COMPUTER GRAPHICS for VIRTUAL REALITY

(Program Elective-V)

CourseCode	19IT4702C	Year	IV	Semester	I
CourseCategory	PE	Branch	IT	CourseType	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Computer Graphics
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

	Course Outcomes	Blooms Taxonomy Level
	Upon successful completion of the course, the student will be able to	
CO1	Understand the basics of computer graphics	L2
CO2	Articulate various transformations, surface and curve generation techniques.	L3
CO3	Analyze the virtual reality concepts in computer graphics	L4

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (H:High, M:Medium, L:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1												1	
CO2	1	2	2										1	
CO3	1		2										1	

Syllabus

Unit No	Contents	Mapped CO
I	**Introduction to Computer Graphics and Display Systems**: Introduction, Image and Objects Image Representation, Basic Graphics Pipeline, Raster and vector-based graphics, Applications of computer graphics, Display devices, Cathode ray tubes, Flat Panel display, 3D display technology, Input technology, Hard-copy output devices, Coordinate system overview, Introduction to graphics libraries in C.	CO1
II	**Curve Generation**: Introduction, Curve continuity, Conic curves, Piecewisecurve design, Parametric curve design, LeGrange interpolated curves, Spline curve representation, Non- uniformrational B-spline curves, and Fractal curves. Area Filling and Solid Area Scan-Conversion: Introduction, Inside-outside test, Winding number method, Coherence, Polygon filling, Scan conversion of character, Aliasing, Anti-Aliasing, Half toning, threshold and dithering.	CO1 CO2
III	**Two-Dimensional Transformation**: Introduction, Transformation matrix, Types of Transformations in two-dimensional graphics, Combined transformation, Homogeneous coordinates, Two-Dimensional Viewing and Clipping: Introduction, Viewing transformation in two dimensions, Introduction to Clipping, Two-Dimension Clipping, Text Clipping. **Three-Dimensional Transformation, Viewing and Projection**: Introduction, Objects in homogeneous coordinates, Three-dimensional transformations, World coordinates and viewing coordinates, Three-dimensional viewing transformation, Projection, Viewing and Clipping in three dimensions.	CO1 CO2
IV	**Surface Generation**: Introduction, Bilinear Surfaces, Ruled Surfaces, Developable Surfaces, Coons Patch, Sweep Surfaces, Surfaces of Revolution, Quadric Surfaces, Constructive Solid Geometry, Bezier Surfaces, B-spline Surfaces, Rational B-spline Surfaces, Subdivison Surfaces. **Visible and Hidden Surfaces**: Introduction, Coherence, Extents and bounding volumes, Back face culling, Painter's algorithm, Z-Buffer algorithm, Newell's algorithm, Scan line rendering, Appel's algorithm, Warnock's area subdivison algorithm, Binary space partitioning trees, Floating Horizon algorithm, Roberts algorithm, Haloed lines.	CO1 CO2
V	**Introduction to Virtual Reality**: Introduction, Classical components and design of a VR system, Important Factors in a Virtual Reality system, Types of virtual reality systems, Advantages of virtual Reality, VR Input devices, Graphics display interfaces, Sound display and interface, Examples of input devices, Haptic feedback, Graphical rendering pipeline, Haptic rendering pipeline, OpenGL rendering pipeline, Applications of virtual reality, Modelling techniques in virtual reality.	CO1 CO3

Learning Resources
Text Books
1.Computer Graphics with Virtual Reality, by Rakesh K.Maurya,2/e, 2013
References
1.Virtual Reality System by John Vince, Pearson Publication.   2.Computer Graphics with Virtual Reality,Roy Lathum, Springer-Verlag NewYork Inc Publication, Second edition.