CS 67101/77101  ADVANCED COMPUTER GRAPHICS   3 Credit Hours

Instructor’s Name: ____Ye Zhao______________________________

(Textbook Title, Author, Year) 
No single specific textbook required.

(Other Supplemental Material)

Alan H. Watt and Mark Watt, Advanced Animation and Rendering Techniques: Theory and Practice, Addison-Wesley, 1992

Course Content:
(Cross-listed with CS 77101) In-depth study of active research topics in computer graphics. Topics include volume rendering, image-based rendering and modeling, graphics architectures, virtual reality, modeling in computer graphics, non-photorealistic rendering, computer animation and computer games.

Prerequisites or co-requisites: Graduate standing
Required, elective, or selected elective

Topics to be Covered: Total 45 hours

1. Graphics systems: graphic pipeline, GPU, GUI and API (10 hours)
2. Advanced rendering techniques: Phone Shading, Global Illumination, Ray Tracing, Monte-Carlo Ray tracing, Photon Mapping, Rendering Equations, Multiple Scattering (20 hours)
3. Surfaces and meshes: Mesh representation, Mesh generation, Mesh Smoothing, Subdivision (10 hours)
4. Animation and Phenomena: Physically based modeling; Fluid and Natural Phenomena (5 hours)

Learning Outcomes:
The objectives of the course are to learn advanced concepts and methods in three dimensional computer graphics. The focus will be on learning advanced methods in rendering, modeling and animation. The students will gain backgrounds and skills that will aid the design of new, innovative graphics in realistic applications

**Learning Outcomes Assessment:**
1. Reading and presentation: Students are required to read technical papers related to class topics. Each student will be required to give a presentation of your reading of technical papers during the semester. The presentation can use the given paper or other technical paper upon the lecturer’s permission.
2. Paper examinations: Two paper-based exams will be given during the semester. Students are asked to answer questions of general knowledge we studied on class and on your readings.
3. Projects: Programming projects will be evaluated by project design, work load, and results, as well as the presentation students give on class.