

**Maharashtra State Board of Technical Education, Mumbai**  
**LABORATORY PLAN (LP)/COURSE INFORMATION SHEET (CIS)**

**K-2**

**Academic Year:** 2026-27

**Date:** 01/07/2024

**Institute Name & Code:** K. K. Wagh Polytechnic, Nashik-3

**Institute Code:** 0078

**Program and Code:** Computer Technology (CM)

**Course Index:** CI305

**Course Name:** Computer Graphics (CGR)

**Course Code & Abbr :-** 313001 (CGR)

**Class:** SYCM-Win

**Semester:** IIIrd

**Scheme:** K

**Total Hrs:** 30 Hrs.

**Name of Faculty:** Miss. S. R. Nikam

**• Teaching and Examination Scheme:**

| Course Title      | Course Code/ Abbr | Course Category | 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 | LL |     |     |         |                | FA TH             | SA TH | Total |     | FA-PR                       |     | SA-PR |     | SLA         |     |             |
|                   |                   |                 |                         |    |    |     |     |         |                |                   |       | Max   | Max | Max                         | Min | Max   | Min | Max         | Min |             |
| Computer Graphics | 313001 CGR        | DSC             | 1                       | -  | 2  | 1   | 4   | 2       | -              | -                 | -     | -     | -   | 25                          | 10  | -     | -   | 25          | 10  | 50          |

**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

**• Course Outcomes (COs): Theory & Practical**

By learning course Computer Graphics (CGR), Second Year students will be able to:

| CO No.        | Course Outcomes (COs) / Unit Outcomes (UOs)                                            |
|---------------|----------------------------------------------------------------------------------------|
| CO305.1 (CO1) | Manipulate Visual and Geometric information of Images.                                 |
| CO305.2 (CO2) | Develop programs in C applying standard graphics algorithms.                           |
| CO305.3 (CO3) | Perform and Demonstrate basic and composite graphical transformations on given object. |
| CO305.4 (CO4) | Implement various Clipping algorithms.                                                 |
| CO305.5 (CO5) | Develop programs to create Curves.                                                     |

**• Practical -Laboratory Learning Outcome:**

| Pr No | CO            | LLO      | Practical -Laboratory Learning Outcome (LLO)                                  |
|-------|---------------|----------|-------------------------------------------------------------------------------|
| 1     | CO305.1 (CO1) | LLO 1.1  | Implement a C program using different graphics functions.                     |
| 2     | CO305.2 (CO2) | LLO 2.1  | Implement a C program to draw line using DDA algorithm.                       |
| 3     | CO305.2 (CO2) | LLO 3.1  | Implement a C program to draw line using Bresenham's algorithm.               |
| 4     | CO305.2 (CO2) | LLO 4.1  | Implement a C program to draw circle using Bresenham's algorithm.             |
| 5     | CO305.2 (CO2) | LLO 5.1  | Implement a C program for Flood fill algorithm.                               |
| 6     | CO305.2 (CO2) | LLO 6.1  | Implement a C program for Boundary fill algorithm.                            |
| 7     | CO305.3 (CO3) | LLO 7.1  | Implement a C program for 2D Translation and Scaling                          |
| 8     | CO305.3 (CO3) | LLO 8.1  | Implement a C program for 2D Rotation.                                        |
| 9     | CO305.3 (CO3) | LLO 9.1  | Implement a C program for 2D Reflection and Shear.                            |
| 10    | CO305.3 (CO3) | LLO 10.1 | Implement a C program for 3D Translation and Scaling.                         |
| 11    | CO305.3 (CO3) | LLO 11.1 | Implement a C program for 3D Rotation                                         |
| 12    | CO305.4 (CO4) | LLO 12.1 | Implement a C program for Line Clipping using Cohen- Sutherland algorithm.    |
| 13    | CO305.4 (CO4) | LLO 13.1 | Implement a C program for Line Clipping using Midpoint Subdivision algorithm. |
| 14    | CO305.4 (CO4) | LLO 14.1 | Implement C program for Sutherland Hodgeman Polygon Clipping.                 |
| 15    | CO305.5 (CO5) | LLO 15.1 | Implement a C program for Bezier Curve.                                       |

