

**CAP 6938: 3D User Interfaces for Games and Virtual Reality
Spring 2008; MW 4:30pm-5:45pm ENG I – 0383**

Instructor: Dr. Joseph J. LaViola Jr.

Website: www.eecs.ucf.edu/courses/cap6938/spr2008/section02

Office Hours: T: 4:30pm-6:30pm

W: 5:45pm-6:45pm

Office: ENGR III – 321, phone: x2285

jjl@cs.ucf.edu

READINGS:

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

Papers: Student 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 a Nintendo Wii controller.
2. 3D Pac-Man -- Students will create a 3D Pac-Man game where they will travel through a maze using the Nintendo Wii controllers.
3. Survey Paper -- Students will pick a particular topic in 3D UI and write a survey paper on it.
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 | 15% |
| 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 | Bowman – Chapters 1,2 | |
| 2 | XNA Programming and Development | Cawood and McGee | 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 | Bowman— | |

| | | | |
|-------|---|---------------------|----------------------------|
| | <ul style="list-style-type: none"> -- Symbolic input tasks -- Symbolic input techniques -- Beyond text and number entry | Chapter 9 | |
| 9 | <p>Designing and Developing 3DUIs</p> <ul style="list-style-type: none"> -- Designing for humans -- Inventing 3D user interfaces -- Borrowing from the real world -- Magical techniques | Bowman – Chapter 10 | Survey paper due |
| 10 | <p>Evaluation of 3DUIs</p> <ul style="list-style-type: none"> -- Tools for Evaluation -- Evaluation metrics -- 3D UI evaluation characteristics -- Testbed evaluation | Bowman – Chapter 11 | Final Project proposal due |
| 11 | <p>3DUIs in the Real World</p> <ul style="list-style-type: none"> -- Augmented Reality interfaces -- Augmented surfaces -- Tangible augmented reality -- Mixed Reality | Bowman – Chapter 12 | |
| 11-14 | <p>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.</p> | | |