



USC School
of Cinematic Arts

CTIN 406L: Sound Design for Games

Spring 2025

Instructor

David Su

dds@usc.edu

Office Hours

Mondays 3pm to 5pm on Zoom, by appointment via <https://calendly.com/usdivad/office-hours>
(Email me to schedule alternate times and/or if you'd like to meet in person)

Meeting and Location Information

Class meets in room [SCIL114](#) on Wednesdays from 10am to 11:50am.

Units

2.0

Course Description

Sound Design for Games is an introduction into the practical skills and methodology for designing and implementing audio in games, with an emphasis on what distinguishes game audio from audio for other media.

The course begins with the fundamentals of approaching the job from pre-production to design, using tools to develop professional-quality sounds. The course then transitions to implementation and practice of interactive audio through the use of game and middleware tools, focusing on the theory and practice of using the affordances of interactivity. Students will learn to use the [Unity](#) game engine's suite of audio tools as well as the audio middleware [Wwise](#). Other technologies such as the [FMOD](#) middleware and [Unreal Engine](#)'s [MetaSounds](#) will be introduced as well.

Sound Design for Games is designed as a hands-on, holistic approach to audio implementation inside a game engine. Over the course of the semester, students will build skills and complete assignments that culminate in a final project: implementing an explorable 3D space that features a variety of game audio techniques.

Over the course of the semester, guests will share their own knowledge and experiences and be on hand to answer questions, so participation and attendance is a crucial part of the class. In addition to lecture content, students will get the most out of the class by completing project-based tutorials. The course will also touch on career opportunities within game audio, as well as collaboration between sound designers and game developers.

Finally, the class will look at recent advances and considerations for sound designers in games that are on the horizon.

Grading and Due Dates

Class Attendance and Participation - 10%

Week 1-2 - Etude 1 - 5%

Week 2-3 - Etude 2 - 5%

Week 3-4 - Etude 3 - 5%

Week 4-5 - Etude 4 - 5%

Week 6-8 - Project 1 - 15%

Week 8-10 - Project 2 - 15%

Week 10-12 - Project 3 - 15%

Week 12-15 - Final Project - 25%

Course Overview

Week #	Date	Class Topics & Activities	Etude/Project Assigned	Etude/Project Due
Week 1	1/15	Overview of Class, Role of Audio in Games <ul style="list-style-type: none"> - The creative use of sound in games - The four basic audio disciplines - sound effects, dialogue, music, implementation - Audio team roles in game development - Spotting, breakdowns, the work of sound design 	Etude 1: Game Audio Scene Analysis	
Week 2	1/22	Deliberate Design in Audio, and Digital Audio Tools <ul style="list-style-type: none"> - Sound basics -- what is sound, and how do we measure it? - Microphones and recording, analog to digital, digital storage and playback, and an introduction to DAW use - A brief history of game audio 	Etude 2: Sound Collage	Etude 1: Game Audio Scene Analysis
Week 3	1/29	Dialogue and SFX, Introduction to Using Sound in Unity <ul style="list-style-type: none"> - Sourcing and editing dialogue and SFX - Audio manipulation and synthesis - Designing sounds and systems of sounds. - Introduction to using sound in Unity 	Etude 3: Sound Redesign (Project Preparation: Download Unity, familiarize yourself with the interface, do the overview tutorial if you're new to Unity)	Etude 2: Sound Collage

Week 4	2/5	Audio Implementation Fundamentals <ul style="list-style-type: none"> - Introduction to Unity's audio workflow, one-shots vs. loops, listeners, emitters, sound zones, tagging animation for sound 	Etude 4: Unity Game Sound/Music Replacement	Etude 3: Sound Redesign
Week 5	2/12	Audio Middleware <ul style="list-style-type: none"> - Overview including Wwise and FMOD 	Project Preparation: Download Wwise and add it to your project	Etude 4: Unity Game Sound/Music Replacement
Week 6	2/19	Ambiences <ul style="list-style-type: none"> - Ambiences - building the world beyond 	Project 1: Ambiences	
Week 7	2/26	Guest Lecture: Sabrina Fedele (Audio Director at The Wandering Band)		
Week 8	3/5	Introduction to Dynamically Driven Audio <ul style="list-style-type: none"> - Avoiding repetition, reacting to changes in the world, the world reacting to changes - Foley/footsteps variations 	Project 2: Footsteps	Project 1: Ambiences
Week 9	3/12	Interactive Music Approaches <ul style="list-style-type: none"> - Music editing, simple music production, diegesis concepts - Layering, branching, stingers, crossfading, transitions 		
	3/19	No class -- spring break / GDC		

