AUDIO SOFTWARE DESIGN

Faculty: Kady Richardson, (360) 972-8095, richarka@evergreen.edu
Andrew Buchman, (360) 545.3627, buchmana@evergreen.edu

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): Introduction to general computer programming concepts and 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. We'll explore 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 and guidance and support available from the instructors.

WEEK THREE (July 8): Mid-Quarter Projects Salon. We'll explore aesthetics and visual design concepts that can evoke a mood in a user and their relationship to the aesthetics of physical musical instruments. Software is a relatively young medium of artistic expression; we've only just begun to discover what it is possible. We'll explore how to use filmstrips to make a completely custom graphical user interface.

WEEK FOUR (July 15): Effects and DSP (Digital Signal Processing) Effects can merely be a piece of a larger signal chain for a virtual instrument, or their own complex bespoke projects. HISE enables us to build an effects plug-in in real-time in both linear and non-linear ways.

WEEK FIVE (July 22): Final Projects Salon. We'll look at future avenues of discovery in areas like HISEScript, real-time neural networks, FAUST programming, ray-traced computer graphics.