Lesson plan
Session: 2022-2023
Semester: 3rd
Subject: CG
Paper Code : CSC 2046

Month	Units	Topics
August	Unit I: Introduction and overview of Graphics systems	**Introduction:** Computer graphics and its applications; Input devices; Output devicesdisplay devices; Display techniques- Raster-scan display and Random-scan display; color display techniques; Direct view storage tubes; emissive & non-emissive flat-panel displays-Plasma panels, Thin-film electrostatic displays, LED, LCD; Three-dimensional viewing devices; display systems architecture. **Graphics software:** classifications, graphics functions for various operations, software standards- PHIGS, PHIGS+, GKS.
September	Unit II: Output primitives	**Line-drawing algorithms:** DDA algorithm and Bresenham's algorithm. Midpoint algorithms for circle & ellipse generation. **Area-filling algorithms:** scan-line polygon-fill, nonzero-winding number rule, scan-line curve filling, boundary-fill algorithm, flood-fill algorithm. **Character generation techniques:** generation of bitmap and outlined font.
October	Unit III: Geometric transformations	**2-D geometric transformations:** Basic transformations- translation, rotation and scaling; matrix representations and Homogeneous coordinate representations; Composite transformations among translation, rotation and scaling; General pivot-point rotation; General fixed-point scaling; General scaling directions; Other transformationsreflection and shear; Transformation between co-ordinate systems; Definition of Affine transformations. **3-D geometric transformations:** Translation; Rotation- rotations about co-ordinate axes, general 3-D rotation; Scaling; Reflection; Shear.
November	UNIT-IV: Viewing and Clipping	**2-D viewing:** definition; viewing transformation pipeline; window-to-viewport co-ordinate transformation. **2-D Clipping operations:** definition; point clipping; line clipping algorithms; polygon clipping algorithms; curve clipping, text clipping. **3-D viewing:** viewing transformation pipeline; world co-ordinate to viewing co-ordinate transformation.
December	UNIT-V: 3D Graphics	**3-D concepts:** display methods- Parallel projection, perspective projection, depth visible line & surface identification, surface rendering, exploded & cutaway views, 3-D & stereoscopic views. **Projections:** Parallel projection techniquesorthographic & oblique projections and their transformation equations; Perspective projection and transformation equations. **Visible surface detection:** definition; classification of algorithms- object-space methods & Image-space methods;

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		algorithms for visible surface detection; curved-surface detection; wireframe displays. **Illumination and Surface rendering:** definition and importance; light sources; Definition of basic illumination models. **Color models and applications:** properties of light; standard preliminaries- XYZ model, CIE chromaticity diagram; color models- RGB, YIQ, CMY, HSV, HLS; conversion between color models.
	UNIT-VI: Multimedia Systems and Computer Animation	Multimedia Systems: Review of typical interactive multimedia systems, Aspects of multimedia systems, Multimedia design techniques, Multimedia technology; Networkbased multimedia systems. Computer Animation: Traditional animation techniques, 2D animation, 3D animation. Case Study: Graphics API with GD or OpenGL or DirectX/3D.

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