

## **CSC 631/831: Multiplayer Game Design and Development**

**Units:** 3

**Prerequisite:** CSc 413

### **Course Description:**

Students who have taken 631 can not retake 831. 831 students are required to perform extra work of intensive literature survey and class presentation.

The course introduces characteristics of multiplayer games and teaches fundamental technologies to develop 3D multiplayer games. The course will explore the methodologies and practice of computer game design and programming as a way of introducing students to computer graphics, network technologies, building comprehensive application, robust programming, user-interface design, and team projects. Primary focuses are on computer graphics and network technologies rather than AI or theory of game designs. Students are required to design and develop 3D multiplayer game as a team project.

### **Topics covered in the class:**

- Principles of game design
- History and design issues of multiplayer games
- Computer graphics
  - Introduction to Modeling,
  - Introduction to Rendering,
  - OpenGL
  - Graphics Pipeline
  - Shading and Illumination
  - Texture, shadow, reflection
  - Level of Detail, Spatial subdivisions
  - Collision Detection/response
  - Realtime rendering
  - Game Engine
  - GPU and Shader programming
  - Introduction to Animation (Inverse kinematics, Physics, Simulation, Particle systems)
- Network
  - Client Server Architecture
  - Socket programming
  - Protocols for effective bandwidth usage
  - Dealing with lag / network failures
- Diagnosis of example multiplayer game (Quake 2)

**Grading System:** Plus-minus letter, CR/NC allowed.

**Grades** will be based on projects, midterm and final exams.

**Reference books and resources:**

Core Techniques and Algorithms in Game Programming,  
Sanchez-Crespo, D., New Riders, 2004.

Game Programming Gems, Mark DeLoura, Charles River Media.

3D Game Engine Design, David H. Eberly, Morgan Kaufmann.

Tricks of the Windows Game Programming Gurus, Andre LaMothe.

GameMaker software for teaching programming via games from Utrecht  
University: <http://www.cs.uu.nl/people/markov/gmaker/>