ACAD 217 Extended Reality Design
Units: 4

Fall 2024

Location: Iovine & Young Hall,

Instructor: Carsten Becker
Office: Zoom
Office Hours: As announced, or per individual request
Contact Info: Preferred communication channel is Slack
DM me in the **iya-becker.slack.com** workspace **For
grades-related questions: carstenb@usc.edu**
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://uscedu.sharepoint.com/sites/IYAStudent/SitePages/IT-Resources.aspx
Hours of Service: 8.30 am – 6.30 pm
Contact Info: iyahelp@usc.edu

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

- Aldous Huxley

Course Description

In playful discovery, skill-building labs, lectures and project work, students dive into the potential of Extended Reality (xR) for creating designs, new experiences, technologies and entrepreneurship. A strong focus on innovation in life-enhancing and future-casting applications draws the Iovine and Young perspective of designing in XR with purpose.

Students will gain an expert understanding, inspiration, and the design skills to foray into Augmented (AR), Mixed (MR), or Virtual Reality (VR) to become designers of experiences that engage audiences.

Students build skills in creating experiences through knowledge and practice with XR tools. They will have opportunity to connect with creators and industry guests in the XR space.

Learning Objectives and Outcomes

Understand the potential of Extended Reality (XR) experiences for new ways to experience the world, raise awareness, create, or launch a product or service. See their context within spatial computing and Web3.

Gain an understanding of the cognitive and behavioral processes involved in sensory-spatial experiences. Design with knowledge, empathy, perspective, productivity, health, and journalism as your goals.

Deepen your creative thinking and maker skills in media. Through exposure to the most innovative forms of media and hands-on learning, practice infusing user-centric benefits such as interactivity and perspective-taking into media narratives and experiences.

Study the importance of desirability and viability in existing interactive media formats and conceive future forms of experiences that provide the qualities to become sustainable platforms.

Understand and the iterative process of creative making. Learn to prioritize and improve your time management skills to be efficient and iterate frequently.

Creative Storyteller Skills

1. Build meaningful and innovative interactions for diverse and inclusive audiences.
2. Learn to craft visual assets for XR experiences (3d models, textures, UI elements)
3. Recognize and pursue UX and UI design for XR experiences as a key component.
4. Design in temporal and spatial dimensions.
5. Ability to ideate and successfully communicate *all* aspects of an immersive experiences (goal, audience appeal, feasibility, mechanics, user experience and impact).

Prerequisites

None. Fundamental design and object-oriented programming skills will be beneficial in everything you make in this course. Completion of ACAD-187 or self-taught 3D will also be helpful (but isn't required).

Expectations

To get the most out of this course, a student will…

1. Engage with newly gained insights beyond the classroom. Be actively curious, try out new releases in the extended reality space and share your experience with the group.
2. Follow-up on skill training during class with personal study. Finish work started in the classroom async and share with the instructor even if not prompted.
3. Bring a personal standpoint to your work in the course wherever you can.

What **you** can expect: Lots of new impressions, experiences to try out and build expert opinions on 😉
Also, spending an average of 3 hours outside of class sessions for preparation, self-teaching, assignments, and project work. In weeks before projects are due, this may go up to 7 hours outside of class time. You will never be expected to spend more than 12 hours per week on the course total (in-classroom and async).

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Technological Proficiencies and Software/Hardware Required

As a foundational course, no technological proficiencies are required. All students *should* bring a strong interest in interaction, design and purpose (also see *Expectations* section above).

- **Laptop Computer** Mac: M1 or M2 chip (MacBook Pro with 16GB of RAM recommended) with min. 200GB of free hard drive space and Ventura 13.4 or newer installed

Windows: i7 processor or better with min. 200GB of free hard disk space, Windows 10 or 11 installed.
It is highly recommended for students with a Windows laptop to **also bring a recent iPad** (2020 or newer) as much software we use is Apple-centric

- **iPhone 11** or newer, or recent upper segment Android phone with 25% free storage

In the process of the course, you will also need to install **required software on your laptop**:

  Lens Studio (free)

  Shapr3d (free with edu license), or another 3d program the student is already proficient in

  Unity (free with edu license)

- install a variety of apps **on your phone** that may require setting up an account. This also requires…

  An iTunes or Google Play account to download free mobile apps

- 1TB of free space in your USC-managed Google Drive for safely storing your project files

Academy Equipment

We may utilize the Academy's Mixed Reality Lab, sound, video and lighting equipment to create media content, and VR headsets to research, audition and publish VR work. Ask your instructor or the Systems personnel for proper training in the setup and use of the equipment so you can utilize these tools confidently in exercises and projects. Not having spent the proper time to figure out their full use will not be accepted as a valid reason for delays in submitting your assignments.
To check out valuable equipment you may need to acquire certification.
Equipment that is returned late or broken may lead to delays or restrictions in your subsequent check-out.

