COMPUTER GRAPHICS
(Elective-II)

Subject Code: 13ME2120

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Pre requisites: Computer Aided Design

Course Educational Objectives:

To make the student understand

1. basics of colour raster scan display devices and draw lines and circles on it
2. fill polygons and clip lines and polygons against a window
3. procedures for transformation, rendering and shading of objects
4. hidden line removal algorithms

Course Outcomes:

The student will be able to

1. draw lines and circles on colour raster scan display devices
2. fill polygons and clip lines and polygons against a window
3. transform, render and shade objects
4. eliminate hidden lines and surfaces using algorithms

UNIT – I

Transformations: Cartesian and homogeneous coordinate systems two dimensional and three dimensional transformations – scaling, rotation, shearing, zooming, viewing transformation, reflection, rotation about an axis, concatenation.

UNIT –II

Surface generation:Shape description requirements, parametric functions, Bezier methods, Bezier curves, Bezier surfaces, B-Spline methods.

Unit –III

Mesh generation: Meshes, Mesh elements, types of mesh operations, mesh representation, traversal operations , Face based mesh representation, Half edge data structures, Constructing a mesh data structure, constructing a half edge base mesh data structure, sub division of surfaces, subdivision of splines, Constructing rules, Examples.

UNIT-IV

Solid modelling:Introduction to solid modelling, Implicit representation: primitives and skeletal elements, combination of fields – Boolean operations, polygonization, Solids modelling by boundary representation and CSG.

UNIT- V

Rendering and shading algorithms:Rendering: Hidden line removal algorithms, surface removal algorithms, painters, Warnock, Z-buffer algorithm.

Shading algorithms: Constant intensity algorithm, Phong's shading algorithm, Gourand shading algorithm, comparison of shading algorithms.

TEXT BOOKS:

1. D.F.Rogers , "*Procedural elements for computer graphics*", 2e, TMH, 1998.

2. Donald Hearn & M.P. Bakers, " *Computer Graphics*", 2e, Prentice-Hall, 1994

REFERENCES:

1. Harrington, "*Computer graphics*", 2e, TMH, 1987.

2. Smartech.gatech.edu/bitstream/ handle.