Course:503: Computer Graphics

Course Code	503
Course Title	Computer Graphics
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2018
Purpose of Course	The purpose of the course is to make student capable of implementing the basic theoretical concepts, methodology and tools of Computer Graphics.
Course Objective	The objective of the course is to Introduce the programming principles and theoretical foundations of computer graphics. This course provides depth knowledge of computer graphics environment and tools to develop graphics application.
Pre-requisite	Basic knowledge of Programming and basic of Mathematics.
Course Out come	After completion of this course, the student will be able to develop and manage Computer Graphics applications.
Course Content	**Unit : 1 : Introduction to Computer Graphics** 1.1 Usage of Graphics and their applications 1.1.1. Presentation Graphics 1.1.2. Computer Aided Design 1.1.3. Computer Aided Design- 1.1.4. Computer Art- Entertainment 1.1.5. Education and Training- 1.1.6. Visualization- Image Processing- 1.1.7. Graphical User Interfaces 1.2 Pixel Graphics 1.2.1 File Formats of Pixel Graphics 1.2.1.1 PNG 1.2.1.2 JPEG 1.2.1.3 GIF 1.2.1.4 BMP 1.2.1.5 PSD 1.3 Vector Graphics 1.3.1 File Formats of Vector Graphics 1.3.1.1 SVG 1.3.1.2 PS 1.3.1.3 CDR 1.3.1.4 WMF 1.4 Video Display Devices 1.4.1 CRT 1.4.2 Color CRT 1.4.3 LCD 1.4.4 LED 1.5 Raster Scan Displays 1.6 Random scan Displays 1.7 Input devices and hard copy devices 1.8 Graphics Monitors and Workstations 1.9 Graphics software

	Unit : 2 Graphics Output Primitives 2.1 Points and Lines 2.2 Line Drawing Algorithms 2.2.1 VECGEN Algorithm 2.2.2 Bresenham's Line drawing Algorithm 2.3 Circle- Generating Algorithms 2.3.1 Parameteric Circle Drawing Algorithm 2.3.2 Bresenham's Circle Drawing Algorithm 2.4 Ellipse Generating Algorithms 2.5 Other Curves 2.6 Line and Curve Attributes 2.7 Pixel Addressing 2.8 Character Generation 2.9 Color and Gray scale levels 2.10 Polygon 2.10.1 Types of Polygon 2.10.2 Polygon Inside-Otuside Test 2.10.2.1 Even-Odd Method 2.10.2.2 Winding Number Method 2.10.3 Polygon Area Filling 2.10.3.1 Flood Fill Method 2.10.3.2 Scan-line Fill Method 2.10.3.3 Boundary Fill Method 2.10.3.4 Filling Polygon with Pattern 2.11 Anti-aliasing **Unit : 3 : 2D Transformations and Viewing** 3.1 Transformations 3.1.1 Basic Transformations 3.1.1.1 Scaling 3.1.1.2 Tanslation 3.1.1.3 Rotation 3.1.2 Homogeneous Coordinates 3.1.3 Composite Transformations 3.1.4 Other Transformations 3.1.5 Transformations between Coordinate Systems 3.1.6 Affine Transformations 3.1.7 Raster methods for Transformations 3.2 Viewing 3.2.1 The viewing Pipeline 3.2.2 Viewing Coordinate Reference Frame 3.2.3 Window-to-Viewport Coordinate Transformation 3.2.4 Clipping 3.2.4.1 Point Clipping 3.2.4.2 Line Clipping 3.2.4.3 Polygon Clipping 3.2.4.4 Text and Exterior Clipping **Unit : 4 : Introduction to 3D graphics** 4.1 3D object representation 4.2 3D object transformation 4.3 3D object viewing 4.3.1 Viewing Parameters

	4.3.2 Projection 4.3.2.1 Parallel Projection 4.3.2.2 Perspective Projection 4.3.2.2.1 One-point Perspective Projection 4.3.2.2.2 Two-point Perspective Projection 4.3.2.2.3 Three-point Perspective Projection **Unit : 5 : Colors and Shading** 5.1 Properties of Light 5.2 Illumination 5.3 Shading 5.3.1 Constant Shading 5.3.2 Gouraud Shading 5.3.3 Phong Shading 5.4 Shadow 5.5 Colours 5.5.1 RGB Model 5.5.2 CMY Model 5.5.3 HSV Model 5.6 Colour Selection and Applications
Reference Book	1) Computer Graphics C Version, Donald Hearn & M. Pauline Baker , Pearson Education, New Delhi, 2004. 2) Computer Graphics: Programming Approach. – Harrington S., Tata McGraw Hill, 3) Computer Graphic – Dr. Apurva A. Desai, PHI, 4) Procedural Elements for Computer Graphics, David F. Rogers, Tata McGraw Hill Book Company, New Delhi, 2003 5) Computer Graphics: Principles & Practice in C, J. D. Foley, S. K Feiner, A Van Dam F. H John Pearson Education, 2004 6) Computer Graphics using Open GL, Franscis S Hill Jr, Pearson Education, 2004. 7) Edward Angel, 'Interactive Computer Graphics' – A top down approach using OpenGL, Pearson, Fifth Edition
Teaching Methodology	Lectures, Discussion, Self Study, Seminars, Case Study and Assignment
Evaluation Method	30% Internal assessment 70% External assessment