


CTAN504L Creative Production in Virtual Reality



Explore the intersection of cinematic and realtime VR storytelling utilizing Quest2 headsets, 360 cameras, 3D animation, and realtime interactive techniques.



USC Cinematic Arts
John C. Hench Division of Animation & Digital Arts

2 Units, Instructor: Eric Hanson, hanson@usc.edu
Open to waive non-majors and undergrads.



CTAN504L Creative Production in Virtual Reality

17922D Fall 2022, 2 units

Time: Lecture Tuesdays 1:00-3:50a PST, Optional Lab Fridays 10:00-12:50a PST

Location: RZC117

Instructor: Eric Hanson, hanson@usc.edu , www.blueplanetvr.com

A visual effects designer specializing in the creation of digital environments and effects for feature films, Eric Hanson has worked with noted visual effects houses such as Digital Domain, Sony Imageworks, Dream Quest Images, and Walt Disney Feature Animation. His credits include *The Fifth Element* (1997), *Bicentennial Man* (1999), *Cast Away* (2000), *Hollow Man* (2000), *Mission to Mars* (2000), *Spider-Man* (2002) and *Atlantis* as well as many special-venue films. Hanson is currently CEO of Blueplanet VR, a VR practice specializing in 360 capture technology, cultural heritage, and science visualization content. With a background in design, architecture, photography, and visual effects, Eric finds enormous potential in volumetric VR for creating important and meaningful experiences. Eric has also been on faculty at the USC School of Cinematic Arts since 2001, having developed curriculum in visual effects and virtual reality. Above all, Hanson wishes he could sleep more.

Office Hours: Online, schedule at calendly.com/hansonusc

Teaching Assistant: TBD

IT Help: Creative Tech Help Desk, creativetech@sca.usc.edu or 213-821-4571

Course Description:

A creative VR studio course exploring the intersection of linear cinematic film and realtime immersive experience. Techniques employed will cover live-action capture with the 360 cameras, animated 3d animation utilizing Autodesk Maya, and realtime immersive narrative utilizing Unity/Unreal and Oculus Quest2 headset. Intent of the class is to build one's maker skills and to advance the art and creative expression in the maturing field of virtual reality.

Prior knowledge of Adobe After Effects, Autodesk Maya, and Unity/Unreal helpful.

Course Requirements and Grades:

- Completion of 3 projects (90%):

1. Brief 3D art study using either Tilt Brush, Gravity Sketch, or Multibrush (15%)
2. Brief mixed-media study using AfterEffects (15%)
3. Fully completed short linear cinematic 3DOF VR film and/or interactive realtime 6DOF media experience, (60%)

Unfinished works-in-progress will be considered incomplete. Originality, creativity, and quality of project expected.

- Final exam, multiple-choice, from lecture notes: (10%)

Attendance:

ATTENDANCE WILL BE TAKEN 10 MINUTES AFTER THE START OF CLASS. Attendance and participation are vital as many weekly assignments will be both introduced and started during the class. You will be marked tardy after ten minutes and absent after 60 minutes. Three or more absences are ground for failing the class. Three tardies equals an absence. If a student is to be absent from a class (barring an emergency) the instructor must be notified prior to the absence via phone or email.

Course Length:

15 weeks, meeting once a week, three hours each class meeting and three hours lab.

Optional Books:

"The Filmmaker's Eye: Learning Cinematic Composition", Gustavo Mercado, Focal Press, 2010

"Exploring 3D: The New Grammar of Stereoscopic Filmmaking", Adrian Pennington, Focal Press, 2012

"3D Storytelling", Bruce Block, Phillip McNally, Focal Press, 2013

"The VES Handbook of Visual Effects", Jeffery Okun, Susan Zwerman, Focal Press, 2010

Schedule:

Week 1 Aug 23 CLASS INTRO

Lecture: Intro to class, discussion of project structure and approaches, USC production protocol. Introduction to current state of virtual reality field.

Lab Assignment: Familiarize yourself w/ the Quest, view sample VR content.

- Review of class and projects structure
- Current state and expansion of VR field
- History of immersion and virtual reality
- Storytelling types via 3DOF, 6DOF
- Introduction to VR ecosystems, content portals
- Introduction to Quest headset

Week 2 Aug 30 FUNDAMENTALS OF IMMERSIVE MEDIA

Lecture: Key concepts of immersion.

Lab Assignment: Create 3D art project w/ VR app.