• **Practical Plan:**

| Sr No | COs & LLOs       | Practical Titles                                                                                                                          | Date of Plan |            | Remark/<br>Assessment Date<br>with Staff sign |
|-------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------|-----------------------------------------------|
|       |                  |                                                                                                                                           | From         | To         |                                               |
| 1     | CO 1<br>LLO 1.1  | Write a C program to draw various graphics objects (Pixel, Circle, Line, Ellipse, Rectangle, Triangle, Polygon) using graphics functions. | A-06/07/26   | A-13/07/26 |                                               |
|       |                  |                                                                                                                                           | B-07/07/26   | B-14/07/26 |                                               |
|       |                  |                                                                                                                                           | C-01/07/26   | C-08/07/26 |                                               |
| 2     | CO2<br>LLO 2.1   | Write a C program to draw line using DDA algorithm.                                                                                       | A-13/07/26   | A-20/07/26 |                                               |
|       |                  |                                                                                                                                           | B-14/07/26   | B-21/07/26 |                                               |
|       |                  |                                                                                                                                           | C-08/07/26   | C-15/07/26 |                                               |
| 3     | CO 2<br>LLO 3.1  | Write a C program to draw line using Bresenham's algorithm.                                                                               | A-20/07/26   | A-27/07/26 |                                               |
|       |                  |                                                                                                                                           | B-21/07/26   | B-28/07/26 |                                               |
|       |                  |                                                                                                                                           | C-15/07/26   | C-22/07/26 |                                               |
| 4     | CO 2<br>LLO 4.1  | Write a C program to draw circle using Bresenham's algorithm.                                                                             | A-27/07/26   | A-03/08/26 |                                               |
|       |                  |                                                                                                                                           | B-28/07/26   | B-04/08/26 |                                               |
|       |                  |                                                                                                                                           | C-22/07/26   | C-29/07/26 |                                               |
| 5     | CO 2<br>LLO 5.1  | Write a C program for Flood fill algorithm of polygon filling.                                                                            | A-03/08/26   | A-10/08/26 |                                               |
|       |                  |                                                                                                                                           | B-04/08/26   | B-11/08/26 |                                               |
|       |                  |                                                                                                                                           | C-29/07/26   | C-05/08/26 |                                               |
| 6     | CO 2<br>LLO 6.1  | Write a C program for Boundary fill algorithm of polygon filling.                                                                         | A-10/08/26   | A-17/08/26 |                                               |
|       |                  |                                                                                                                                           | B-11/08/26   | B-18/08/26 |                                               |
|       |                  |                                                                                                                                           | C-05/08/26   | C-12/08/26 |                                               |
| 7     | CO 3<br>LLO 7.1  | Write a C program for 2D Translation and Scaling.                                                                                         | A-17/08/26   | A-24/08/26 |                                               |
|       |                  |                                                                                                                                           | B-18/08/26   | B-25/08/26 |                                               |
|       |                  |                                                                                                                                           | C-12/08/26   | C-19/08/26 |                                               |
| 8     | CO 3<br>LLO 9.1  | Write a C program for 2D Reflection and Shear.                                                                                            | A-24/08/26   | A-31/08/26 |                                               |
|       |                  |                                                                                                                                           | B-25/08/26   | B-08/09/26 |                                               |
|       |                  |                                                                                                                                           | C-19/08/26   | C-02/09/26 |                                               |
| 9     | CO 3<br>LLO 10.1 | Write a C program for 3D Translation and Scaling.                                                                                         | A-31/08/26   | A-07/09/26 |                                               |
|       |                  |                                                                                                                                           | B-08/09/26   | B-15/09/26 |                                               |
|       |                  |                                                                                                                                           | C-02/09/26   | C-09/09/26 |                                               |
| 10    | CO 3<br>LLO 11.1 | Write a C program for 3D Rotation.                                                                                                        | A-07/09/26   | A-21/09/26 |                                               |
|       |                  |                                                                                                                                           | B-15/09/26   | B-29/09/26 |                                               |
|       |                  |                                                                                                                                           | C-09/09/26   | C-16/09/26 |                                               |
| 11    | CO 4<br>LLO 12.1 | Write a C program for Line Clipping using Cohen-Sutherland algorithm.                                                                     | A-21/09/26   | A-28/09/26 |                                               |
|       |                  |                                                                                                                                           | B-29/09/26   | B-06/10/26 |                                               |
|       |                  |                                                                                                                                           | C-16/09/26   | C-23/09/26 |                                               |
| 12    | CO 5<br>LLO 15.1 | Write a C program for Bezier Curve.                                                                                                       | A-28/09/26   | A-05/10/26 |                                               |
|       |                  |                                                                                                                                           | B-06/10/26   | B-13/10/26 |                                               |
|       |                  |                                                                                                                                           | C-23/09/26   | C-14/10/26 |                                               |

