Course Description
This course will cover the production and manipulation of sound through electronic means. We will begin with the basics and work our way through to sophisticated contemporary sound synthesis. Although labs outside of class will provide help with software, this course does not focus on software specifics. For your assignments you may use Reaktor, MAX/MSP, or some other software of your choice. Although no musical training is necessary, basic computer skills are a prerequisite.

Assignments
There will be a series of three online quizzes interspersed throughout the term. These will cover basic material covered throughout the course.

At the end of week six, you will produce a simple synthesizer. You may use additive, subtractive, or frequency modulation techniques, or a combination of these. The synth should utilize some form of modulation in both the frequency and amplitude domains. A paper describing your efforts, your motives, and the synth’s final form is also required.

Your final assignment, due at the end of the term, will be a composition utilizing at least one synth and one sampler that you have designed. The composition can have be a standard linear work, an algorithmic process, or a reactive system. Again, you must submit a paper describing your process, your motive, and the final outcome. Also, you must produce a user manual for each synth and sampler created.

Grading
Grading will be based on novelty, usability, application of the material learned in class, and, of course, on the functional robustness of your creations. The midterm will account for 30% of your grade, the final will account for 60%, and quizzes will constitute the final 10%.

Attendance
Attendance, although highly recommended, is optional.

Text
Recommended reading for the course is as follows:

Reaktor user manual
MAX/MSP user manual
Roads, Curtis. The Computer Music Tutorial
Cope, David H. New Directions in Music.
Cage, John. Silence.
week 1
what is sound? what is a speaker?
oscillators (sin, square, triangle, noise), oscilloscopes, oscillator sync, additive
synthesis

week 2
filters (lowpass, highpass, bandpass, notch, comb)
eq (parametric, graphic, paragraphic, shelving)
subtractive synthesis

week 3
modulation
matrix modulation
envelope (AR, ASR, ADSR), envelope to amp, envelope to filter

week 4
LFO (sin, ramp, square, random)
pulsewidth modulation
ring modulation
FM synthesis

week 5
sampling (looping, slicing, changing tempo)

week 6
dynamics (gating, compression, multi-band compression)
keying
expanders, limiters

week 7
wavetable synthesis
granular synthesis

week 8
delay-based effects (delay, chorus, phase, flange, reverb)
distortion effects (clipping, overdrive, saturation, quantization)
frequency domain effects (vocoder, convolution)

week 9
MIDI
sequencing

week 10
MIDI and Director
physical controllers