

Academic Year: 2026-27

Date: 01/07/2026

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-Lin

Semester: IIIrd **Scheme:** K

Total Hrs: 15 Hrs.

Name of Faculty: Ms. 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	Min	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

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

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

By learning course Computer Graphics (CGR-313001) Second Year students will be able to:

CO No.	TLO No.	Course Outcomes (COs) / Theory Learning Outcomes (TLOs)
CO305.1 (CO1)		Manipulate Visual and Geometric information of Images.
	TLO 1.1	Describe coordinate system.
	TLO 1.2	Select and use various graphics file formats.
	TLO 1.3	Use different graphics functions and standards.
CO305.2 (CO2)		Develop programs in C applying standard graphics algorithms.
	TLO 2.1	Apply Line Drawing algorithms to generate Line.
	TLO 2.2	Apply Circle Drawing algorithms to generate Circle.
	TLO 2.3	Apply Polygon Filling algorithms to Fill Polygon.
CO305.3 (CO3)		Perform and Demonstrate basic and composite graphical transformations on given object.
	TLO 3.1	Perform various transformations on given graphics object.
	TLO 3.2	Use composite transformations.
	TLO 3.3	Write need of homogeneous coordinates
CO305.4 (CO4)		Implement various Clipping algorithms.
	TLO 4.1	Define: Windowing and Clipping.
	TLO 4.2	Apply Clipping algorithms for Line and Polygon.
CO305.5 (CO5)		Develop programs to create Curves.
	TLO 5.1	Draw various Curves using Curve generation algorithms.
	TLO 5.2	Identify different types of Projections.

● **Teaching Plan:**

Unit No. (Allotted Hrs & Marks)	COs & 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)	CO1 TLO 1.1 1.2	Unit - I Basics of Computer Graphics 1.1 Coordinate system 1.2 Graphics file formats: Basics, advantages, disadvantages – BMP – GIF – JPEG – TIFF – PCX	03/07/2026 to 03/07/2026 (01)		Chalk, Board, PPT + LCD Projector Notes	
	1.3	1.3 Graphics functions & standards: Text mode, Graphic mode, Shapes, Colors, Graphics standards.	10/07/2026 to 10/07/2026 (01)		Chalk, Board, MKCL ERA Learn Live	
02 (04)	CO2 TLO 2.1	Unit - II Raster Scan Graphics 2.1.1 Line Drawing Algorithms : Digital Differential Analyzer algorithm	17/07/2026 to 17/07/2026 (01)		Chalk, Board, PPT + LCD Notes	
	2.1	2.1.2 Bresenham's algorithm.	24/07/2026 to 24/07/2026 (01)		Chalk, Board, PPT Notes	
	2.2	2.2 Circle Generation- Symmetry of Circle, Bresenham's algorithm	31/07/2026 to 31/07/2026 (01)		Chalk, Board, PPT Notes	
	2.3	2.3 Polygon Filling: Seed Fill algorithms- Flood Fill algorithm, Boundary Fill algorithm.	07/08/2026 to 07/08/2026 (01)		Projector Notes, MKCL ERA Learn Live,	
03 (04)	CO3 TLO 3.1	Unit - III Overview of 2D And 3D Transformations 3.1 Basic Transformations: Translation, Scaling, Rotation, Reflection, Shear.	14/08/2026 to 14/08/2026 (01)		Chalk, Board, PPT + LCD Projector Notes,	
	3.1	3.2 Matrix representations & homogeneous coordinates	21/08/2026 to 21/08/2026 (01)		Chalk, Board, PPT + LCD Projector	
	3.2	3.3 Composite transformations.	28/08/2026 to 28/08/2026 (01)		Chalk, Board, PPT + LCD Projector	
	3.3	3.4 Three-dimensional transformation.	04/09/2026 to 04/09/2026 (01)		LCD Projector MKCL ERA Learn Live	

04 (03)	CO4 TLO 4.1	Unit - IV Windowing and Clipping Techniques 4.1 Windowing concepts.	11/09/2026 to 11/09/2026 (01)		Chalk, Board, PPT + LCD Projector	
	4.2	4.2 Line Clipping: Cohen Sutherland Line Clipping algorithm, Mid-Point Subdivision Line clipping algorithm.	18/09/2026 to 18/09/2026 (01)		Chalk, Board, PPT Notes	
	4.2	4.3 Polygon Clipping: Sutherland Hodgeman Polygon clipping algorithm.	09/10/2026 to 09/10/2026 (01)		Chalk, Board, Notes,	
05 (02)	CO5 TLO 5.1	Unit - V Introduction to Curves and Projections 5.1 Bezier and B-Spline Curves.	16/10/2026 to 16/10/2026 (01)		Chalk, Board, PPT + LCD Projector Notes,	
	5.2	5.2 Projections: Perspective and Parallel Projection and its types.	16/10/2026 to 16/10/2026 (01)		Chalk, Board, PPT + LCD Projector Notes	
		Total	15			

• Chapter wise CO-PO Mapping:

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes 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 and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	2	1	1	1			
CO2	2	2	2	2	-	1	1			
CO3	2	2	2	2	-	1	1			
CO4	2	2	2	2	-	1	1			
CO5	2	2	2	2	-	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	
4	PO-4 Engineering Tools	
5	PO-5 Engineering Practices for Society, Sustainability and Environment	PSO-2 Pursue higher studies in the field of Computer Science / Computer Engineering /Information Technology.
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	Basics of Computer Graphics	CO1	2	0	0	0	0
2	Raster Scan Graphics	CO2	4	0	0	0	0
3	Overview of 2D And 3D Transformations	CO3	4	0	0	0	0
4	Windowing and Clipping Techniques	CO4	3	0	0	0	0
5	Introduction to Curves and Projections	CO5	2	0	0	0	0
		Total :	15	0	0	0	0

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

- Formative & Summative Assessment Criteria:**

- 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

$$\text{Term Work Marks} = (25 * \text{Total Marks Obtained in FA-PR}) / (25 * \text{Total Number of Experiments})$$

- 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

- References:**

- SUGGESTED LEARNING MATERIALS / BOOKS:**

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

2. LEARNING WEBSITES & PORTALS:

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

3. URLs of referred YouTube Videos:

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

4. Self-Prepared Video URLs:

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

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

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

CC-

1. CGR-313001 Course File
2. Notice Board / ERP
3. Institute Website / CIAAN Coordinator