

## Computer Science 4371 Computer Game Development II

### Student Learning Outcomes

1. Students will write low-level rendering code (shaders) for programmable graphics hardware.
2. Students will create 3D models that blend multiple textures using 3D modeling software.
3. Students will write software demonstrating multi-texture blending in a 3D graphics application.
4. Students will write software demonstrating the use of multiple concurrent threads of execution in an application program.
5. Students will write software demonstrating client-server network communication in an application program.
6. Students will create 3D models for use in a portal rendering scheme.
7. Students will write software demonstrating portal rendering in a 3D graphics application.
8. Students will create 3D models for use in skeletal animation and/or morph animation.
9. Students will write software demonstrating on-demand skeletal animation in a 3D graphics application.
10. Students will write software demonstrating playback of pre-recorded skeletal animation data in a 3D graphics application.
11. Students will write software demonstrating on-demand morph animation in a 3D graphics application.
12. Students will write software demonstrating dynamic real-time lipsync in a 3D graphics application.
13. Students will write software demonstrating speech synthesis in an application program.

### Course Content

**Textbook:** *Real-Time Rendering*, Second Edition, by Moller & Haines. The following chapters are covered (See textbook "Contents").

1. **Advanced Lighting and Shading.** Vertex shading, pixel shading, reflections, shadows.
2. **Pipeline Optimization.** Optimization, multiprocessing, balancing the graphics pipeline.
3. **Collision Detection.** Collision detection with rays, general hierarchical collision detection, collision response.
4. **Texturing.** Multitexturing.