USC Technology Rental Program

If you need resources to successfully participate in your classes, such as a laptop or internet hotspot, you may be eligible for the university's equipment rental program. To apply, please submit an USC Technology Rental Program Application

HOW TO PURCHASE OPTIONAL SOFTWARE AT THE DISCOUNTED ACADEMY:
For classes that require them, the following software are available for purchase **online** through the USC Iovine and Young software catalog at the Academy discounted rate:

Software	IYA Short-Term License at USC Bookstore
Adobe Creative Cloud	$70 2023-2024 annual license
Apple Logic Pro	$35 semester licenses
Apple Final Cut Pro	$35 semester license

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, please do not hesitate to contact Academy IT Support at iyahelp@usc.edu.

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Required Reading

"UX for XR" (I'll announce the reading assignments in classroom)
by Cornel Hillmann (Apress, 2019) available as download from the USC Library
or as Softcover Book, ISBN 978-1-4842-7019-6 ($37.99 at barnesandnoble.com)

Recommended reading:

"Experience on Demand" (Research on the cognitive effects and potential of VR)
by Jeremy Bailenson (Norton, 2018) - Paperback, $16.95 at barnesandnoble.com
Available for loan-out at Leavey Library

"Storytelling for Virtual Reality"
By John Bucher (Focal Press, 2017) – Paperback from $39 on Amazon Download
free from Taylor Francis Online

"Using Wearable Devices to Participate in 3D Interactive Storytelling"
By Alex Mitchell (Springer International Publishing, 2021)
Available as download from the USC Library

"Storytelling for New Technologies and Platforms"
By Ross Berger (CRC Press, 2022) – Paperback from $51 on Amazon
Download free from Taylor Francis Online

"Designing Interactions for Music and Sound" - Edited by Michael Filmowicz
Available as download from the USC Library

Grading

Assessment Category	Points	% of Grade
Participation[1]	75	12.5
1-Hour-or-less Prompts[2]	120	20
Ideation Exercises	75	12.5
Tests	90	15
Projects	240	40
TOTAL points max. possible	600	

[1] = Attendance + regular contributions to the discussion in the classroom and in our white-boarding sessions for full points. Unique ways of contributing are welcome also – please communicate.

Letter Scale

Course final grades will be determined using the following scale:

A	95-100		C	73-76
A-	90-94		C-	70-72
B+	87-89		D+	67-69
B	83-86		D	63-66
B-	80-82		D-	60-62
C+	77-79		F	59 and below

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Understanding Assessment Types and Definitions

[2] ***1-hour-or-less Prompts*** recall or complete material from class. They might be reading or viewing assignments, completing a class exercise, reflection, or a preparation necessary to move ahead. Prompts are <u>always due at the next meeting</u>.

Tests recall concepts and technical knowledge that will be critical to apply in your Projects.

Successful ***Ideation Exercises*** are proof that you understand and can apply the concepts and strengths extended reality applications with strategic and creative thinking.

Projects require you to build interactive prototypes, along with demonstration of research, self-ideation, strategic and creative thinking, and good time management. You may be assigned a role within a team.

There is no Midterm for this course.

For our **Final**, each student selects their two personal bests in projects and presents them

Assignment Submission Policy / Late Submissions

Assignments will be accepted after the deadline with the following grade penalties. Do not ask for extensions; the below are the extensions.

Submission in the 24 hours after the deadline	10% deduction
Submission between 24 and 48 hours after the deadline	20% deduction
Submission between 48 hours and 3 days after the deadline	50% deduction
Submission more than 3 days after the deadline	100% deduction

Keep copies of all your files and emails until the end of the semester.

Course 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 absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-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 ⅓ 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. Additionally, students who need accommodations for religious observations should provide advanced notice to instructors and student athletes should provide Travel Request Letters. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

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Unless students provide an accommodation letter from USC's Office of Student Accessibility Services (OSAS) or a letter from IYA Student Services detailing visa or travel restrictions, attendance and active participation is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor as soon as possible to discuss appropriate accommodations.

Students who are experiencing illness should not attend class in person. Please inform the instructor in advance of any class sessions that you can't attend for medical reasons, and accommodations will be arranged to view recorded lectures and submit alternatives to any missed class participation. Students will not be penalized for not attending class in person under these circumstances.

