Miami Dade College

Course Description

DIG2771 | 3D Programming 2 - Virtual Reality | 4.00 credits

This course is for students majoring in game development and covers key aspects of advanced 3D programming. Students will learn how to program special effects and create realism for games by using: illumination, shading, reflections, collision detection/ reaction, light mapping, sound, music, alpha blending, fog, and applying basic Newtonian physics to objects. Prerequisite: DIG1705 Pre/ Corequisite: COP2335.

Course Competencies

Competency 1: The student will demonstrate an application of library initialization by:

1. Modifying programs that use different graphics libraries
2. Using different graphics libraries in the final project and programming assignments
3. Developing libraries to use with 3D software Development

Competency 2: The student will demonstrate how to apply programming 3D sound effects by:

1. Modifying existing programs that use sound and music to add realism in game development
2. Modifying sound systems to add direction and distance to sound effects
3. Using sound effects in programming assignments
4. Distinguishing different sound file formats with respects to quality and size
5. Using sound effects and music in the final project

Competency 3: The student will demonstrate an application of different input devices by:

1. Modifying existing programs that use different types of input devices in game development
2. Using different input devices in the final project and programming assignments
3. Using forced feedback devices for input
4. Summarizing papers on the future of input devices

Competency 4: The student will demonstrate an application of transparency, fog and alpha blending by:

1. Creating 3D transparent objects
2. Summarizing papers on alpha blending programming methods
3. Using transparency or fog in the final project

Competency 5: The student will demonstrate an application of partial systems for creating special effects by:

1. Distinguishing partial systems in terms of their uses such as fire and explosions
2. Modifying and write programs that use partial systems for special effects
3. Appling physics to particle system for realism

Competency 6: The student will analyze methods of programming light sources and shadows by:

1. Distinguishing different methods for creating shadows
2. Experimenting with different lighting effects
3. Modifying 3D programs to include lighting and shadow effects in a 3D world
4. Applying light and shadow effects in games to add realism
5. Creating light sources and shadows in the final project

Competency 7: The student will Demonstrate how to apply programming reflections and refraction of light and images by:

1. Modifying existing programs that uses reflection and refraction
2. Developing programs that light reflection and refraction
3. Using light reflection and refraction in the final project

Competency 8: The student will demonstrate an application of texture by:

1. Modifying programs that use texture mapping
2. Creating 3D texture mapped surfaces
3. Using texture mapping in the final project

Competency 9: The student will analyze programming collision detection and reaction by:

1. Modifying programs that use collision detection and reaction
2. Comparing different collision detection algorithms in terms of CPU usage and accuracy
3. Using collision detection in the final project
4. Discussing advantages of different collision methods

Competency 10: The student will demonstrate of application of visible-surface determination by:

1. Modifying programs that use visible-surface determination
2. Applying different algorithms for visible-surface determination to determine their effect on the performance of games and the game engines

Competency 11: The student will demonstrate an application of hidden line removal by:

1. Modifying programs that use hidden line removal
2. Applying different algorithms for hidden line removal to determine their effects on the performance on games and the game engines

Competency 12: The student will demonstrate an application of basic Newtonian physics to game development by:

1. Applying basic physics to a 3D game environment
2. Creating simplified calculations to mimic real life physics
3. Manipulating physics functions to be applied to existing data structures that store the 3D world

Learning Outcomes

- Communicate effectively using listening, speaking, reading, and writing skills
- Use computer and emerging technologies effectively