FLORIDA ATLANTIC UNIVERSITY

COURSE CHANGE REQUEST
Graduate Programs

Department School of Communication and Multimedia

College D. F. Schmidt College of Arts And Letters

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

***Current* Course Prefix and Number**	DIG 6605	***Current* Course Title**	Interactive Interface Design

Syllabus must be attached for ANY changes to current course details. See Guidelines. Please consult and list departments that may be affected by the changes; attach documentation.

Change title to:
Immersive XR Design

Change prefix
From: **To:**

Change course number
From: **To:**

Change credits*
From: **To:**

Change grading
From: **To:**

*Review Provost Memorandum

Change description to:
Creative exploration of immersive design frameworks in a game engine for extended reality (XR) interfaces such as the latest mobile devices and headsets. Projects bridge the gap between design, technology, engineering and art.

Change prerequisites/minimum grades to:

Change corequisites to:

Change registration controls to:

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.

Effective Term/Year for Changes:	Fall 2019	**Terminate course? Effective Term/Year for Termination:**	

Faculty Contact/Email/Phone Christopher Maraffi/cmaraffi@fau.edu/954-236-1324

Approved by	***Date***
Department Chair	2/22/19
College Curriculum Chair	2/22/19
College Dean	2/25/2019
UGPC Chair	
UGC Chair	
Graduate College Dean	
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

GRADUATE COLLEGE

MAR 0 1 2019

Received

DIG 6605-001 (CRN 13097)
Interactive Interface Design
Spring 2019 (01/08 - 04/16); Tues. 6:00-9:50pm
ES411, Davie Campus

Chris "Topher" Maraffi
Asst. Professor of Multimedia Production
cmaraffi@fau.edu

Office hours: Tuesday 3pm-5:30pm, Wednesday 1pm-3:30pm,
Thursday 2pm-4pm and By Appt.
LA 417/402, Davie Campus

Course Description:

Creative exploration of immersive design frameworks in a game engine for extended reality (XR) interfaces such as the latest mobile devices and headsets. Projects bridge the gap between design, technology, engineering and art.

Course Overview:
This graduate multimedia production course will focus on interactive interface design for extended reality (XR) interface devices. We will explore all aspects of XR design, including virtual reality (VR), augmented reality (AR) and mixed reality (MR) using Unity game engine. Project work will involve research to apply player-centric game design frameworks to the latest hand-held and wearable devices, such as the HTC Vive, Oculus Rift, and Magic Leap One. Research will explore how XR game design can make educational experiences more fun, how game engines with extended reality devices are becoming the film cameras of the future for immersive cinema and 3D animation, and how spatial computing with an MR headset can enhance live play in a performative space.

Design frameworks and techniques covered in this course will include MDA, Flow, 3D media asset development, C# coding in Unity, terrain building, character animation for games, GUI interface design for mobile devices and immersive headsets. Coursework will be supplemented with discussions that explore how games and immersive devices are changing the entertainment experience of consumers and our contemporary media culture. This is a graduate research-oriented course, so each student will be expected to be exploring new aesthetics and techniques related to the course and share that information with the group through discussions and short presentations.

Course Length:

16 Weeks

Credit Hours:

GRADUATE COLLEGE
MAR 22 2019
Received

Prerequisites:

None

Instructional Methods:

The material for this course will be taught in the lab through graduate level discussions and group demos, with independent project work that is presented for group critiques.

Explanation of Assignments:

Assignments will mainly consist of project designs, media asset development, and playable game prototypes. Each project will explore a new aspect of immersive experience design, while building on previously learned techniques in Unity. Since we won't be having any written tests, there will be a scholarly component in the form of design process research papers and a final research poster that can be submitted to a conference. Design papers will be 5-7 pages double spaced, 12-point text, with your name, title, at least three references, and 3-5 images or screenshots. A power-point template will be provided for the research poster, and content can be taken from the two papers.

Assignment details will be discussed in class. The instructor will specify whether an assignment is due as a file to be turned in or a presentation to be shown during class for critique and grading. All papers will be turned in as electronic word or PDF files on the day they are due. Late assignments will receive an automatic 10-point grade reduction for each day past the due date, which will be computed as part of the final grade for the assignment. Final projects will be turned in on exam day.