## • Learning Assessment (Practical) :

### A. Formative assessment (FA-PR)

- For the Formative Assessment (FA-PR) each experiment will be assessed out of 25 marks. Practical will be assessed considering 60% weightage to process and 40% weightage to product.
- Final term work (FA-PR) of 25 marks is calculated based on scored in Formative Assessment for each experiment  
Term Work Marks =  $(25 \times \text{Total Marks Obtained in FA-PR}) / 25 \times \text{Total Number of Experiments}$

### • Self-Learning(SLA): Self learning

Self-learning Activities (SLA) includes micro project / assignment / Any computer graphics course on NPTEL, MOOCs and it will be evaluated out of 25 Marks

### • Laboratory Equipment / Instruments / Tools / Software required

- Computer system - (Any computer system with basic configuration)
- 'C' Compiler – Turbo 'C', Developer C/ C++, CodeLite, Sublime Text, Visual Studio

### • References:

#### 1. SUGGESTED LEARNING MATERIALS / BOOKS:

| Sr. No | Author                                    | Title                                          | Publisher with ISBN Number                                            |
|--------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------|
| 1      | Donald Hearn ,<br>M Pauline Baker         | Computer Graphics                              | Prentice-Hall<br>• ISBN-10 : 0131615300<br>• ISBN-13 : 978-0131615304 |
| 2      | William M. Newman<br>Robert F. Sproull    | Principles of Interactive<br>Computer Graphics | McGraw-Hill<br>• ISBN: 978-0-07-046338-7                              |
| 3      | Zhigang Xiang,<br>Roy Plastock            | Computer Graphics                              | Schaum O Series<br>• ISBN: 9789389538847<br>• ISBN: 938953884X        |
| 5      | Atul P. Godse,<br>Dr. Deepali A.<br>Godse | Computer Graphics                              | Technical Publications ISBN 933322338X,<br>9789333223386              |

#### 2. LEARNING WEBSITES & PORTALS:

| Sr. No | Link /Portal                                                                                                                                                                                                                | Description                  |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1      | <a href="https://www.javatpoint.com/computer-graphics-programs">https://www.javatpoint.com/computer-graphics-programs</a>                                                                                                   | Basic graphics programs      |
| 2      | <a href="https://www.tutorialspoint.com/computer_graphics/index.htm">https://www.tutorialspoint.com/computer_graphics/index.htm</a>                                                                                         | Basics of Computer graphics  |
| 3      | <a href="https://www.educba.com/line-drawing-algorithm/">https://www.educba.com/line-drawing-algorithm/</a>                                                                                                                 | Line drawing algorithm       |
| 4      | <a href="https://www.javatpoint.com/computer-graphics-clipping">https://www.javatpoint.com/computer-graphics-clipping</a>                                                                                                   | Clipping Algorithms          |
| 5      | <a href="https://www.tutorialspoint.com/computer_graphics/computer_graphics_curves.htm">https://www.tutorialspoint.com/computer_graphics/computer_graphics_curves.htm</a>                                                   | Curves in computer           |
| 6      | <a href="https://www.tutorialspoint.com/computer_graphics/2d_transformation.htm">https://www.tutorialspoint.com/computer_graphics/2d_transformation.htm</a>                                                                 | 2D and 3D Transformation     |
| 7      | <a href="https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384200894190387210361_shared/overview">https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384200894190387210361_shared/overview</a> | Project on Computer Graphics |

