

**PRIN 526 Virtual Maker Lab**

**Units: 2**

**Spring 2021**

Mondays & Wednesdays - 10 to 11.50pm Pacific Time

Lecture/Lab Time

Location: IYH 110 and Online

**Instructors:** Carsten Becker, Chris Swain

**Office:** Slack or Zoom.

**Office Hours:** Per Individual Request

**Contact Info:** [carstenb@usc.edu](mailto:carstenb@usc.edu)

[cswain@usc.edu](mailto:cswain@usc.edu)

**Slack:** iya-becker.slack.com

Allow up to 24 hours for replies to emails and messages.

**Grader and/or Classroom Assistant/s:** TBD

**Office Hours (if applicable):**

**Contact Info:**

**IT Help:** <https://iovine-young.usc.edu/ait/index.html>

**Hours of Service:** 8:30am - 5:00pm

**Contact Info:** [iyhelp@usc.edu](mailto:iyhelp@usc.edu), 213-821-6917

*Experience is not what happens to you.  
It is what you do with what happens to you.*

- Aldous Huxley

## Course Description

Designing effective and compelling product-related multimedia experiences, including through the application of intermediate tools and techniques related to state-of-the-art creative hardware and software.

Students will be given tools and inspiration to foray into Augmented and Mixed Reality platforms to create in multimedia landscapes without bounds.

## Key Learning Objectives

1. Understand the potential of immersive media in the launch, user engagement and/or function of a product or service.
2. The experience itself can be the product.

## Detailed Objectives and Outcomes

1. Use strategy, writing and production tools to create compelling content that relate to the design, usability and communication of product ideas.
2. Learn hardware and software applications for designing and programming XR experiences.
3. Exercise planning, teamwork and collaboration as part of the creation process.
4. Use acquired skills to innovate within the medium.
5. Create work that adds to your portfolio in meaningful ways.

Specific Skills to be Covered:

- Creation of visual assets (Adobe Creative Cloud, photography, 3d software)
- Understanding technical pipelines in XR production
- Intermediate use of tools for Augmented Reality, 360 Video, VR, and the Unity game engine
- Practicing a productive creative process
- Fulfill various roles in a production team and together strive for success
- Regularly exercise group crit
- Documenting the process and outcome of your projects (in the form of video)

## Expectations

To master this course, student needs to...

1. Develop a solid understanding of XR: Augmented Reality, Virtual Reality, the tech that make these possible and the current status and success of these media forms.
2. Acquire and demonstrate the software skills for building XR experiences. Employ various forms of immersive media to create adequate applications.
3. Apply and expand your skills in video/audio techniques and storytelling to pitch and later document your projects.
4. Define purpose and alignment for the XR applications you build in relation to a product, business or research you are pursuing.
5. Create immersive experiences that engage an audience/users in discovery and compels them to act.

## Prerequisites:

General understanding of product development, 3d concepts and interaction models.

## Recommended Preparation:

- 1) Research recently developed products, digital and physical, that use interactive visuals to enhance their functionality or appearance.
- 2) Familiarize yourself if needed with the concepts of augmented reality, user experience and immersive experiences (projection mapping, 360 video, virtual reality)

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## Nature of this Course

This is a fast-paced course which will immerse students in a range of media tools. Through lecture and practice, they will become the authors, designers, deployers and documentarians of media forms that create meaningful communications and user interaction. Assignments are based on narrative and interactive concepts that deepen and expand existing skills in media creation.

Student responsibilities: Students need to develop their project goals and execution on a base of research, thematic merit and relevance to their career goals. Furthermore instructors expect everyone to take an active role in the success of the full group through discussion in the classroom, sharing of ideas, actively providing constructive feedback for your peers, observing your own learning process and taking initiative in everyone's growth as media-savvy makers.

## Motto

PLAY – EVALUATE – CREATE

Equal parts discovery, product analysis, ideation and execution.

## Required Hardware/Software

Students must have access to the following:

On day 1 of instruction:

- **Laptop Computer** with authorized installs of the following software:
  - Apple Keynote (free) to create visual presentations (can use InDesign, Sketch or Figma if preferred)
  - Adobe Creative Cloud (If you do not already have an Adobe CC account, you will need to purchase it through the online bookstore and the Academy will set up an account for you (see below)
  - Bootcamp Assistant (free Utility pre-installed on all Macs)
  - Tbd: Apple Xcode 12 (requires MacOS 10.14.6 or later)
  - Windows 10 Education (free with student account)
  - Unity - Student license with GitHub account and install of the latest version
  - iTunes or Google Play account to download free AR Creation software
- Cloud Storage account (Google Drive, Dropbox, Microsoft OneDrive et.) for safely storing your project files
- Instructors recommend to keep up-to-date backups on a hard drive as well
- For in-class instruction, **Headphones** to use with your laptop. Over-ear / closed type only (no ear buds) so you can listen without disturbing others. Some recommended models: Audio Technica ATH-M50x, Sony MDR-7506 or equivalent

As the course progresses, instructors may announce other software necessary for work in labs and projects such as

- 3d photo stitching app (free or trial)
- Adobe Mixamo and Fuse (free), can be substituted with a 3d software package you are familiar with
- Unity Game Engine (free)

## Academy Equipment

When permitted by USC health regulations, we will utilize the Academy's Mixed Reality Lab and sound, video and lighting equipment to create audio and video content. You'll receive proper training in the use of the equipment so you can use these tools confidently in your labs and projects. In order to check out valuable equipment you may need to acquire certification.

