

Architecture, Music and Structure: Explorations in Sonic Visualization
AAE 495 / AAE 695 — Special Topics in Architectural Design
Fall 2025 Course Syllabus

Time: Saturdays, 10:00-12:45
Class Location: ARC 152
Instructor: Deborah Oakley, AIA, PE
Office Location: 221 ARC (Architecture Building)
Office Hours: Tues & Thurs, 11:30 – 12:30, or by appointment. Zoom meetings also possible
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Course Description

This class will explore the relationships between music, architecture, structure and interactive visualizations using the open-source software Blender. Students are assumed to have little or no musical background and will learn the essentials of music theory in a powerful essential form. Animated 3D graphics will creatively explore musically themed expressions of structural principles in architecture.

Course Prerequisite:

Upper division architecture undergraduate students or graduate students in the School of Architecture.

Course Experience

In this course, architecture students, who may have little or no musical background, will learn the essentials of music theory presented from a lay perspective that does not require extensive memorization of conventional music theory.

Collaborative teams of students will create musically narrated animated audio-visual interpretations of architectural and structural principles embodied in the constructed and natural world. The resultant student projects can then be documented in video format, including the possibility for a live performance at a future Art Walk event.

Learning Outcomes/Course Objectives

1. Non-musicians will learn the essentials of music theory without need for extensive memorization
2. Students will further their understanding of the essentials of architecture and structural principles in architecture which can be interpretively presented in a manner accessible to a lay audience
3. Students will learn the use of open-source 3D software Blender to create visual animations
4. Small student teams will create audio-visual interpretations of architectural and structural principles

Software

3D animation will employ the use of the widely used open-source program *Blender*. This software is fully functional, free to use, and works on Mac, Windows and Linux. It has significant capabilities and has even been used for special effects in commercial productions such as the popular Netflix series *The Man in the High Castle*. The 2025 Academy Award winning feature animation, *Flow*, was done completely with Blender. For those with existing 3D software skills, you will find that Blender has an entirely different evolutionary past and functions in its own peculiar and unique way.

Curated video tutorials by the professor and others freely available on YouTube will be employed, along with pre-constructed elements made specifically for the class. This tool will be employed throughout the semester for 3D object creation and animation, as well as video production and for a final audio-graphic animation project by student teams. The latest version of Blender (4.5) may be downloaded at blender.org.

In addition, audio editing software will be needed on occasion. The ability to slow down playback without affecting pitch is an important capability when audibly analyzing music. The open-source software *Audacity* is recommended and works on all platforms, Download at Audacity.com.

Lastly, Digital Audio Workstation ("DAW") software will be used. Mac users have GarageBand that ships with all Macs, however Windows users will need an equivalent software. Recommended for this class is Waveform Free. Tracktion.com/products/waveform-free

Hardware

Computer: Blender is by itself has fairly low system requirements to do basic modeling. Those requirements rapidly ramp up with model complexity, however. The main intensive task is rendering, and there are workarounds for slower computers working with complex scenes, but it is recommended that a recent generation computer with a graphics processor unit is best. A very important consideration is to have adequate free space. This may sound crazy, but 100 GB is not unreasonable for working free space.

External Display: An external display for a dual-screen setup with a laptop is recommended (though not required). The extra room provided by a secondary monitor is extremely helpful in managing multiple windows in Blender. Basic 1080P resolution USB-Powered external displays can be obtained for under \$100 these days. Instead of a dedicated display, if you have a tablet device it may be possible to use this as a secondary display, such as an iPad using screen sharing for Mac users, or a screen sharing application on Windows.

External Storage: An external flash or hard drive is recommended for backup as well.

Earbuds or Earphones: Please bring a pair of earbuds or earphones since we will be using audio

MIDI Keyboard: This is optional but recommended. A MIDI (Musical Instrument Digital Interface) keyboard does not generate sound on its own, but uses computer software to play the sounds indicated by the keyboard. On-screen keyboards can be used for the class, but lack the tactile feedback of an actual keyboard. A basic 25 key MIDI keyboard (such as the Donner Mini MIDI or the MidiPlus AKM320) can be found for as low as \$40 on retailers like Amazon, or even less on the used and import markets.

