CS 6250: ADVANCED COMPUTER GRAPHICS

Course Description

Topics may include: hidden line/surface algorithms, curved lines and surfaces, illumination and shading techniques, color models, geometric and solids modeling, animation, graphics for game programming, virtual reality, image processing, image compression, and pattern recognition algorithms. Prerequisites: Admission to MS in CS program, or consent of department, plus CS 5250 or equivalent.

Course Syllabus

- **X-Windows**
  - Client/Server model
  - XLIB graphics toolkit
  - Graphical User Interface Toolkits
- **Hidden line/surface algorithms**
  - Z-buffer
  - Heedless Painter
  - Scanline methods
  - Area Subdivision methods
- **Curved line and surfaces**
  - Hermite, Bezier and Splines
  - Bi-cubic surfaces
  - Drawing Techniques
- **Color**
  - Theory of color
  - Color Models
    - RGB, CMY, CMYK, YIQ, HSV
  - Color Interpolation techniques
- **Realism Techniques**
  - Illumination Models
  - Shading
    - Flat, Gouraud, Phong
    - Color issues
  - Texture & Bump Mapping
  - Shadow & transparency effects
  - Ray Tracing
  - Radiosity
- **Additional topics as time permits**
  - JPEG and MPG standards
  - VRML
  - Fractals

Course Project
Four to six computer graphics programming using a high level programming language will be assigned. Some projects may be group oriented. At least one project using a high level graphics application program will be assigned.