How to Avoid Plagiarism on Projects & Papers: Students are required to use visual reference and do online research of other game designers as inspiration for developing their own work. In developing game assets, students will need to either self-generate source material through drawing and photography, or sample online images that must then be transformed into unique imagery that no longer resembles the original. All project work turned in for grading must be unique work created for the course, and citations for source imagery and visual influences should be referenced in the design research paper that accompanies each major project. In addition to citing artists and other resources used in developing project work, papers should describe the design principles and techniques used to develop each project. When writing about designers or industry techniques learned through class or research, to avoid plagiarism, always paraphrase or quote the source and provide a citation to a book or online reference.

Course Objectives

The experiential learning approach of this course is to have students gain immersive interface design knowledge through hands-on project development, practice-based research, and class discussions. Students should be self-motivated to do online research and independent software exploration to further their knowledge and share insights with the class. To be successful, students should come up with research questions to apply their knowledge of design frameworks and principles from games, animation, and cinema to extended reality interfaces, and be able to demonstrate novel creative approaches through playable prototypes within Unity.

Student Learning Outcomes

Students who successfully complete this course should be able to:

1. Apply fundamental design principles and software tools to produce immersive 3D game experiences using a variety of extended reality interface devices.
2. Reference industry-standard design techniques and vocabulary in critical discussions of immersive games and interactive media.
3. Utilize online research and software documentation to creatively solve technical and design problems in the immersive game design process for extended reality.

Required Course Materials:

While all needed hardware and software will be provided in the lab, students are required to provide a way to back up their work at the end of each class session. If you don't already own one, buy a flash/external hard drive (with at least 16 GB of memory). The lab computers are set to wipe the drives when you log out each day, so back up your projects before you log out, and do not work directly off of a thumb drive (as they frequently will crash).

Online Resources:

1. Unity 3D: https://unity3d.com/
2. SteamVR: https://steamcommunity.com/steamvr
3. HTC Vive: https://www.vive.com/us/
4. Oculus Rift: https://www.oculus.com/rift/#oui-csl-rift-games=star-trek
5. Viewforia: https://www.vuforia.com/
6. Magic Leap: https://www.magicleap.com/
7. Immersive Cinema: The Philosophy Behind VR: https://filmschoolrejects.com/immersive-cinema-the-philosophy-behind-vr/
8. Research Paper: "MDA: A Formal Approach to Game Design and Game Research": https://www.cs.northwestern.edu/~hunicke/MDA.pdf
9. MDA Intro: https://www.youtube.com/watch?v=bB3gNkFmIMA
10. Explaining the MDA Framework: https://www.youtube.com/watch?v=NxiGduvDJ8s
11. What is VR, AR, MR, XR, 360 (Unity Glossary): https://unity3d.com/what-is-xr-glossary
12. Extended Realities Dictionary: https://arvrjourney.com/extended-realities-vr-ar-mr-dictionary-d5bf048c2320
13. Introducing Immersive Design: https://www.autodesk.com/solutions/virtual-reality

14. The Difference Between VR, AR, MR, and XR: https://hackernoon.com/the-difference-between-ar-vr-mr-xr-and-how-to-tell-them-apart-45d76e7fd50
15. Getting Started with VR Development (Unity): https://unity3d.com/learn/tutorials/topics/xr/getting-started-vr-development
16. Flow in Games (and Everything Else): https://www.jenovachen.com/flowingames/p31-chen.pdf
17. Research Paper: "Immersion in Computer Games: The Role of Spatial Presence and Flow": https://www.hindawi.com/journals/ijcgt/2011/282345/
18. Game UI By Example: https://gamedevelopment.tutsplus.com/tutorials/game-ui-by-example-a-crash-course-in-the-good-and-the-bad--gamedev-3943
19. User Interfaces for VR (Unity): https://unity3d.com/learn/tutorials/topics/virtual-reality/user-interfaces-vr
20. 7 Lessons About Great VR Game Design: https://www.roadtovr.com/7-lessons-sea-of-thieves-can-teach-us-about-great-vr-game-design/
21. Tribocalypse VR Game Design Recap: https://cgvr.cs.ut.ee/wp/index.php/vr-gamedev-guide-part-i-introduction/
22. Enhancing Our Lives with Immersive VR: https://www.frontiersin.org/articles/10.3389/frobt.2016.00074/full
23. Immersive VR and Education: https://www.frontiersin.org/articles/10.3389/frobt.2018.00081/full
24. 1st & 3rd Person Perspective in Immersive Environments: https://www.frontiersin.org/articles/10.3389/frobt.2017.00033/full
25. Getting Started with Viewforia in Unity: https://library.vuforia.com/articles/Training/getting-started-with-vuforia-in-unity.html
26. XR in Unity: https://unity3d.com/learn/tutorials/s/xr
27. HTC Vive Unity Tutorial: https://circuitstream.com/htc-vive-tutorial/
28. Unity for 360 Video: https://unity.com/solutions/360video
29. How to Integrate 360 Video with Unity: https://blogs.unity3d.com/2017/07/27/how-to-integrate-360-video-with-unity/

