COLLEGE OF
ARTS, COMMUNICATIONS AND DESIGN

DEPARTMENT OF
DESIGN AND DIGITAL TECHNOLOGIES

COURSE SYLLABUS:
Audio Design for Games

AY 2019-2020

COURSE NUMBER: DGD 22 001
NUMBER OF CREDITS: 3
COURSE TITLE: Audio Design for Games
INSTRUCTOR: Corey Bertelsen
DATE SUBMITTED: 09/04/2019

Audio Design for Games

DGD 22

FALL 2019

Professor: Corey Bertelsen
Email: Corey.Bertelsen@liu.edu
Class: Thursday 5:00pm– 7:40pm
Office Hours: Thursday 3:00 pm-4:00 pm

Course Description

Audio Design for Games is an introduction to creating, critiquing, and implementing the various types of audio content & systems used in digital games. Students will author a broad variety of audio: from sound effects, to recorded voice over, to environmental ambiance. The course will emphasize techniques for creating and critiquing audio in service of achieving design and/or storytelling goals.

Note that this class doesn't cover musical topics in depth & requires no musical background.

Course Objectives

At the completion of this course, the student will be able to:

- Create a broad variety of types of audio, from sound effects to voice over
- Understand audio design's vital role in enhancing and supporting the mechanics of digital games
- Develop and achieve a unique sonic aesthetic for their games
- Identify and remedy issues in games that result from improper use of audio
- Utilize a variety of digital audio workstations and tools
- Understand the benefits & drawbacks of a variety of game-specific middleware audio tools
- Contextualize their audio creation in the broader history of game audio
- Understand the core concepts behind digital audio and audio synthesis
- Critique game audio using industry standard terminology

Course Format

Audio for digital games focuses on project-based learning. Weekly meetings consist of a 2 hour, 40 minute class, which will consist of demos, lectures, critical play, listening exercises & critical feedback sessions.

Prerequisites

Students should be familiar with Unity or another contemporary 3D game engine & capable of basic scripting. Students who have completed an introductory digital studio class will be adequately prepared. Other students may join at the professor's discretion. No prior musical experience is necessary.

Required Equipment

There are no required textbooks for this course (a few books will be recommended for the curious and/or those interested in further technical study). However, the following piece of equipment is recommended:

Over-ear headphones:

Recommendation: Sony MDR7506 (~$90)

Software:

We will be using the following software in this course, available on the lab computers during class time.

Adobe Audition (provided with LIU Account)
Reaper ($60, though with a generous trial version)
Unity (free for personal version)
FMOD Studio (free for education and low-budget games)

Be Nice

We would like to create a productive academic space where we can learn and advance without treating each other badly. Please make a strong, purposeful attempt not to hurt other people. Hate speech is not acceptable.

Missed Classes

You can miss one class without taking a hit to your grade. You must send the professor an email letting them know you will be missing class before the beginning of class. You are also expected to send the professor this week's assignment before class begins. Any assignment that is delivered after the beginning of class will be counted as one day late. Finally, you should reach out to other students to figure out what you missed during class and what's due next week.
Any classes missed beyond the first one will lower your overall grade by 5 points (out of 100). If you miss 4 classes in the semester you receive an automatic F.

Lateness

Each extremely late arrival (over 15 minutes) counts as half of a missed class (two late arrivals add up to one missed class). Assignments that are handed in late are penalized at 10% of the

assignment's best possible grade per late day. This penalty for lateness also applies if you are not in the classroom with a completed assignment at the beginning of class.

Disability Statement

If you are a student with a documented disability, medical condition, or think you may have a disability, and will need accommodations, academic adjustments, auxiliary aids, or other services, please contact Marie Fatscher in Disability Support Services (Post Hall, Lower Level, C10) at 516-299-3057 or marie.fatscher@liu.edu to request services, accommodations or for additional information. Additional information is also available on the DSS website: www.liu.edu/post/dss

Plagiarism and Academic Honesty

Plagiarism and Academic Honesty: Plagiarism is taking ideas or writings from another and passing them off as one's own. According to the Academic Misconduct Policy of the LIU Post Task Force on Plagiarism, plagiarism is defined as "representing the words or ideas of another as one's own (whether knowingly or in ignorance) in any academic activity. This principle applies to texts published in print on online, to manuscripts, to your own work, and to the work of other students. All suspected academic misconduct will be appropriately handled in accordance with the university's policies. Papers in which violation of academic honesty occur will receive an F grade with no possibility of rewriting. A second violation of academic honesty by the same student will be penalized by an F for the course."

