25	
14	CO4	LLO 15.1 LLO 15.2	ALP to check a given number is positive or negative	A-23/03/26 B-24/03/25 C-18/04/25	A-30/03/26 B-31/03/26 C-25/03/26	
15	CO5	LLO 17.1 LLO 17.2	* ALP to perform arithmetic operations on given numbers using procedure	A-30/03/26 B-31/03/26 C-25/03/26	A-06/04/26 B-07/04/26 C-01/04/26	

● **Formative Assessment Criteria:**

Performance Indicators		Weightage
Process Related (10 Marks)		30%
1	Logic formation	10%
2	Debugging ability	15%
	Follow ethical practices	5%
Product Related (15 Marks)		70%
1	Interactive GUI	20%
2	Answer to sample questions	20%
3	Expected output	20%
4	Timely submission	10%
	Total (25 Marks)	100%

● **Rules for Formative Assessment:**

- Formative assessment of each practical is based on Process related (10 marks) and Product related (15 marks) - Total out of 25 marks as per the assessment scheme prescribed by MSBTE,
- Final assessment of 25 Marks for all practicals.
Following is the distribution of 25 Marks –
 - Summative Assessment (SA-PR) for 25 Marks will be conducted by MSBTE after the completion of the term.
 - Formative assessment (FA-PR) will carry 25 Marks
- Final Formative Assessment (F.A.) of 25 marks is calculated as follows:

$$FA\ Marks = ((Total\ obtained\ marks) * 25) / (25 * Total\ Number\ of\ particals)$$
- 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 Internal examiner.
The schedule of MSBTE Practical Examination will be display on Notice board prior to examination.

● **Practical wise LLO-CO Mapping:**

PR. No.	LLO	CO203.1	CO203.2	CO203.3	CO203.4	CO203.5
Practical 1	1.1	<input type="checkbox"/>				
Practical 2	2.1		<input type="checkbox"/>			
Practical 3	3.1		<input type="checkbox"/>			
Practical 4	4.1			<input type="checkbox"/>		
Practical 5	5.1		<input type="checkbox"/>	<input type="checkbox"/>		
Practical 6	6.1		<input type="checkbox"/>	<input type="checkbox"/>		
Practical 7	7.1		<input type="checkbox"/>	<input type="checkbox"/>		
Practical 8	8.1				<input type="checkbox"/>	
Practical 9	11.1		<input type="checkbox"/>	<input type="checkbox"/>		
Practical 10	12.1		<input type="checkbox"/>	<input type="checkbox"/>		

Practical 11	13.1		<input type="checkbox"/>	<input type="checkbox"/>		
Practical 12	15.1				<input type="checkbox"/>	<input type="checkbox"/>
Practical 13	16.1				<input type="checkbox"/>	<input type="checkbox"/>

● **Chapter wise CO-PO Mapping:**

Course Outcomes (COs)	Programme Outcomes (POs)							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 & Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2
CO405.1	2	-	-	-	-	1	1	2	2
CO405.2	2	1	1	2	-	1	1	2	2
CO405.3	3	2	2	2	-	1	1	2	2
CO405.4	3	3	3	2	-	1	1	2	2
CO405.5	3	3	3	2	-	1	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

1.Learning Websites & Portals:

Sr. No	Website /Portal Link/URL	Description
1	https://www.tutorialspoint.com/microprocessor/microprocessor_8086_overview.htm	Architecture of 8086
2	https://www.geeksforgeeks.org/architecture-of-8086/	Architecture of 8086
3	https://www.javatpoint.com/8086-microprocessor	Pin description
4	https://electronicsdesk.com/assembler-directives.html	Assembler directives
5	https://www.geeksforgeeks.org/addressing-modes-8086-microprocessor/	Addressing modes of 8086
6	https://www.tutorialspoint.com/microprocessor/microprocessor_8086_instruction_sets.htm	Instruction set of 8086
7	https://www.javatpoint.com/instruction-set-of-8086	Instruction set of 8086
8	https://nptel.ac.in/courses/108103157	NPTEL Course on Microprocessors and Interfacing

Formative & Summative Assessment Criteria:

- **Theory Assessment:**

- b) **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 Consider for final TH-FA(Average) out of 30 marks.

- c) **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: TH-SA [out of 70] + TH-FA [Average out of 30] =100 Marks

c) Rules for Self Learning Assessment:

1. Self-learning assessment includes micro-project or assignment.
2. SLA Marks Shall be awarded as per the continuous assessment record
3. SLA will be of 25 Marks.
4. Following are some SLA topic or similar self-learning topic could be added by SLA:
 - i. Simple chatting application
 - ii. Class time-table application

- **References:**

- 1. Suggested Books for Reference:**

Sr. No	Author	Title of the Book	Publisher
1.	Douglas V. Hall	Microprocessor and Interfacing (Programming and Hardware)	McGraw Hill Education, New Delhi ISBN-13: 978-0070257429
2.	Walter A. Triebel, Avtar Singh	The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications	Pearson Publications, New Delhi ISBN-13: 978-0131228047
3.	Sunil Mathur	Microprocessor 8086: Architecture, Programming and Interfacing	PHI, New Delhi ISBN-13: 978- 8120340879
4.	K. R. Venugopal and Raj Kumar	Microprocessor X86 Programming	BPB Publications, Delhi ISBN-13: 978- 8170294580

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

1. Google Classroom –As a digital learning platform, Google Classroom makes the educational process for student and staff more efficient, interactive and accessible.
2. MKCL LMS Era – Used for Performing Quizzes and short test for Student.

Ms. K. J. Patil
(Faculty Name & signature)

Prof. R.Y.Thombare
(HOD-AN Dept.)

CC-

a. MIC-314321Course File

CC: 1. Lab File

2. Course File-BLP

3. Notice Board-AN Lab-01

4. Formative Assessment