Equipment that is returned broken may uncertify you for another check-out.

## Software Proficiencies

To work in spatial applications of XR, an understanding of 3D space is required. XYZ coordinates, transformations, rotations etc. Furthermore, video terminology, lights, shot sizes should be fluent. Students may want to refresh in these area if necessary.

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## Recommended Readings and Supplementary Materials

Books:

“The History of the Future” by Blake J. Harris

“The VR Book: Human-Centered Design for Virtual Reality” by Jason Jerald

Blogs:

<https://usdzshare.com/>

<https://vr-tigers.com>

<https://ngrp.github.io/FabriqueMobile/>

[blogs.unity3d.com](https://blogs.unity3d.com)

Instructors may publish additional recommended readings throughout the term as it relates to the individual areas of study and topics we touch upon.

## Assessments and Assignments

**Weekly Assignments** are quick skill recaps or preparatory tasks necessary to move ahead. They are always due at the next meeting.

**Lab Exercises** are opportunities for you to fill lacquired concepts with purpose, or a creative aspiration.

Likely, one lab will be the development of an augmented reality experience of your choice (Lab mentor: Prof. Becker). For the second lab, you will create a working experience or interface in VR under Prof. Swain’s guidance.

Your **Term Project** is something you will be working on throughout most of the semester. You will develop a purpose-driven, individual combination of acquired to plan, build and showcase your creation.

Students will have flexibility in the format of their term project, but purpose and profoundness of the concept will weigh into the acceptance of the proposal for your term project. Examples are a substantial virtual enhancement to a physical product, or a fully digital product, or the planning, execution and documentation of an immersive experience.

## Term Project Milestones

Instructors reserve the right to adjust

*Due Dates:*

<i>Week 4</i>	Milestone 1	<i>Written Outlines (Two Ideas)</i>
<i>Week 5</i>	Milestone 2	<i>Show User Journey</i>
<i>Week 7</i>	Milestone 3	<i>Innovation and Technical Approach</i>
<i>Week 11</i>	Milestone 4	<i>Prototype 1</i>
<i>Week 13</i>	Milestone 5	<i>Prototype 2 (graded for improvements)</i>
<i>Week 15</i>	Milestone 6	<i>Final, and Write Up</i>

Instructors will give individual guidance along these steps

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## Grading Breakdown

	Points	% of Grade
Participation <sup>1</sup>	80	10
Weekly Assignments (12)	180	22.5
Labs (2)	240	30
Term Project <sup>2</sup>	240	30
Final Presentation/Exhibit	60	7.5
<b>TOTAL</b>	<b>800</b>	<b>100</b>

<sup>1</sup> Participation grade is based on the substance of your interactive and verbal contribution across all channels of the course experience (classroom, Zoom, Mural, Slack)

<sup>2</sup> Points will be given across the 6 Milestones

## Grading Scale (Example)

Course final grades will be determined using the following scale

A	94-100
A-	90-93
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

## Assignment Submission Policy

All labs, projects and assignments are due at the date and time specified in the syllabus. Projects that are more than 24 hours late will receive a 50% deduction in points. Projects that are more than 7 days late will receive 0 points. Be sure to check Blackboard if you have to miss a class. You are responsible for any materials presented and assignments made even if you are not in class that day.

## Extensions

Each student may ask for an extension on one of her/his assignments. Above Assignment Submission Policy strictly applies to the extension date given.

## Grading Timeline

You will receive grades for classroom quizzes, check-ins, labs, projects and other assignments within two weeks of submission.

## Academy Attendance Policy

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected. Each student will be allowed two excused absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-

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critical issues, and to use them carefully for illness or other issues that may arise unexpectedly. Except in the case of prolonged illness or other serious issue (see below), no additional absences will be excused. Each unexcused absence will result in the lowering of the final grade by 1/3 of a grade (e.g., an A will be lowered to A-, and A- will be lowered to a B+, etc.). In addition, being tardy to class will count as one-third of an absence. Three tardies will equal a full course absence.

Students remain responsible for any missed work from excused or unexcused absences. Immediately following an absence, students should contact the instructor to obtain missed assignments or lecture notes and to confirm new deadlines or due dates. Extensions or other accommodations are at the discretion of the instructor.