Copyright: Copyright is the exclusive legal right of a creator or owner to reproduce, publish, adapt, sell or distribute his or her original work of authorship. It covers literary, dramatic, musical, artistic, and other intellectual works. The published or broadcast work of student media professionals, just like any other author or creator, is protected by copyright. The Game Design Program the copyrights of others. The Program expects students to abide by all university copyright policies. Although the fair use defense may permit students to incorporate copyrighted material into their work in certain circumstances, when in doubt about the use of any materials created by a third party, always consult with your instructor.

Basically, don't present someone else's work as your own.

Grading

Assignments students complete will be evaluated with special attention paid to:

Comprehension & Application - Does the assignment reflect an understanding of the concepts covered in class? Does it follow rules or guidelines outlined in class? If not, does it intentionally & meaningfully subvert these rules?
Sound Quality - Does the sonic quality of the assignment aide in achieving its stated creative goals? Is it free from distracting or otherwise out-of-place sonic elements & artifacts?
Cohesion - Does the audio mesh with the other game elements, visual, mechanical, or otherwise? Do they meaningfully complicate or compliment the work? Are the sounds appropriate for the interaction in context?
Creativity - Does the work represent a unique perspective? Is it innovative & unique either in its execution or juxtaposition?

Grade Calculation

Students will be given grades based on a 100-point scale. Each assignment will be graded on a point scale, and these points will be added up to determine the final grade, according to the following:

92-100	A
90-91	A-
88-89	B+
82-87	B
etc.	

The following are the components of the grade:

20% Participation & In-class preparedness
50% Weekly Pass-Fail Assignments:

Assignment	**Assigned Date**	**Due Date**
Active Listening	Sept 5 (Week 1)	(Presentation - Varies)
Sound Collage	Sept 12 (Week 2)	Sept 19 (Week 3)
Gif Scoring	Sept 19 (Week 3)	Sept 26 (Week 4)
Field Recordings	October 10 (Week 6)	October 17 (Week 7)
3D Sound Space	October 31 (Week 9)	November 7 (Week 10)
Music Loops	November 7 (Week 10)	November 14 (Week 11)

30% Projects:

Project	**Assigned Date**	**Due Date**

2D Sonic Reskin	September 26 (Week 4 Lecture)	Part 1: October 3 (Week 5 lecture) Part 2: October 10 (Week 6 Lecture)
3D Sonic Reskin	October 17 (Week 7 Lecture)	October 31 (Week 9 Lecture)
Final Project	November 14 (Week 11)	December 5 (Week 13)

Schedule

Week 1 - Basics of Digital Audio Part 1

(Adobe Audition, Reaper)

- Definition of Sound
- Role of Audio in the Game Development Process
- Anatomy of a Sound Demo
  - Noisiness
  - Pitchiness
  - Volume

Assignment

Reading - Seeing Circles Signs & Signals: “Intro, Signals & Sound” & “Sines & Sampling”

Critical Listening Response - Play a game (do NOT watch a Let’s Play). List every sound that you hear in the game. How would you describe the overall audio aesthetic, mood, or feeling of the game? What do you think are the most important sounds, and why? How do sounds change in response to player action (some sounds may be randomized, or connected to in-game physics in interesting ways).

For next week, also bring in 3 sounds from a game project that you’ve worked on.

Week 2 - Basics of Digital Audio Part 2

(Audition, Reaper)

- Frequency Content & FFT
- Samples, sample prep, and loops
- Sound Quality & File Compressions
- EQ & Basics of Digital Signal Processing

Assignment

Reading - Seeing Circles Signs & Signals: “Sines & Sampling”;
Sound Collage - Create a 3-5 minute “story” (whatever that means to you) using samples sourced from the Audio for Digital Games Library or Freesound.org. Experiment with different sample rates, bit depths, and sculpting using filters and EQ.

