CAP 6121: 3D User Interfaces for Games and Virtual Reality
Spring 2021; MW 4:30pm-5:45pm ENG1 - 0383

Instructor: Dr. Joseph J. LaViola Jr.
Website: www.cs.ucf.edu/courses/cap6121/spr2021/
Office Hours: M: 6:00pm-7:00pm   Office: ENGRIII – 321, phone: x2285
                    T: 4:00pm-6:00pm   jjl@cs.ucf.edu

Information will be posted in Webcourses as well

This course will incorporate the BlendFlex model. This means that the face-to-face classroom sessions will take place on the days and times noted on the class schedule, but will also be recorded for remote student participation. The idea is to provide all students with continued access to learning experiences.

Please view the 3-minute BlendFlex Delivery Model UCF Student Guide video for an overview.

Use of Zoom
Lectures will also be streamed in Zoom
Lecture Recordings will be posted in Webcourses
Zoom links will be emailed to students at least a day before the Zoom class or virtual office hours event takes place.

Because of the continued remote instruction requirement due to the COVID-19 pandemic, this course will use Zoom for some synchronous ("real time") class meetings. Meeting dates and times will be scheduled through Webcourses@UCF and should appear on your calendar. Please take the time to familiarize yourself with Zoom by visiting the UCF Zoom Guides at https://cdl.ucf.edu/support/webcourses/zoom/. You may choose to use Zoom on your mobile device (phone or tablet).

Things to Know About Zoom:
- You must sign in to my Zoom session using your UCF NID and password.
- The Zoom sessions are recorded.
- Improper classroom behavior is not tolerated within Zoom sessions and may result in a referral to the Office of Student Conduct.
- You can contact Webcourses@UCF Support at <https://cdl.ucf.edu/support/webcourses/> if you have any technical issues accessing Zoom.

READINGS:
Text: LaViola, J., Kruijff, E., McMahan, R., Bowman, D., and Poupyrev, I. *3D User Interfaces: Theory and Practice, Second Edition*, Addison Wesley, ISBN 0134034325, April 2017.

Smith, M., Queiroz. C. *Unity 5.x Cookbook*, Packt Publishing, October 2015 or latest Unity book.

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 HTC Vive.

2. Fruit Ninja -- Students will create a Fruit Ninja game where they will travel through a maze and fend off attacking fruit using the HTC Vive.

3. Survey paper -- Students will write a paper on a 3D UI topic of their choice, focusing on summarizing and aggregating work done in the last decade.

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, augmented reality, or virtual reality. 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.

Required Statement Regarding COVID-19

University-Wide Face Covering Policy for Common Spaces and Face-to-Face Classes
To protect members of our community, everyone is required to wear a facial covering inside all common spaces including classrooms (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf. Students who choose not to wear facial coverings will be asked to leave the classroom by the instructor. If they refuse to leave the classroom or put on a facial covering, they may be considered disruptive (please see the Golden Rule for student behavior expectations). Faculty have the right to cancel class if the safety and well-being of class members are in jeopardy. Students will be responsible for the material that would have been covered in class as provided by the instructor.

Notifications in Case of Changes to Course Modality
Depending on the course of the pandemic during the semester, the university may make changes to the way classes are offered. If that happens, please look for announcements or messages in Webcourses@UCF or Knights email about changes specific to this course.

COVID-19 and Illness Notification
Students who believe they may have a COVID-19 diagnosis should contact UCF Student Health Services (407-823-2509) so proper contact tracing procedures can take place.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19, have tested positive for COVID, or if anyone living in their residence has tested positive or is sick with COVID-19 symptoms. CDC guidance for COVID-19 symptoms is located here: (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)
Students should contact their instructor(s) as soon as possible if they miss class for any illness reason to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) before missing class.

In Case of Faculty Illness
If the instructor falls ill during the semester, there may be changes to this course, including having a backup instructor take over the course. Please look for announcements or mail in Webcourses@UCF or Knights email for any alterations to this course.

Course Accessibility and Disability COVID-19 Supplemental Statement
Accommodations may need to be added or adjusted should this course shift from an on-campus to a remote format. Students with disabilities should speak with their instructor and should contact sas@ucf.edu to discuss specific accommodations for this or other courses.

Syllabus

Week	Topic	Readings	Assignments
1	Introduction to 3D User Interfaces -- What are 3DUIs? -- Application areas -- 3DUI history -- Games and 3DUIs	LaViola – Chapters 1,2 LaViola (2008) Bowman et al. (2006,2008)	
2	Intro to Unity 3D HTC Vive, Nintendo Wii Remotes, the Microsoft Kinect, PlayStation Move	Creighton LaViola and Marks (2010)	Assignment 1 – Star Wars out
3	Human Factors and HCI Basics	LaViola – Chapters 3,4	
4	3DUI Output Hardware -- Visual displays -- Auditory displays -- Haptic displays	LaViola – Chapter 5	
5	3DUI Input Hardware -- Desktop input devices -- Gaming devices -- Tracking devices -- Direct human input (e.g., brain, speech, bioelectric) -- Building custom input devices	LaViola – Chapter 6	Assignment 1 due Assignment 2 – Fruit Ninja out
5	Selection and Manipulation -- 3D manipulation tasks -- Interaction techniques for 3D manipulation -- Design guidelines	LaViola – Chapter 7	
6	Travel Techniques -- 3D travel tasks -- Travel techniques -- Design guidelines Wayfinding -- Theoretical foundations -- User-centered wayfinding support -- Environment-centered wayfinding support	LaViola – Chapters 8	
7	System Control -- Graphical menus -- Voice commands -- Gestural commands	LaViola – Chapter 9	Assignment 2 due

	-- Tools -- Multimodal interaction		
8	Designing and Developing 3DUIs -- Designing for humans -- Inventing 3D user interfaces -- Borrowing from the real world -- Magical techniques	LaViola – Chapter 10	
9	Evaluation of 3DUIs -- Tools for Evaluation -- Evaluation metrics -- 3D UI evaluation characteristics -- Testbed evaluation	LaViola – Chapter 11	Survey paper due
10	Future of 3D UIs	LaViola – Chapter 12	Final Project proposal due
11-16	In the last 4-6 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.		