1. **Number and title of course:** CS 184, Foundations of Computer Graphics

2. **Course objectives:**
   - An understanding of the physical and geometrical principles used in computer graphics
   - An understanding of rendering algorithms, and the relationship between illumination models and the algorithms used to render them
   - An understanding of the basic techniques used to model three dimensional objects, both as surfaces and as volumes
   - An acquaintance with the principles of interaction and of user interfaces

1. **Topics covered:**
   - Polygon scan conversion (rasterization)
   - 2D and 3D Geometric and Modeling Transformations
   - Rotation about an arbitrary axis, quaternions, exponential maps
   - Homogeneous coordinates and projective geometry
   - Planar geometric parallel and perspective projections
   - 2D and 3D viewing transformations
   - Perspective Pipeline
   - Line and Polygon clipping algorithms
   - Visible surface determination
   - Illumination (Reflectance) models and gamma correction
   - Smooth shading methods and mach band artifacts
   - Ray tracing: reflection/refraction/transparency/shadows
   - Radiosity, photon mapping, and global illumination
   - Texture mapping
   - Environment mapping and bumb mapping
   - Spline curve and surface representations
   - Animation
   - Image-based and non-photorealistic rendering

2. **Relationship of course to program objectives:** This course requires students to use their fundamental knowledge of mathematics, science, and engineering to analyze and solve engineering problems. Students identify, formulate, and solve challenging engineering problems. Students use modern skills, tools and techniques to meet desired needs.

3. **Prepared by:** James O'Brien (3/24/06)