Week 3 - Basics of Digital Audio Part 3

(Audition, Reaper)

- Audio in Games vs. Audio in Music vs. Audio in Cinematic Forms
- Psychoacoustics
- Encoding, File Formats
- Complex Filters, Noise Reduction
- Dynamic Range: Normalization vs. Compression
- Repetition & Fatigue

Assignment

Audio-visual synchronicity - You will be provided 3 animated gifs. Complete the Foley sound for these gifs using any combination of sampling, synthesis, and/or recording.

Week 4 - Audio & Design 1

(Reaper, Unity)

- Sound Design & Game Feel
- Basics of Sound Assets and Audio Sources
- Audio Scripting in Unity

Project 1: 2D Sound Reskin

Part A: You will be given a feature-complete 2D game that's completely silent. It's up to you to provide audio for each of the actions in the game, as well as environmental ambience (you may also create music for the game, but this is not required). You may alter the code as you wish if it helps you achieve your vision for the game audio, but no scripting is required for this assignment.

Week 5 - Audio & Design 2

(Reaper, Unity)

- Audio Aesthetics
- Sound "Quality" as Content
- Games without Visuals - Playing by Sound

Project 1: 2D Sound Reskin

Part B: Your lead designer has evaluated the game, and wants to go in a different sonic direction. You now must re-create all of the audio in the game, using only the 5 samples provided (but you may alter, recombine, filter, and edit them however you choose)

Week 6 - Recording & Making Your Own SFX

(Reaper, FMOD)

- Mic'ing
- Types of Microphones
- Recording Spaces
- Overview of Synthesis Approaches
- Intro to FMOD Studio

Assignment

Field Recording: create 2 unique ambiences, an attack-sustain-release sound, 2 mono sound effects, and 2 stereo sound effects. Create FMOD events for each of these; we will connect the FMOD project to Unity during week 7

Week 7 - Middleware and FMOD Studio

(UNITY, FMOD)

- Middleware overview
- Connecting FMOD to Unity

Project 2: 3D Sound Reskin

You will be given a 3D game with an associated FMOD project, but all the audio is removed. As with the 2D reskin, create the audio for this experience, paying special attention to how the sound is reinforcing a sense of space.

Week 8 - Interactive 3D Audio

(REAPER, UNITY, FMOD)

- Reverb, Delay
- Creating a Shared Sonic Space
- Panning, Surround, & Spatialization
- "3D" Sound

Project 2: 3D Sound Reskin

Complete a second pass on the project, incorporating techniques such as reverb settings and mixer states.

Week 9 - 3D Audio 2

(REAPER, FMOD, UNITY)

- Intro to Resonance Audio
- Creating Ambisonics and Spatial Audio
- Audio Occlusion, HRTF, and VR consideration

Assignment

3D Sound Space - Using Resonance Audio, FMOD, and whatever sound effects you wish, create a sonic environment that includes an ambisonic source, at least 5 sources that utilize some type of audio occlusion, and at least 3 distinct reverb spaces.

Week 10 - Music

(REAPER, FMOD, UNITY)

- How to source and commission music
- Interactive Music in FMOD
- Basics of music creation and theory
- The MIDI protocol

Assignment

Music Loop - Create 2 music loops. In FMOD, create an interactive music event that demonstrates both "horizontal" and "vertical" interactive music transitions.

Week 11 - Voice Over

(REAPER, UNITY, FMOD)

- Basics of Mic'ing Vocal Performers
- Casting & Auditions
- Directing Voice Actors
- Preparing & Integrating Voice Over
- Asset Organization

Final Project

Prototype a game that has no visual feedback, in which the player must rely solely on audio cues in order to succeed. This can be any type of game you wish, so long as it is audio only. You can work with up to 3 people on this project.

Alternatively, if you are audio lead on a project for another studio class (or are working on a game outside of school), you may use that as a final project. Keep in mind that if you choose this option, I will have much higher expectations for your work.

Week 12 - Mixing and Mastering

(REAPER, UNITY, FMOD)

- Thinking about the Mix
- Realtime Mixing vs. Premixed Audio

- Side Chaining & Advanced DSP
- Monitoring & Targets
- Using the FMOD Profiler

Final Project Review 2

We'll review your final assignments in class, providing feedback before their final due date, which is Dec 5th.

Week 13 - Thanksgiving (No Class)

Week 14 - Final Project Review

- We will review final projects in class, then debrief.

Final Assignment Due

Be prepared to show your final project in class on Dec 5th!