Automatically excused absences normally may not be used for quiz, exam or presentation days. Using an excused absence for a quiz, exam or presentation, such as in the case of sudden illness or other emergency, is at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events or opportunities. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

**Additional Policies**

Should the needs of the class dictate, I reserve the right to modify the class schedule and assignments. Any substantive changes will be announced in class and posted in Blackboard and/or Slack.

**HOW TO PURCHASE SOFTWARE AT THE DISCOUNTED ACADEMY RATE THROUGH THE USC BOOKSTORE:**

The following first year software are now available for purchase **online** through the USC Bookstore at the Academy discounted rate:

<b><u>Software</u></b>	<b><u>IYA Short-Term License at USC Bookstore</u></b>
<b>Adobe Creative Cloud</b>	\$70 2020-2021 annual license (active through July 2021)

To purchase:

- Visit: <https://commerce.cashnet.com/IOVINE>
- Select the software license(s) you would like to purchase by clicking “View Details” or the software title, and make your purchase
- You will receive an order confirmation receipt at the email address you provided
- You will be notified by email when the software license has been activated

If you have any questions about this process, please do not hesitate to contact Academy IT Support at [iyhelp@usc.edu](mailto:iyhelp@usc.edu).

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## Class Schedule

Note: To accommodate changing modalities and access to equipment, I reserve the right to alter the weekly topics and assignments. Adjustments will be made with the objective of optimizing the course's progress and opportunities for students.

	Lectures/Discussions	Assignments due	Techniques and Tool Exploration
<b>Week 1</b>	<i>Monday: MLK (holiday)</i> Meet your instructors History of XR Structure of Course, Q&A What is immersive?		
<b>Week 2</b>	Augmented Reality - <i>from</i> Orientation to Collaboration		ARKit3 Reality Composer
<b>Week 3</b>	Redefining the Reality of Space with Lidar, Collaborative AR, Lidar, WebAR Intro to Term Project, Q&A		Adobe Aero
<b>Week 4</b>	Immersive Design Guest Speaker / tba	Due: Term Project - Written Outlines (Milestone 1)	Unity Onboarding
<b>Week 5</b>	<i>Monday: Presidents Day (holiday)</i> Discuss Term Project Timeline	Due: Term Project - User Journey (Milestone 2)	Unity
<b>Week 6</b>	Guerilla Dev/Bottom Up Mixed Reality and Dreamwalker – Keys to the Future?	Due: Lab 1 (Becker)	Unity
<b>Week 7</b>	Unity – More than a Game Engine	Due: Term Project - Innovation & Technique (Milestone 3)	Unity Camera Animation, Lights
<b>Week 8</b>	VR Fundamentals Guerilla Dev/Listening to the App		Unity Windows 10 Instalation + BootCamp + Walkthrough

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<b>Week 9</b>	Framework for Experiences: Authoring AR Considerations for User Journey in XR		Xcode/Unity iOS Extension
<b>Week 10</b>	SXSW Report Convergent Products		VR Student Challenge
<b>Week 11</b>	From Unity to Oculus Quest 2 Spatial Prototyping	Due: Term Project - Prototype 1 (Milestone 4)	Unity Gravity Sketch
<b>Week 12</b>	Blue Ocean XR Challenge Term Project	Due: Lab 2 (Swain)	Async Oculus Dev Training
<b>Week 13</b>	Documenting your Term Project	Due: Term Project - Prototype 2 (Milestone 5)	Student Choice
<b>Week 14</b>	State of XR/Product Announcements		Student Choice
<b>Week 15</b>	Future of Computing	Due: Term Project – Final and Documentation (Milestone 6)	Student Choice
<b>Finals Week</b>	Final Presentation	Exhibit	

## 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](http://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](http://policy.usc.edu/scientific-misconduct).



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### **Support Systems:**

*Student Health Counseling Services - (213) 740-7711 – 24/7 on call*

[engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

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

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

[suicidepreventionlifeline.org](http://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 Services (RSVP)*

-213-740-9355 (WELL)

<https://studenthealth.usc.edu/sexual-assault/>

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

Relationship and Sexual Violence Prevention and Services provides immediate therapy services for situations related to gender- and power-based harm (e.g., sexual assault, domestic violence, stalking). (wording from the site)

*Office of Equity and Diversity (OED) | Title IX - (213) 740-5086*

[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help a survivor of 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.

*USC Policy Reporting to Title IX (213) 740-5086*

<https://policy.usc.edu/reporting-to-title-ix-student-misconduct/>

The university encourages individuals to report prohibited conduct to the *Title IX Office*. Individuals can report to the university *Title IX Coordinator* in the *Office of Equity and Diversity*.

*Bias Assessment Response and Support - (213) 740-2421*

[studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

*The Office of Disability Services and Programs - (213) 740-0776*

[dsp.usc.edu](http://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 Support and Advocacy - (213) 821-4710*

[studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

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*

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[diversity.usc.edu](http://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](http://dps.usc.edu), [emergency.usc.edu](http://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) 442-120 – 24/7 on call*

[dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.