

USC Iovine and Young Academy

*Arts, Technology and the Business
of Innovation*

IDSN 538 Extended Reality Technologies

Units: 2

Fall 2024

Fridays, 6 to 7.50pm Pacific Time

Location: Online (Zoom)

Instructor: Carsten Becker

Office: Zoom

Office Hours: As needed

Contact Info: Preferred communication channel is Slack

DM me in the iya-becker.slack.com workspace

For grades-related questions email: carstenb@usc.edu

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

Grader and/or Classroom Assistant/s: n/a

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

2-unit course that introduces students to exciting opportunities in spatial interactive design. Extending our physical world through augmented reality, sensing of locations, gesture and spatial computing engages millions of people daily in play, mobility, and learning. With the release of Apple's Vision Pro and other "mixed reality" headsets, these more immersive ways of experiencing and interacting might start to overshadow smartphones for interfacing with media and our digital lives.

Learn how sophisticated mapping of our world, visual and UX design, sensory interactions, and storytelling are blended to create new ways to discover and experience products, work, your commute, entertainment, education and much more.

About the Instructor

Carsten Becker is faculty lead for extended reality at the Iovine and Young Academy for the Arts, Technology and Business of Innovation. Joining USC in 2019 as a lecturer for design and communication, he developed the academy's curriculum in exploring creative technologies for the development of purpose-driven narratives and impact. He has created many industry connections for the academy and USC including with Niantic, Nike, Meta, Microsoft, Qualcomm, and Snap and teaches courses related to extended reality, spatial computing and other narrative technologies for IYA bachelor's and master's degrees.

In his professional practice, Becker is a studio owner and creative consultant for immersive content and experiences. A lifelong passion for visual storytelling and interactivity put him behind the camera on film sets, on stop motion stages, leading social AR teams, and as head of a creative 3D and effects studio. He's designed movie sequences, animation, avatars, and augmented reality games. His work has launched products and campaigns for A24, Adobe, Cirque du Soleil, Netflix, Marvel, Meta, Netflix, Snap and Sony. Carsten pursues the potential of maturing XR forms to surpass all existing mediums for human engagement. He works with design and development teams for AR, mixed reality, and Apple Vision Pro.

Becker is an active member of extended reality and spatial computing communities at conferences and social platforms. He is a lecturer and liaison for the Academy in USC's Fashion MFA and Minor programs, a mentor to the Neely MBA Ethics & Technology Fellows program, and faculty advisor of the Spatial SC student club for XR design and development.

Learning Objectives and Outcomes of this Course

- Solid knowledge in the components, capabilities, applications and formats of extended reality (XR), on market and on horizon
- Cognitive and behavioral considerations of user experiences (UX) for XR
- Confidence in developing and pitching ideas in XR mediums
- Design foundation (spatial design, UI, audio)
- Technical know-how (build and implementation)
- Practice critical and iterative processes
- Ability to mine career opportunities the XR industry

Creative Storyteller Skills

1. Understand and ideate meaningful and innovative interaction models for diverse and inclusive audiences.
2. Recognize successful UX and UI design for XR experiences as a key component.
3. Design in temporal and spatial dimensions.
4. 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 the maker part of this course. Completion of classes or self-taught UX/UI, mobile app-making, and 3D will also be helpful (but aren'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 a weekly average of 4 hours outside of class meetings for research, preparation, and work on assignments and project. You will never be expected to spend more than 6 hours per week on the course total.

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).

- **Laptop Computer** (i7 processor or better) with at least 100GB of free hard disk space on Day 1 of classes
- **External Hard Drive** (minimum 1 TB – about \$60 on Amazon)
- **3-Button Mouse with Scroll Wheel** (USB-C mouse - about \$15 on Amazon)

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
- install a variety of apps **on your phone or iPad** 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.

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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.