Week 10	3/26	Digital Signal Processing & Audio Effects <ul style="list-style-type: none"> - Hard FX, variations, and using processing - Interactive props with repetition and reactive environments 	Project 3: Interactive Music	Project 2: Footsteps
Week 11	4/2	Musical Game Mechanics, Mixing <ul style="list-style-type: none"> - Case studies, beat synchronization, procedural music, and audio visualization - Unreal MetaSounds and the Harmonix plugin 		
Week 12	4/9	The Physics of Audio in Games <ul style="list-style-type: none"> - Binaural audio, obstruction and occlusion, reflection and reverb, HRTFs - Project Acoustics 	Final Project	Project 3: Interactive Music
Week 13	4/16	Guest Lecture: Andrew Prahlow (Composer for <i>Outer Wilds</i>)		
Week 14	4/23	Collaboration, Production, Budgeting, Careers in Game Audio		
Week 15	4/30	Guest Lecture: Caleb Epps (Audio Director at Brass Lion Entertainment)		
FINAL	5/7	Final Projects In-Class Crit 2-4pm, during Final Exam slot		Final Project first submission
	5/12	Revised Final Projects Due		Final Project final submission

Etudes and Projects

Etudes

Etude 1: Game Audio Scene Analysis

Etude 2: Sound Collage

Etude 3: Sound Redesign

Etude 4: Unity Sound/Music Replacement

Projects

Project 1: Ambiences

- Using Unity, create an explorable space with background ambiances. The space should include 2 distinct areas with different ambiances and transition interactively.

Project 2: Footsteps

- Using Unity with Wwise (or FMOD if you prefer), create dynamic footsteps when exploring the spaces. Footsteps should vary and react to different surface materials.
- You are encouraged to use the environment from Project 1.

Project 3: Interactive Music

- Using Unity with Wwise (or FMOD if you prefer), add interactive music (your own or provided by the class) to create basic music that reacts to player actions/positions in the world.
- You are encouraged to use the environment and implementations from Projects 1 and 2.

Final Project: Putting It All Together

- Create a fully explorable audio world using all that you've learned in the class.
- Your world should feature the following (potentially drawn from Projects 1-3):
 - At least 2 unique spaces with different ambiances
 - Dynamic footsteps that react to at least 2 different terrain types
 - Interactive music using horizontal and/or vertical techniques
- It should also include at least 2 additional audio features, such as (but not limited to):
 - Voiceover (VO) -- verbal or non-verbal, human or creature
 - Spatial audio (reflections, obstruction/occlusion, etc.)
 - UI sounds
 - Adaptive mixing (e.g. ducking a bus based on states or RTPCs)
 - Gameplay reacting to music (e.g. elements pulsing to the beat)
 - A prop that adapts to player interaction (e.g. a helmet that changes player sound perception when worn, a transmitter that tunes based on player proximity)
- You are highly encouraged to use the environments and audio from Projects 1-3.

Reviews and Critiques

In addition to formal testing, projects will also undergo extensive peer review and critique during the class sessions. Students are expected to participate actively in both the giving and receiving of feedback as a crucial part of the design process. These reviews will cover both creative and technical aspects of the project.

Missing an Assignment Deadline, Incompletes

The only acceptable excuses for missing an assignment deadline or taking an incomplete in the course are personal illness or a family emergency. Students must inform the instructor before the assignment due date and present verifiable evidence in order for a deadline extension to be granted. Students who wish to take incompletes must also present documentation of the problem to the instructor or student assistant before final grades are due.

For assignments turned in after the assignment deadline without prior permission from the instructor, a penalty will be imposed equal to 10% of the total available points for the assignment, for each day or part of a day that the assignment is late, up to a maximum of seven days.