Music Theory Concepts

Learning music theory can be a long and complex process, however the basics can be explained in a simplified and yet powerful way. This course will draw upon essential concepts taught in the approach named *Improvise for Real*, developed by musician/teacher David Reed. Although these essential principles will be employed it should be noted that Professor Oakley is not a representative of this organization and only the key ideas of the method will be presented. None of their specifically copyrighted materials will be used in this class. Interested students are encouraged to consider purchasing one of their courses at improviseforreal.com. It is an exceptionally successful learning technique for beginning music students.

Semester Overview

The class is structured to present essential concepts in music, architecture and structures early on, plus developing basic skills in Blender. Students will be organized in groups early in the semester to begin developing working relationships. Animation in Blender is likely to be new to all students and so a large portion of the early learning experience will focus on developing a basic working knowledge of the software.

Semester Project

A key learning experience of this course will be a culminating semester project completed in teams. Teams will be formed at the start of the semester so that members can develop a working relationship early on. The last third of the semester will be conducted in a quasi-studio format with small group discussions meeting to review project development with Professor Oakley. The final project will be presented to the entire class at the end of the semester.

Evaluation Methods

Standard letter grading will apply to the class. Students will be evaluated on weekly assignment progress, class participation, and development of the final semester project.

Grading Scale

UNLV Standard grading scale will apply

A	95 – 100	B-	80 – 83	D+	67 – 69
A-	90 – 94	C+	77 – 79	D	64 – 66
B+	87 – 89	C	74 – 76	D-	60 – 63
B	84 – 86	C-	70 – 73	F	00 – 59

Attendance Policy

The class meets once per week. Other than qualified excused absences, full attendance is expected.

University Policies

Please refer to <https://www.unlv.edu/policies/students> or scan the QR code here  for standard UNLV Student Policies regarding student conduct, copyright, etc.



Week	Topic	Music or Other Assignment	Blender Assignment	Assignment Discussion
1	Introduction, aspirations, concepts, musical principles, Arch/Music conns. Where music comes from. Intro to Blender.	Recognize the major scale, intervals, basic 1-5 chord progressions	Learn the interface of Blender, object types & creation methods.	—
2	More time on basic music concepts for architects	Analyze popular music for 1, 4, 5 chords	All about curves, intro to modifiers	Review music studied & Level 1 basic Blender study
3	Introduction to Blender as a 3D modeling/visualization environment	Minor harmonies in 6, 2, 3	Basic animation	Review music studied & object creation and manipulation
4	Fundamentals of the guitar—The guitar as physical structure	Delving deeper into chord progressions	Materials and the shader editor	Review music studied & Blender questions
5	Introduction to the basic principles of structures in the world	Illustrating structures	Animating music	Review music studied & Blender questions
6	Music and mood	The harmonic minor scale	Animating structures	Review structures & Blender questions
7	Nondestructive editing in Blender	TBA	Geometry nodes exercise	Review music studied & Blender questions
8	Composition	Composition exercise	The Blender video editor	Review music studied & Blender questions
9	Blender geometry nodes: Ultimate nondestructive editing	Selection of project concept	TBA	Review Blender & composition exercise
10	TBA			
11	Telling a story through music and visual imagery to explain a concept	Storyboard concept development of graphics and music		Studio Time: Individual group meetings, discuss project concept
12	Guitar fretboard relationships: Intervals hidden in plain sight	Concept development		Studio Time: Individual group meetings
13	Project development	Project elaboration		Studio Time: Individual group meetings
14	Project development	Project refinement		Studio Time: Individual group meetings
15	Project conclusion and presentation, discuss future possibilities			Final class presentations & wrap-up