(Highly!) Recommended Reading

"UX for XR" (some chapters will be assigned reading)

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)

"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.](#)

Further reading:

"Storytelling for Virtual Reality"

By John Bucher (Focal Press, 2017) – Paperback from \$39 on Amazon
[Available online from USC Library in Taylor Francis Online Reader](#)

"Using Wearable Devices to Participate in 3D Interactive Storytelling"

By Alex Mitchell (Springer International Publishing, 2021)

[Available as download from the USC Library](#)

"Designing Interactions for Music and Sound" - Edited by Michael Filmowicz

[Available as download from the USC Library](#)

"Sonic Virtuality" by Mark Grisham and Tom Garner (2015)

[Available as a download from the USC Library](#)

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Grading

Assessment Category	Points	% of Grade
Participation ¹	100	12.5
Prompts	120	15
Ideation Exercises	180	22.5
Journal, Midterm & Portfolio	120	15
Projects (Originality & Execution)	280	35
TOTAL	800	100

¹ = Attendance (see policy below) + regular contributions to the discussion in the classroom and in our white-boarding sessions for full points. I encourage students to find their own way of contributing.

Letter Scale

Course final grades will be determined using the following scale:

A	94-100	C	73-76
A-	90-93	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

Result Timeline

You can expect to see your score in all graded exercises within 2 weeks of submission.

Assessments and Assignment Types

Prompts include reading or viewing reflections, completing a software install or tutorial, or other preparation necessary to move ahead. Prompts are always due at the next meeting.

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.

You are expected to keep a **Journal** tracking your personal insights and successes of the course. Since students in this course have diverse and specific goals for furthering their career, your **Course Portfolio** (to be presented on our final day) can be built from the vantage point of a certain role.

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.

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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 $\frac{1}{3}$ 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. 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.

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.

Additional Policies

Reaching goals together with Zoom Etiquette

Students are expected to actively engage with the subjects of the course inside and outside of the virtual 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.

Group discussion and a true interest in your peer's thoughts and projects are a key requisite for the above, and for this we need everyone in our group to have their camera ON. Using your laptop for non-course related purposes is discouraged. I recommend taking notes as nothing we cover verbally in discussion will be in posted slides..

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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).

USC Learning Experience Evaluations

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

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Course Schedule: Weekly Breakdown

Notes: I reserve the right to modify schedule and assignments. Any substantive changes will be announced in class and posted in 2U/Canvas and/or Slack.

Submissions on prompts (such as in research, text reflections, software installs and tutorials) are always due the following course meeting and are not listed below.

I will offer lab time and individual/group guidance on projects in the form of Office Hours – only the main weekly components are listed below.

	Topics	Assignments
Week 1	Course Overview, Zoom, Slack Big Picture of XR – Evolution of formats, Players, Spaces Categorizing use cases	Get your tech ready for the course Install apps Research reward in participatory spaces
Week 2	Augmented Reality – origin, UX, creative, and the technical concepts in AR 3.0 Basics of setting up Mobile AR scenes Audience engagement: discovery, and immersive spaces	App Makeover Ideation Challenge Lens Studio foundation exercises
Week 3	Getting to know Lens Studio – our design and build platform for the course Unpacking an AR face filter	Lens Studio foundation exercises Ideation Challenge: Adapt a face filter for different thematic context
Week 4	Space, Movement, Interaction, Feedback – components of World Space 3d Basics	Read & Reflect on book chapters
Week 5	Sensory Immersion Audio in XR and Multimodal Connections	Ideation Challenge: Sketch a sensory flow for spatial interaction
Week 6	Primer/Refresher of JavaScript (ES5)	Proposal for personal productivity AR experience (Project 1)
Week 7	Project 1 Proposals Q&A UX and UI Design for XR formats The future of in-product Augmentations	Submit P1 Prototype v1
Week 8	What we can learn from Virtual Reality - Precursor of experiences of the future New opportunities in Storytelling	Submit P1 Prototype v2 with User Testing results

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Week 9	Onboarding your Audience / Designing for Reward	Project 1 final due Write Midterm Paper (journal)
Week 10	Mixed Reality: Designing with gestures, location and physical elements	Submit proposal for a multiplayer or location-based experience, incl. defining your prototype (Project 2)
Week 11	Project 2 Proposals Presentations and Q&A	Submit P2 Prototype v1
Week 12	Introduction to Apple Vision Pro Multiplayer concepts for the future	Submit P2 Prototype v2 with User Testing results
Week 13	Reviews of Project 2s Careers in XR	Submit your Project 2 final
	Thanksgiving Break	
Week 14	XR under changing paradigms How will we spatially compute for work, play, and more?	Update personal journal Finish your Course Portfolio
Week 15	Students present their Course Portfolios	(Last day to submit missing work)

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

Important dates:

Statement on Academic Conduct and Support Systems

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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.