### 3. URLs of referred YouTube Videos:

| Sr. No | URLs/Link                                                                                                       | Description                                                   |
|--------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1      | <a href="https://www.youtube.com/watch?v=Kp8Za-JkRuc">https://www.youtube.com/watch?v=Kp8Za-JkRuc</a>           | DDA line drawing Algorithm                                    |
| 2      | <a href="https://youtu.be/KnvbUiSxvbM?si=YP-377HDwNF1k89N">https://youtu.be/KnvbUiSxvbM?si=YP-377HDwNF1k89N</a> | Web Designing                                                 |
| 3      | <a href="https://www.youtube.com/watch?v=fneoVtZx9iA">https://www.youtube.com/watch?v=fneoVtZx9iA</a>           | Liang Basrky Algorithm                                        |
| 4      | <a href="https://www.youtube.com/watch?v=EQxxjyGLE1I">https://www.youtube.com/watch?v=EQxxjyGLE1I</a>           | Cyres Beck Line clipping Algorithm                            |
| 5      | <a href="https://www.youtube.com/watch?v=OGW9Cqr5RRg">https://www.youtube.com/watch?v=OGW9Cqr5RRg</a>           | Sutherland Hodgeman Polygon Clipping Algorithm with Numerical |
| 6      | <a href="https://www.youtube.com/watch?v=z5CqHStw_HA">https://www.youtube.com/watch?v=z5CqHStw_HA</a>           | DDA Curve Generation                                          |
| 7      | <a href="https://www.youtube.com/watch?v=zjdfotio1XI">https://www.youtube.com/watch?v=zjdfotio1XI</a>           | Bezier Curve                                                  |
| 8      | <a href="https://www.youtube.com/watch?v=83Nsel2uv6k">https://www.youtube.com/watch?v=83Nsel2uv6k</a>           | B Spline Curve in Computer Graphics                           |

### 4. Self-Prepared Video URLs:

| Sr. No | URLs/Link                                                               | Description                     |
|--------|-------------------------------------------------------------------------|---------------------------------|
| 1      | <a href="https://youtu.be/RyNi-A2DL9U">https://youtu.be/RyNi-A2DL9U</a> | Basics of Computer Graphics     |
| 2      | <a href="https://youtu.be/E0aWM5Rxz08">https://youtu.be/E0aWM5Rxz08</a> | Raster Scan Graphics            |
| 3      | <a href="https://youtu.be/4MNzrVrxPkU">https://youtu.be/4MNzrVrxPkU</a> | Line, Circle Drawing Algorithms |
| 4      | <a href="https://youtu.be/_niJFnoZkCk">https://youtu.be/_niJFnoZkCk</a> | Introduction to Transformation  |
| 5      | <a href="https://youtu.be/dCA2z8bltPE">https://youtu.be/dCA2z8bltPE</a> | Windowing & Clipping            |
| 6      | <a href="https://youtu.be/XFVxz2wFtvk">https://youtu.be/XFVxz2wFtvk</a> | Introduction to Curves          |
| 7      | <a href="https://youtu.be/zMjXisne_7c">https://youtu.be/zMjXisne_7c</a> | Types of Curves                 |

### 5. Tools for Teaching and Assessment:

- MKCL Learn-Live for MCQ Based Quiz.
- Quiz using Google Forms.
- Computer system - Any computer system with basic configuration
- 'C' Compiler – Turbo 'C', Developer C/ C

Miss. S. R. Nikam  
(Name & signature of staff)

Prof. M. B. Bhosale  
(Name & signature of HOD)

CC-

1. Lab File
2. CGR - 313001 Course File
3. Notice Board / ERP
4. Institute Website / CIAAN Coordinator
5. Progressive Assessment