Attendance Policy

Punctual attendance at all classes is mandatory. Students arriving more than five minutes late to three classes, more than ten minutes late to a single class, or leaving early, will be marked as having an unexcused absence from class, unless prior permission has been obtained from the instructor. The following guidelines are from the Interactive Media & Games Division handbook regarding absences and grading and apply to all students.

Guidelines for absences affecting grading:

- Two unexcused absences: lowers grade $\frac{1}{2}$ grade (for example, from A to A-)
- Three unexcused absences: lowers grade one full grade
- Four or more unexcused absences: request to withdraw from course (instructor's discretion)

Excused absences are:

- Illness (with a doctor's verification)
- Family or personal emergency (with verification)

Social media use, including text messaging, Internet messaging, and email, is not permitted in class unless explicitly permitted by the instructor. A 0.5% grade reduction will result from each occurrence of a student being found using social media in class.

Creating a Safe Space

In this class, we make a commitment to foster a welcoming and supportive environment where students of all identities and backgrounds can flourish. This means that we will use preferred pronouns and respect self-identifications. While debate and discussion are welcome, please remain aware of the implications of your words and the images that you include in your work. If the instructor or another student points out that something you have said or shared with the group might be offensive, avoid being defensive; this is a valuable opportunity for us to grow and learn together. If you have a concern about any aspect of the class, you are encouraged to speak with the instructor. If you feel uncomfortable speaking with the instructor, you are also welcome to speak with either the undergraduate or graduate advisor for the division, who can discuss the issue with you directly or point you toward other on- and off-campus resources for addressing your concern.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity equity.usc.edu or to the Department of Public Safety dps.usc.edu/contact/report. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. Relationship and Sexual Violence Prevention and Services (RSVP, formerly known as the Center for Women and Men) <https://sites.usc.edu/clientservices/> provides 24/7 confidential support, and the Sexual Assault Resource Center <https://sarc.usc.edu> describes reporting options and other resources.

Harassment, sexual misconduct, interpersonal violence, and stalking are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours).

Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem and may be reported to the Office of Student Judicial Affairs for disciplinary action.

Fair Use

Fair use is a legal principle that defines certain limitations on the exclusive rights of copyright holders. The Interactive Media & Games Division of USC's School of the Cinematic Arts seeks to apply a reasonable working definition of fair use that will enable students and instructors to develop multimedia projects without seeking authorization for non-commercial, educational uses. In keeping with section 107 of the Copyright Act we recognize four factors that should be considered when determining whether a use is fair: (1) the purpose and character of use, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use upon the potential market for or value of the copyrighted work. In general, we regard the reproduction of copyrighted works for the purposes of analysis or critique in this class to be covered by the principle of fair use.

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. 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.

Academic dishonesty has a far-reaching impact and is considered a serious offense against the university. Violations will result in a grade penalty, such as a failing grade on the assignment or in the course, and disciplinary action from the university itself, such as suspension or even expulsion.

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](#).

This course aims to develop creative, analytical, and critical thinking skills. Therefore, all assignments should be prepared by the student working individually or in groups. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using

AI-generated text, code, or other content is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

You are welcome to make use of code libraries, Unity extensions, and the like, as appropriate to your project. However, the substance of the project must be your work, and you must document the sources (links to the original work) in a text file submitted with your project. If you are not sure whether you need to document something, document it. If you are uncertain about what constitutes plagiarism, it is your responsibility to ask the instructor for clarification.

University Academic and Support Systems

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.

Student Financial Aid and Satisfactory Academic Progress

To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the [Financial Aid Office webpage](#) for [undergraduate](#)- and [graduate-level](#) SAP eligibility requirements and the appeals process.

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.

[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 consists 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) 740-2500

- 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.

Acknowledgments

Thanks to Jesse Vigil and Michael Sweet for laying the groundwork for this edition of the course.

Syllabus Updates

This syllabus is liable to change throughout the semester. Please check the posted syllabus regularly, and note all changes that are shared by the instructor in class.

(Last updated on 1/22/25)