# 19IT41E1 - COMPUTER GRAPHICS

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| **Course Category:** | Program Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3-0-0 |
| **Prerequisite:** | Basic knowledge on Vectors, vector operations, and vector spaces, matrices, basic linear algebra such as solving a system of linear equations and Polynomials | **Sessional Evaluation:**  **Univ.Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | * Gain knowledge about graphics hardware devices and software used. * Understand the two dimensional graphics and their transformations. * Understand the three dimensional graphics and their transformations. * Appreciate illumination and color models. * Be familiar with understand clipping techniques. | | |

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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Now the different types of display devises and working procedure.  Algorithms for to display lines, circles and ellipse. |
| CO2 | Design two dimensional graphics and Apply two dimensional transformations. |
| CO3 | Design three dimensional graphics. |
| CO4 | Apply three dimensional transformations. |
| CO5 | Apply Illumination and color models. |
| CO6 | Apply clipping techniques to graphics andDesign animation sequences. |
| **Course Content** | UNIT-I  **Introduction:**  Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.  UNIT-II  Two dimensional graphics:  two dimensional geometric transformations – matrix representations and homogeneous coordinates, composite transformations; two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.  UNIT-III  **Three dimensional graphics:**  Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces  UNIT-IV  **Transformation and viewing:**  Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.  UNIT-V  **Illumination and colour models:**  Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.  UNIT-VI  **Animations & realism 10 animation graphics:**  Design of Animation sequences – animation function – raster animation – key frame systems – motion specification –morphing – tweening.  **Computer graphics realism:** Tiling the plane – Recursively defined curves – Koch curves – C curves – Dragons – space filling curves – fractals – Grammar based models – fractals – turtle graphics – ray tracing. | |
| **Text Books and References:** | Text Books:   1. John F. Hughes, Andries Van Dam, Morgan McGuire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley ,”Computer Graphics: Principles and Practice”, , 3rd Edition, Addison- Wesley Professional,2013. (UNIT I, II, III, IV). 2. Donald Hearn and Pauline Baker M, “Computer Graphics”, Prentice Hall, New Delhi, 2007 (UNIT VI). | |
| Reference Books:   1. Donald Hearn and M. Pauline Baker, Warren Carithers,“Computer Graphics With Open GL”, 4th Edition, Pearson Education, 2010. 2. Jeffrey McConnell, “Computer Graphics: Theory into Practice”, Jones and Bartlett Publishers, 2006. 3. Hill F S Jr., “Computer Graphics”, Maxwell Macmillan” , 1990. 4. Peter Shirley, Michael Ashikhmin, Michael Gleicher, Stephen R Marschner, Erik Reinhard, KelvinSung, and AK Peters, Fundamental of Computer Graphics, CRC Press, 2010. 5. William M. Newman and Robert F.Sproull, “Principles of Interactive Computer Graphics”, McGrawHill 1978. | |
| **E-Resources** | 1. http://nptel.ac.in/ | |