Introduction to Computer Graphics - Video course

Course objective

To introduce students to the basics of computer graphics.
Prerequisites: Basic programming, Data structures and Basics of linear algebra and matrices.
Course contents
Graphics display devices, Input devices, Rendering pipeline, Raster Graphics: Line and Circle drawing algorithms, Windowing, Clipping: Cohen and Sutherland line clipping, Cyrus-beck clipping method, 2D and 3D Geometrical Transformations, Viewing Transformations: parallel and perspective projection, Curves and Surfaces: Cubic splines, Bezier curves, B-splines, Tensor product surfaces, Surface of revolution Sweep surfaces, Fractal curves and surfaces, Hidden line/surface removal methods, Illumination model, Polygon Shading: Gouraud, Phong, Introduction to Ray-tracing, Animation.
Lecture **Outline with topics** (and no. of hours)

1. Graphics display devices, Input devices, Rendering pipeline (3)
2. Raster graphics, windowing and clipping (6)
3. Transformations (5)
4. Curves and surfaces (7)
5. Hidden surface elimination (6)
6. Illumination and Shading Models (4)
7. Introduction to Ray-tracing (4)
8. Animation (5)

Brief description of laboratory activities

1. Implementation of viewing/rendering pipeline
2. Hierarchical modeling using transformations
3. Basic ray tracing
4. Programming practices with standard graphics libraries like open GL.

Suggested texts and reference materials

1. *Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addisen Wesley (Indian Edition).*
2. *Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).*
3. *Mathematical Elements for Computer Graphics by D F Rogers, McGraw Hill (Indian Edition).*
4. *Procedural Elements for Computer Graphics by D F Rogers, McGraw Hill (Indian Edition).*
5. *Interactive Computer Graphics, A top-down approach with OpenGL by Edward Angele, Addisen Wesley.*
6. *Curves and Surfaces for Computer Aided Geometric Design by G Farin, Academic Press.*

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