Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
MCAE35 D	Computer Graphics and Image Processing	3	-	--	3	-	--	3
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes	--	
Course Outcomes	CO1	Demonstrate the algorithms to implement output primitives of Computer Graphics.
	CO2	Apply 2 D transformation techniques.
	CO3	Analyze 3 D transformation techniques.
	CO4	Apply image processing techniques.

Module	Unit No.	Topics	Ref.	Hrs.
1		**Introduction to Computer Graphics**	1,2	2
	1.1	Introduction to Computer Graphics		
	1.2	Elements of Computer Graphics, Graphics display systems.		
2		**Output primitives & its Algorithms**	1,2	10
	2.1	Points and Lines		
	2.2	Line Drawing algorithms: DDA line drawing algorithm, Bresenham's drawing algorithm		
	2.3	Circle and Ellipse generating algorithms : Mid-point Circle algorithm ,Mid-point Ellipse algorithm		
	2.4	Parametric Cubic Curves :Bezier curves		
	2.5	Fill area algorithms: Scan line polygon fill algorithm ,Inside-Outside Tests, Boundary fill algorithms, Flood fill algorithms		
3		**2D Geometric Transformations & Clipping**	1,2	10
	3.1	Basic transformations, Matrix representation and Homogeneous Coordinates		
	3.2	Composite transformation, shear & reflection. Transformation between coordinated systems		
	3.3	Window to Viewport coordinate transformation, Clipping operations – Point clipping		
	3.4	Line clipping : Cohen – Sutherland line clipping, Midpoint subdivision		
	3.5	Polygon Clipping: Sutherland – Hodgeman polygon clipping, Weiler – Atherton polygon clipping		
4		**Basic 3D Concepts & Fractals**	1,2	6
	4.1	3D object representation methods: B-REP Fractals		

	4.2	Sweep representations, CSG, Basic transformations, Reflection, shear.		
	4.3	Projections – Parallel and Perspective Halftone and Dithering technique.		
	4.4	Self-similarity: Koch Curves/snowflake, Sirpenski Triangle		
5		**Introduction to Image Processing**	**5,3**	**4**
	5.1	Fundamental Steps in Digital Image Processing ,Components of an Image Processing System		
	5.2	Basic Concepts in Sampling and Quantization, Representing Digital Images		
	5.3	Spatial and Gray Level Resolution		
6		**Image Enhancement Technique**	**3,4,5**	**10**
	6.1	Image Enhancement in the Spatial Domain		
	6.2	Some Basic Intensity Transformation Functions: Image Negatives, Log Transformations, and Power Law Transformations		
	6.3	Piecewise Linear Transformation Functions: Contrast stretching, Gray-level slicing, Bit plane slicing.		
	6.4	Introduction to Histogram, Image Histogram and Histogram Equalization, Image Subtraction, and Image Averaging		
			Total	**42**

References:

[1] Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education, Second edition.
[2] David F. Rogers, James Alan Adams, “Mathematical elements for computer graphics”, McGraw-Hill, Second edition.
[3] Rafael C. Gonzalez and Richard E. Woods, “Digital Image Processing”, Pearson Education, Third Edition
[4] S. Sridhar, “Digital image Processing”, Oxford University Press, Second Edition
[5] Anil K. Jain “Fundamentals of digital image processing” Prentice Hall, Second Edition