

# AET 339 AR AND VR FOR GAMES

**Instructor:** MJ Johns

**Meetings:** T 5:00PM-8:00PM

**Text:** N/A

**Location:** DFA 4.126

**TA:** N/A

## ABSTRACT

An introduction to exploring virtual and augmented reality through creative content creating in Unity. Examines the technical and creative aspects to designing experiences that target VR and AR hardware and software, and understanding how the hardware functions as a physical interface for the user.

## OBJECTIVE

Content creation for VR and AR requires knowledge of design, technical, and artistic disciplines. This course will allow students to choose one of the three to focus on while working on a small team to create content. Although each student will choose one area to focus on, all students will walk away with an understanding of the content creation pipeline for VR and AR, and an ability to work competently with: the HTC Vive, the Google Daydream, and ARCore for Android AR.

## PROCESS

We will work through demonstrations, class activities, and 3 larger projects. Each project will focus on one specific hardware type:

- Room-scale VR (HTC Vive)
- Mobile VR (Google Daydream)
- Android AR (Google Pixel with ARCore)

Note: It is common practice in the coding world to use and learn from examples. "Borrowing" source code from others is acceptable, provided it is licensed for reuse and is referenced in code comments.

## ASSESSMENT

All in-class activities will be graded as part of the professionalism grade. The three larger projects will be worth 30% each, and will be graded based on the technical, design, and artistic quality. The remaining 10% of the final grade is based on professionalism which is earned by attending class and participating in the activities.

Group projects will receive one grade shared by all team members, except in circumstances where teammate issues are discussed with the instructor prior to submitting the assignment.

No late work will be accepted. No incompletes will be given. If you feel you will not be able to complete all work on time, you should ask the instructor for a grade of Q or drop before the deadline for doing so passes.

## CLASSROOM POLICY

### DEVICES

- Must be kept in silent mode unless an emergency notification is expected (please discuss this with me prior to class).
- Can be used for research and class note taking, but not for social media (unless related to class activities)

### FOOD/DRINK

- Food is not allowed in class.
- Drinks in closed containers are permitted but must be kept on the floor or out of sight when not in use.

## UNITS OF STUDY

Note: Each topic will cover a variety of different types of hardware and software in that area, however only one hardware type will be used for demos and projects in that section. The hardware used in the class includes HTC Vive, Google Daydream, Google Pixel for AR.

### ROOM-SCALE VR

- VR Hardware: Headsets, trackers, hand-tracked controllers, other tracking devices
- Software: Unity, Vive SDK, SteamVR
- Room-Scale User Experience

### MOBILE VR

- Mobile Hardware: Daydream headset, Daydream controller, Gear headset, Leap Motion
- Software: Unity, Android SDK, Integrated VR Support
- Mobile VR User Experience

### AUGMENTED REALITY

- AR Hardware: Google Pixel, Tango, iPhone, Merge VR
- Software: ARCore, ARKit, Vuforia
- Augmented Reality User Experience

## REFERENCE

A short list of useful resources for VR and AR

- [Game Prototyping in Unity](#)
- [VR Fundamentals](#)
- [Unity Intro Series](#)

## SEMESTER SCHEDULE

## WEEK 1 (JAN 16)

- Syllabus and course intro
- Lecture: History of Virtual Reality
- Play existing VR experiences (Foundry)
- Skill/Software survey and role selection

## WEEK 2 (JAN 23)

- Lecture: Overview of Room-Scale VR
- Activity: Setting up the Vive (Unity, SDK, SteamVR)
- **First project and teams assigned**
- Lab: Designing a VR experience

## WEEK 3 (JAN 30)

- Lecture: Art and tech considerations for VR
- Activity: Testing art and interactions in Room-Scale VR
- Lab: Integrate art and interactions

## WEEK 4 (FEB 6)

- Lecture: Testing and User Experience
- Lab: Polishing project 1, adding feedback and vfx/sfx

## WEEK 5 (FEB 13)

- **Project 1 Due**
- Demos and post-mortems
- **Second project and team assigned**
- Lecture: Overview of Mobile VR
- Lab: Designing for mobile

## WEEK 6 (FEB 20)

- Lecture: Performance and UX considerations for mobile
- Activity: Testing and analyzing mobile VR experience (Google Daydream)
- Lab: Deploying and testing a mobile VR app

## WEEK 7 (FEB 27)

- Lecture: Working with Unusual Hardware
- Activity: Progress presentations

**WEEK 8 (MARCH 6)**

- **Project 2 Due**
- **Third project and teams assigned**
- Demos and post-mortems

**WEEK 9 (MARCH 13)**

NO CLASS – SPRING BREAK

**WEEK 10 (MARCH 20)**

- NO CLASS (GDC)
- Video Lecture: Overview of AR
- Lab: Designing an AR experience

**WEEK 11 (MARCH 27)**

- Lecture: Art and tech considerations for AR
- Activity: Testing art and interactions in AR
- Lab: Integrating art and interactions

**WEEK 12 (APRIL 3)**

- Lab: Testing and refining AR apps

**WEEK 13 (APRIL 10)**

- Lecture: Cross-platform support
- Activity: Converting an AR experience into a VR experience

**WEEK 14 (APRIL 17)**

- Lab: Polishing project 2, adding feedback and vfx/sfx

**WEEK 15 (APRIL 24)**

- **Project 3 Due**
- Demos and post-mortems
- Lecture: Jobs in AR and VR

**WEEK 16 (MAY 1)**

- Last day of class, review of all content, discussion and post-mortem

#### CLASS ATTENDANCE POLICY

As detailed above, attending class during the scheduled meeting times earns professionalism credit. Credit is NOT earned for arriving late, leaving early, or failing to attend class meetings. If attending a scheduled class meeting is not possible, students are expected to promptly notify the instructor of extenuating circumstances.

#### Q DROP POLICY

The State of Texas has enacted a law that limits the number of course drops for academic reasons to six (6). As stated in Senate Bill 1231: "Beginning with the fall 2007 academic term, an institution of higher education may not permit an undergraduate student a total of more than six dropped courses, including any course a transfer student has dropped at another institution of higher education, unless the student shows good cause for dropping more than that number."

#### UNIVERSITY ATTENDANCE POLICY: RELIGIOUS HOLY DAYS

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

#### DOCUMENTED DISABILITY STATEMENT

Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities (SSD) at (512) 471-6259 (voice) or 1-866-329-3986 (video phone). Faculty are not required to provide accommodations without an official accommodation letter from SSD. academic honesty University of Texas Honor Code The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

#### BEHAVIOR CONCERNS ADVICE LINE (BCAL)

If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual's behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit <http://www.utexas.edu/safety/bcal>.

#### EMERGENCY EVACUATION POLICY

Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.
- If you require assistance to evacuate, inform me in writing during the first week of class.
- In the event of an evacuation, follow my instructions or those of class

instructors. Do not re-enter a building unless you're given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.