CAP 6121: 3D User Interfaces for Games and Virtual Reality
Spring 2011; MW 4:30pm-5:45pm HEC -0111

Instructor: Dr. Joseph J. LaViola Jr.
Website: www.eecs.ucf.edu/courses/cap6121/spr11/
Office Hours: T: 4:00pm-5:30pm   Office: ENGRIII – 321, phone: x2285
           W: 5:45pm-6:45pm   jjl@eecs.ucf.edu

READINGS:
Text: Bowman, D., Kruijff, E., LaViola, J., and Poupyrev, I. *3D User Interfaces: Theory and
    Practice*, Addison Wesley, July 2004.

    Creighton, Ryan H. *Unity 3D Game Development by Example*, Packt Publishing, 2010.

Papers: student/professor selected research papers

Catalog Description: 3D user interaction, spatial user interfaces, selection and manipulation, 3D
navigation, system control, evaluation methodologies, augmented and mixed reality, input and
output hardware

Course Objectives: 3D User Interfaces for Games and Virtual Reality is a course designed to
give students a rigorous introduction to the design, implementation, and evaluation of the
fundamental techniques in spatial 3D interaction.

Student Requirements:
1. Star Wars Game -- Students will create a lightsaber game where they control the saber with and
use the force using the Microsoft Kinect.

2. 3D Pac-Man -- Students will create a 3D Pac-Man game where they will travel through a maze
using the using the Microsoft Kinect.

3. Game UI paper -- Students will examine existing 3D user interaction techniques and see how
they can be applied in a video game setting.

4. Paper Presentations -- Students will have to present at least one paper on a topic in 3DUIs.

5. Final Project -- Students will do a final project of their choice that explores a particular concept
in 3D user interfaces tailored to video games. They must first write a short proposal and get it
approved by the professor.

Tentative Grading Scheme:

Assignment 1	15%
Assignment 2	15%
Survey Paper	15%
Paper presentations	5%
Final Project	50%

The instructor reserves the right to use plus/minus grading in this course.

Syllabus

Week	Topic	Readings	Assignments
1	Introduction to 3D User Interfaces -- What are 3DUIs? -- Application areas -- 3DUI history -- Games and 3DUIs	Bowman – Chapters 1,2 LaViola (2008) Bowman et al. (2006,2008)	
2	Intro to Unity 3D Nintendo Wii Remotes and the Microsoft Kinect	Creighton LaViola and Marks (2010)	Assignment 1 – Star Wars out
3	3DUI Output Hardware -- Visual displays -- Auditory displays -- Haptic displays	Bowman – Chapter 3	
4	3DUI Input Hardware -- Desktop input devices -- Gaming devices -- Tracking devices -- Direct human input (e.g., brain, speech, bioelectric) -- Building custom input devices	Bowman – Chapter 4	
5	Selection and Manipulation -- 3D manipulation tasks -- Interaction techniques for 3D manipulation -- Design guidelines	Bowman – Chapter 5	Assignment 1 due Assignment 2 – 3D Pac-man out
6	Travel Techniques -- 3D travel tasks -- Travel techniques -- Design guidelines Wayfinding -- Theoretical foundations -- User-centered wayfinding support -- Environment-centered wayfinding support	Bowman – Chapters 6,7	
7	System Control -- Graphical menus -- Voice commands -- Gestural commands -- Tools -- Multimodal interaction	Bowman – Chapter 8	Assignment 2 due

8	Symbolic Input -- Symbolic input tasks -- Symbolic input techniques -- Beyond text and number entry	Bowman—Chapter 9	
9	Designing and Developing 3DUIs -- Designing for humans -- Inventing 3D user interfaces -- Borrowing from the real world -- Magical techniques	Bowman – Chapter 10	Survey paper due
10	Evaluation of 3DUIs -- Tools for Evaluation -- Evaluation metrics -- 3D UI evaluation characteristics -- Testbed evaluation	Bowman – Chapter 11	Final Project proposal due
11	3DUIs in the Real World -- Augmented Reality interfaces -- Augmented surfaces -- Tangible augmented reality -- Mixed Reality	Bowman – Chapter 12	
11-14	In the last 4 weeks of the semester one class will be for updates from students on their final projects. The second class will be for students to present papers. Each student must do at least one 15 to 20 minute presentation of a paper of their choice.		