

Academic Fair Prospectus  
"Audio Software Design"  
First session, Summer Quarter, 2024

## AUDIO SOFTWARE DESIGN

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**COURSE DESCRIPTION:** In this program, students will learn how to create their own original real-time audio plug-in. They'll receive instruction on how to implement a variety of features and choose the ones they want for their own personal project that they will present at the end of the quarter. Prior programming skills are helpful but not required as this class is designed for beginners with no background in computer science. This course is designed for students who have some experience working with audio, but are either new to software development or want to hone their skills.

### REQUIREMENTS:

- Students will need to provide computers (ideally laptops) for developing their plug-in project.
- Intermediate audio recording skills including proficiency with a digital audio workstation (DAW)

**LEARNING OBJECTIVES:** Throughout the quarter, students will:

- Design and compile an audio effect or virtual instrument plug-in.
- Learn the basics of developing real-time audio software.
- Create digital representations of audio signal paths.
- Examine how to use sample libraries to shape digital instruments.
- Build a user interface.
- Understand how open-source software libraries are used to build software.
- Gain proficiency with the HISE and JUCE software development environments.
- Navigate licensing their code and samples.
- Develop strategies for troubleshooting and debugging code.
- Provide constructive feedback and testing in collaboration with the cohort.

No required texts. Contact faculty for more information or guidance.

**PREFERRED SUMMER TERM:** 2024

**TIME:** Mondays from 5:00 pm - 8:50 pm, June 24 - July 22, 2024, in Com. 107 (the Recital Hall)

**HISE** (The primary tool being taught): <https://hise.dev/>

## **TENTATIVE SCHEDULE:**

WEEK ONE (June 24): Some Model Projects, Introduction to general computer programming concepts (the difference between high-level and low-level languages, libraries, the role of a compiler, and how all of these concepts relate to the musician-friendly tool that is HISE), HISE, and JUCE in the context of the history of digital audio and computers from the invention of the telegraph to the development of HISE. Students help one another download and install software if needed. The class will use the rapid application development tools in HISE to build a few simple example projects, both to test that the software is installed properly and to provide a foundation for building a final project. Examples of unusual instruments and ensembles, including the string quartet and the Pierrot ensemble.

WEEK TWO (July 1): Sampling Workshop, In-depth walkthrough of the HISE sampler and how to use it to build virtual instruments. Examples of creative compositions utilizing sampling throughout music history. Students are encouraged to bring an instrument they find interesting and sample it in the space at the end of class with recording gear provided for in-class use (that we'll reserve from media loan) and guidance and support available from the instructors (Drew might focus on performance techniques for recording the samples while Kady focuses on bringing the recorded samples into the HISE sampler).

WEEK THREE: Mid-Quarter Projects Salon, remaining time will be spent providing students with assistance building their projects, and reinforcing concepts from the previous two lectures.

WEEK FOUR: Effects and DSP (Digital Signal Processing) I'd like to reach out to the designer of HISE, Christoph Hart and ask if he'd be willing to answer questions from the cohort during this session as well? We might have to collect questions the previous week if his schedule doesn't permit a live appearance.

WEEK FIVE (July 22): Final Projects Salon.