I. CATALOG DESCRIPTION AND CREDIT HOURS OF COURSE:

CS473. 3D Game Programming. Explore the algorithms, data structures, and techniques in 3D computer game programming. Create complex 3D games utilizing a programming language. Prerequisite(s): CS373 or CS375 with a minimum grade of 'C'. (3)

II. PREREQUISITE: CS373 or CS375 with a minimum grade of 'C'.

III. COURSE OBJECTIVES:

The objectives of the course are that the student will be able to

A. Write a proposal for a 3D computer game product.

B. Design and program 3D game(s) involving collision detection/reaction, and user interaction.

C. Apply appropriate path finding algorithms and AI techniques in game design.

D. Develop real-time 3D game programming project(s) as a team.

IV. EXPECTATIONS OF STUDENTS:

Students are expected to:

A. Attend all lectures and participate in lecture discussions and other classroom activities.

B. Take all exams, complete all reading assignments, and complete individual and team project assignments within a given time frame.

C. Develop, a final 3D game programming project as a team, incorporating the expected functionalities and providing all the documentation.
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V. COURSE CONTENT OR OUTLINE:

A. Introduction, Game history and Windows programming  3
B. 3D graphics, rendering and animation  9
C. Terrain creation: heightmaps, terrain mesh and texturing  3
D. Game Design Specification  3
E. Advanced effects: Pixel Shaders, Vertex Shaders, Texture Sampling, Level-of-Detail rendering, Fog, Particle engines  6
F. Collision Detection  3
G. Sound Effects and Music  2
H. HCI concepts and User Interfaces  2
I. Game Physics, Path Finding and Game AI  8
J. Social considerations in games, Game Production  3
K. Exams  3

VI. TEXTBOOK(S) AND/OR OTHER REQUIRED MATERIALS OR EQUIPMENT

A. Optional student textbook:

B. Reference textbooks and periodicals:
   Game Programming Gems (series), Charles River Media, 2000 -2008

C. Tools (Software):
   Microsoft Visual C++; or Microsoft XNA Game Studio and Microsoft Visual C#; or other available IDEs
VII. BASIS FOR STUDENT EVALUATION:

A. Exams 35%

B. Individual Assignments 15%

C. Team Assignment and Project Work 50%