Recommended Books:

- The VR Book: Human-Centered Design for Virtual Reality (ACM Books) by Jason Jerald (2015).
- Virtual Reality Filmmaking: Techniques & Best Practices for VR Filmmakers 1st Edition by Celine Tricart (2017).
- Unity Virtual Reality Projects: Learn Virtual Reality by developing more than 10 engaging projects with Unity 2018, 2nd Edition 2nd Edition, Kindle Edition by Jonathan Linowes (2018).
- Unity 2018 By Example: Learn about game and virtual reality development by creating five engaging projects, 2nd Edition by Alan Thorn (2018).

Weekly Course Outline (subject to changes on Canvas as needed)

1. **01/08:** Course Intro and syllabus review. Extended Reality. MDA Framework and Immersiveness. Real-world Research Projects. Unity 2018 interface and 360 environments.
    a. **Homework:** Use the MDA design framework to start creating the aesthetics for an immersive 360 environment in Unity that will be the basis of a VR game prototype. Consider real-world educational games or something related to your thesis work.

   b. **Research**: Read link #8 about the MDA game design framework and videos #9-10, and familiarize yourself with the XR-VR-AR-MR terms and their differences for discussion (links #11-15). Develop a couple of research questions for an immersive VR experience, and email them to me before next class.
2. **01/15:** Getting started with VR headsets in Unity. Flow design for Immersiveness. 2D HUD vs 3D world interface design for player feedback. HTC Vive setup and interaction.
   a. **Homework:** Design dynamic interaction for your VR game, and a 3D or 2D interface feedback to promote Flow. What works best in a VR headset?
   b. **Research**: Read links #16-17 about Flow for games, and consider how that can be applied to VR, and how it relates to Presence. Read links #18-19 about Game UI design.
3. **01/22:** Creating an immersive cinematic experience. Filmmaking and narrative techniques in games. The Problem of VR Motion Sickness. Camera and Animation in Unity.
   a. **Homework:** Design a narrative for your game incorporating dynamic interaction events and animation. Develop sound effects that enhance the media experience.
   b. **Research:** Read links #20-21 on VR game design, and section 1 of #22: "Enhancing Our Lives with Immersive VR".
4. **01/29:** Modeling 3D game assets in Maya and creating UV textures that fit your aesthetic look and dynamic narrative. **Research and Design Process Paper #1 Assigned.**
   a. **Homework:** Create custom models and textures in Maya to import into your VR game environment.
5. **02/05:** The importance of sound in your VR game. Creating immersive sound effects in Unity. Should a cinematic VR game have a narrator?
   a. **Homework:** Design interaction events that trigger sounds and animation that advances your narrative and game play.
6. **02/12: Project #1 and Paper #1 Due!** Presentations and playtesting of VR cinematic games using HTC Vive and Oculus Rift.
   a. **Homework:** No homework.
7. **02/19:** Game design for an educational AR app on mobile phones. Designing a docu-game using Viewforia in Unity. Mediating the real world with site-specific interactive content.
   a. **Homework:** Create a design doc for an educational app that gamifies documentary narrative content to motivate exploration of a real-world site.
8. **02/26: AR Game Designs Due for Midterm Grades!** Overlaying 3D models with realistic textures on a mobile camera video feed. Tracking site landmarks.
   a. **Homework:** Creating models in Maya that have realistic textures that will overlay seamlessly on a real-world video feed of a specific site.
9. **03/05: SPRING BREAK – NO CLASS**
10. **03/12:** Applying documentary film techniques to AR interface design. How to mix pre-recorded video with a live video feed. Using green-screen footage to insert a narrator. **Research and Design Process Paper #2 Assigned.**
    a. **Homework:** Design and implement some documentary film techniques into your interactive AR environment.
11. **03/19:** Gamifying educational content with site-specific interactive challenges and goals. Creating a GUI or HUD to visualize educational goals and learning progress.
    a. **Homework:** Add dynamic interaction events on the site and a game GUI to display educational progress, as well as win states for achieving goals.
12. **03/26: Project #2 and Paper #2 Due!** Presentations and playtesting of AR educational mobile apps.
    a. **Homework:** No homework.
13. **04/02:** Mixed reality game design and spatial computing using the Magic Leap One headset. Overview of final multi-player group project to design a performative Murder Mystery Theater game in Unity for multiple Magic Leap devices.