- Physiology of immersion
- Importance of stereoscopy
- Differences/relation to cinema
- Story ideation
- Quest functions and settings
- Tilt Brush, Gravity Sketch demo

Week 3 Sept 6 **NARRATIVE IN CINEMATIC VIRTUAL REALITY**

***3D ART PROJECT DUE**, review work.

Lecture: Review of cinematic storytelling.

Lab Assignment: Create VR project pitch stack.

- Traditional linear storytelling structures
- Branching story
- Agency versus passivity
- Participant or observer
- 3DOF vs 6DOF production techniques
- Working with latlong spherical image format
- Omni vs forward facing

Week 4 Sept 13 **SHOOTING FOR CINEMATIC VIRTUAL REALITY**

***VR PROJECT PITCH DUE**, review pitches.

Lecture: Review of digital tools, technique, pipelines.

Lab Assignment: Create storyboard for final project.

- 360 mono, 360 stereo, 180 stereo
- Cameras for VR
- Ambisonic audio capture
- Digital file formats
- Stereo previewing
- Lightfield futures
- AfterEffects demo

FIELD TRIP (OPTIONAL) Sat Sept 17th

Week 5 Sept 20 **ANIMATION AND CGI FOR VIRTUAL REALITY**

Lecture: Review of CGI, animation methods.

Lab Assignment: Create mixed media art project w/ AfterEffects.

- Methods of assembled shot construction
- Autodesk Maya and 3d animation
- Redshift stereo spherical camerawork
- Use of panoramic imagery
- Pre-built model options
- Use of photogrammetry
- Use of AfterEffects for 360 layout

Week 6 Sept 27 **FUNDAMENTALS OF REALTIME MEDIA**

Lecture: Review of digital tools, technique, pipelines.

Lab Assignment: Continue work on final project.

- Realtime versus cinematic VR
- Realtime engine tech review
- Roomscale experiences
- Review of user interaction

Week 7 Oct 4 **REALTIME PRODUCTION**

Lecture: Review of digital tools, technique, pipelines.

Lab Assignment: Continue work on final project.

- Review of modeling options for realtime engines
- Marketplace for UE, Unity asset store.
- Export from Maya, Blender
- Optimization technique
- Authoring issues

Week 8 Oct 11 **IMMERSIVE FUTURES**

Lecture: Future projection and tangents for VR.

Lab Assignment: Continue work on final project.

- Virtual Production use of VR
- Relation to fulldome
- Metaverse Implications
- NFT's

Week 9 Oct 18 **PRODUCTION OF FINAL PROJECT**

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 10 Oct 25 **PRODUCTION OF FINAL PROJECT**

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 11 Nov 1 **PRODUCTION OF FINAL PROJECT**

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 12 Nov 8 PRODUCTION OF FINAL PROJECT

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 13 Nov 15 PRODUCTION OF FINAL PROJECT

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 14 Nov 22 PRODUCTION OF FINAL PROJECT

Lecture: Review progress, assist students.

Lab Assignment: Continue final digital production of project.

- Assist students with individual projects

Week 15 Nov 29 LAST CLASS MEETING, REVIEW

Lecture: Wrap up.

Lab Assignment: Finalize digital production of project.

- Review, critique of finished VR content
- Future directions for immersive media

Study Days: Saturday Dec 3- Tues Dec 6

Finals Week: FINAL EXAM Tuesday Dec 13, 11:00a-1:00a PST, FINAL PROJECT DUE

LAB ACCESS

For weekdays, Monday - Friday, SCB102 is open from 8 am - 10 pm only and RZC is open all week from 8:00 am - 10 pm – Monday to Friday and 8:30 am – 10pm on weekends. There is no card access for non-majors. They can be given limited weekend access for SCB – noon – 8pm. A request has to be made by faculty to Operations operations@cinema.usc.edu with the first and last name of the student and their 10 digit USC ID#.

Everyone is encouraged to use RZC117 on weekends.

Alternatively, Teradici can be used to access the same machines.

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

Student Health Leave Coordinator – 213-821-4710

Located in the USC Support and Advocacy office, the Health Leave Coordinator processes requests for health leaves of absence and advocates for students taking such leaves when needed. <https://policy.usc.edu/student-health-leave-absence/>

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298 equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298 usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776 dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support & Intervention - (213) 821-4710 campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101 diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC) ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

PLEASE NOTE:

FOOD AND DRINKS (OTHER THAN WATER) ARE NOT PERMITTED IN ANY INSTRUCTIONAL SPACE IN THE SCHOOL OF CINEMATIC ARTS COMPLEX