Iovine and Young Hall Cleanout

The Academy is unable to store student projects and materials beyond the end of the semester. Students must remove all projects and personal materials from the Creators Studio, lockers/locker room, and other classrooms by the end of each semester. **All projects and materials left in Iovine and Young Hall will be discarded two days after final exams end. No exceptions.**

Additional Policies

Classroom Norms

Students are expected to actively engage with the subjects of the course inside and outside of the classroom. Assigned papers should be informed by research beyond common knowledge. Your solutions to weekly prompts and your course project are expected to be fulfilled from a personal point of engaging your skills, possess thematic merit and relevance to your maker / portfolio goals. Furthermore, instructor expects all students to documenting your own learning process, take an active role in the success of the group through contributing to discussion in the classroom, sharing of ideas, voluntarily providing constructive feedback for your peers, and supporting each other as teammates.

To make the above possible, phones must be put away while in the classroom. Use of laptops is allowed only for tasks relating to our course. I recommend taking notes by pen in a notebook.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

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USC Learning Experience Evaluations

You'll be provided opportunity to give your feedback on the course during the last week of regular classes.

Course Schedule: Weekly Breakdown

> Notes: I reserve the right to modify weekly topics and assignments based on the group's progress. Any substantive changes will be announced in class and the course Slack channel.
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> *1-Hour-Or-Less Prompts* are always due the following course meeting and are <u>not listed</u> below.
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> There will be in-class lab time and instructor guidance for all projects.

	Lectures and Labs	Assignments (excl. 1-Hr-Prompts)
Week 1	AR, MR, Spatial Computing – Extended Reality in 2024 Course goals for successful XR design Mobile AR lab – anchoring AR in the physical world	Future Artifact Do an immersive activity and create an experience log
Week 2	Design for Immersion and Sensory Connections Screen Space and World Space Starting our ART unit: Extending spaces and narratives through engaging design Objects and environments	Bring Iovine and Young Hall to life with extended reality ideation
Week 3	Basics of 3D Design: Primitives, modeling, textures, export Layout for XR formats AR as co-creative Medium - Introduction to Lens Studio	3D Practice and Layout Exercise
Week 4	Lens Studio Lab (all week) Practice AR thinking with Events and Behaviors Building more engaging AR scenes	PROJECT 1 assigned: Create an Immersive AR Face Filter
Week 5	Lab/Review Time for Project 1 Deepening user engagement: Multiplayer concepts, Perspective-taking	WRITTEN TEST 1 (on XR Concepts and Lens Studio) Submit PROJECT 1
Week 6	Starting our PROGRAMMING unit: Realtime Engines Introduction to Unity Basics of Scripting in C#	Assigned PROJECT 2: Make a desktop game
Week 7	Space design, Cameras, Animation and Lighting in Unity Effective Process and Team Work for XR	Submit PROJECT 2 – Version 1 (Proof of Concept)
Week 8	Lab/Review Time for Project 2 Industry Guest Presentation (tba)	Submit PROJECT 2 - Version 2 (final)

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Week 9	Starting INTERACTION DESIGN unit: User experience (UX) basics The unique UX of XR	WRITTEN TEST 2 (on Realtime design and Unity)
	SPRING BREAK	
Week 10	Continuing our INTERACTION DESIGN unit: Basics of UI design, layout and logic Onboarding, guidance and feedback	Ideation Exercise for Educational or Training Application
Week 11	New formats in immersive storytelling Designing for headset experiences Mixed Reality – learning from VR and beyond Demo of developing for Apple Vision Pro	PROJECT 3 Ideation and Team-Building
Week 12	Lab/Review Time for Project 3 Outlines Device-specific labs (tbd – e.g. Snap Spectacles, Quest 3, other AR glasses)	Submit full PROJECT 3 Plan * attend format-specific labs
Week 13	Lab/Review Time for Project 3 Industry Guest Presentation (tba)	WRITTEN TEST 3 (on UX/UI of XR) Submit PROJECT 3 - Version 1
Week 14	Advancing your programming skills Lab/Review Time for Project 3	Project 3 User Testing Submit PROJECT 3 - Version 2
Week 15	Industry Updates Paths for XR at USC Rehearse Final Presentations	Project 3 User Testing Submit PROJECT 3 - Final Finalize Personal Presentation

Note: If progress in group is good, we will have time for Industry guest visits. I'll announce dates and company/person during the semester.

Important dates: No classes on March 12 and 14 (Spring Break)
May 2, 2-4pm – FINAL: Project Presentations

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Statement on Academic Conduct and Support Systems

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Policy for the use of AI generators
This course follows USC policy on AI.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

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988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL) – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086
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.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 740-0411
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101
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
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
Non-emergency assistance or information.

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

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.