CSE 4280 Computer Graphics Algorithms (3 credits)

Primary instructor: Eraldo Ribeiro

Textbooks and references:

None

Course information:

2014–2015 Catalog description: CSE 4280 Computer Graphics Algorithms (3 credits). Introduces computer graphics algorithms, software and hardware. Includes ray tracing, the graphics pipeline, transformations, texture mapping, shading models, sampling, global illumination, splines, animation and color models. Programming format in course provides sufficient background to write computer graphics applications. Prerequisites: CSE 2010 or ECE 2552.
Prerequisites by topic: Algorithmic paradigms, basic data structures, efficiency measures, rates of growth, and asymptotic behavior, data processing algorithms, recursion

Place in program: Advanced elective

Course outcomes & related student outcomes: The student will be able to

1. Implement a simple ray tracer demonstrating basic knowledge of computer graphics. (4a: Skillful software construction)
2. Explain the concept of a graphics pipeline for polygon rendering. (4a: Skillful software construction)
3. Implement transformations between spaces in the graphics pipeline using standard libraries. (1: Fundamental knowledge & 4a: Skillful software construction)
4. Identify factors contributing to the appearance of objects and know how these can be modeled. (1: Fundamental knowledge)
5. Make presentations on computer graphics concepts. (7: Communicate effectively)

Topics covered:

1. Ray tracing (12 hours)
2. Graphics pipeline (4 hours)
3. Affine and perspective transformations (5 hours)
4. Texture mapping (4 hours)
5. Shading models (5 hours)
6. Sampling (1 hour)
7. Global illumination (3 hours)
8. Splines (2 hours)

9. Animation (3 hours)
10. Color models (3 hours)
11. Applications: image-based rendering (4 hours)

Approved by: Eraldo Ribeio, Associate Professor

Signature:  **Date:** 02/02/2015