    a. **Homework:** Start working on a narrative and design doc for your theatrical game, and schedule pre-production tasks to all participants.
14. **04/09:** Adding animated 3D models and effects into a real-world environment that has depth recognition. Creating media assets for characters in the 3D and real-world mixed environment.
    a. **Homework:** Create assets for a 3D interactive stage environment with models, textures, lighting, animations, and sounds.
15. **04/16:** Tracking actors in 3D space to enhance their performances with animated masks and props. GUI and HUD design to enhance performance. **Final Research Poster assigned!**
    a. **Homework:** Develop animated character masks and props for the actors to enhance the narrative performance and hide the ML One devices. Create GUI interface designs for the HUD that will further the narrative and performance by feeding narrative lines and showing game progress. Use your papers and the poster template to design a final "Making of..." research poster that shows all the design research and technical application of your projects.
16. **04/30: Final Project and Poster Presentations Due!** Present your final Murder Mystery Theater game for multiple players wearing Magic Leap headsets. Turn in your final research posters as Power Point or PDF files.

Final Exam Day is Tues. 04/30/2019 at 7:00pm (all final projects and papers due).

Course Grading:

Each assignment will count 100 points, and then be calculated as a percentage of your final grade for the course. Final grades for this class will break down as follows:

VR Game Prototype	20%
Design Paper #1	10%
Midterm Designs	5%
AR Game Prototype	20%
Design Paper #2	10%
Final Game Prototype	20%
Final Research Poster	15%
Total =	100%

Grading Legend:

93-100 %	A
90-92.9 %	A-
88-89.9 %	B+
83-87.9 %	B
80-82.9 %	B-
78-79.9 %	C+
73-77.9 %	C
70-72.9 %	C-
68-69.9 %	D+

63-67.9 %	D
60-62.9 %	D-
0 – 59.9 %	F

A grading rubric that defines the evaluation of each assignment will be given on that assignment's handout in class.

Attendance:

Since this is a multimedia production course being conducted in the lab as software demonstrations and hands-on project work, attendance is required. To keep up with all the required material, students should be present for every class of the semester, arriving before class begins and staying until class is dismissed. In the case of absences, students are responsible for finding out what work they have missed and are still expected to turn in assignments on the scheduled due dates. If an absence is unavoidable it is strongly recommended to contact the instructor before the absence and make any arrangements to turn in work early. Special exceptions to these policies include religious observances and absences due to an event or purpose that is officially recognized by the University. Students are expected to notify me in advance of these special exceptions and they will be accommodated on an individual basis.

Tardiness:

Being late to class or when returning from break will be recorded as a tardy and can affect a student's grade as it impacts participation. Tardy policy states that any student who is more than ten minutes late will be considered absent for that class. A student who is late more than three times will receive an automatic 10 point deduction from their participation grade with additional 5 point deductions for each additional instance of tardiness.

Code of Academic Integrity:

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center.

CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

Disability Policy:

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/

Current Catalog

Preproduction, Prototyping and Previsualization (DIG 6546) 4 credits
Prerequisite: Admission to M.F.A. in Media, Technology and Entertainment
Explores preproduction techniques and workflows in the production of large-scale creative projects. ~~Students create a number of products around developing a core idea that will culminate in a pitch/project book and/or demo reel of the idea's development throughout the course.~~

~~Interactive Interface~~ Design (DIG 6605) 4 credits
~~Introduces design interactive interfaces for software and hardware. By emphasizing a conceptual approach toward interacting with technology, students learn creative coding techniques using the processing language and Arduino microcontroller. These techniques bridge~~ the gap between design, technology, engineering and art.

New Catalog Entries

Preproduction, Prototyping and Previsualization (DIG 6546) 4 credits
Prerequisite: Admission to M.F.A. in Media, Technology and Entertainment
Explores preproduction techniques in the production of large-scale creative projects. Students visualize a concept through illustrations, storyboards, animatics, and interactive prototypes.

Immersive Extended Reality Design (DIG 6605) 4 credits
Creative exploration of immersive design frameworks in a game engine for extended reality interfaces such as the latest mobile devices and headsets. Projects bridge the gap between design, technology, engineering and art.

Immersive

GRADUATE COLLEGE

MAR 22 2019

Received