SynthCo Syllabus

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1 credit
Wednesdays 7 - 9p.
TIMARA PeTaL

Objectives

The goals of this course are to gain an understanding of fundamental concepts in sound synthesis, focusing primarily on analog modular synthesis. You will learn how to build a variety of synthesizer sounds, such as percussion, pads, leads, textures, and drones, and will learn to control these sounds with your inputs, as well as automatically within the synthesizers. There will be two projects in this course, one focusing on interactivity/ performances and the other focusing on generative synthesis. In both, you will employ the concepts you learn throughout the course. Though this is an ExCo, I have a fairly ambitious plan for the course, as the focus of this class is to build a strong foundation of synthesis skills and knowledge that can be applied to your musical work at a high level. As such, this Experimental College course is more likely to reflect the time commitment of a 2-credit course.

A fundamental understanding of music is recommended, but not required, to participate in this course.

Course Structure

This course mainly consists of lectures, workshops, and listenings. though we will also have some discussions. In the lectures, I will present information on subtractive and additive synthesis, the physics of sound, basic editing/recording, and the control mechanisms we use to play synths. In the workshops, we will be showing our projects and offering each other feedback. Listening to others' music is a very important part of learning what you identify with sonically. We will have weekly listenings, which will mostly occur in class. If we do not get to it, it will be assigned for the following week. After listening, we will discuss the music and how we can learn from it. Discussions are largely informal, yet it can be a good way of showing me your participation. This is not a discussion-based course.

Both of us are available to answer questions. Feel free to email us to discuss any aspects of what is being taught and for help troubleshooting your patches!

Synth Ensemble

This semester I will be involved with Synth Ensemble. Synth Ensemble is a way for you to apply what you learn in this class to a group improvisation and performance setting, and this will give you considerably more exposure to historic synthesizers and hardware than SynthCo would alone. Synth Ensemble is technically a chamber ensemble under APST 805 and would be advised by Tom Lopez, TIMARA Department Chair. It provides two (2) credits. Reach out to me by the end of the day Wednesday, February 7, if this is interesting to you, and I will form an official ensemble.

Assignments and Participation

Participation
You are all expected to attend every class on the schedule, participate in discussions, and ask questions. If you must miss class, please do your best to let me know in advance. Missing more than 3 classes will result in a grade of NP as is ExCo policy.

Patch Assignments
Each week there will be a new patch assignment. The point of these is to build your repository of skills. Each one will focus on a different concept in synthesis and these will serve as building blocks for your projects. Expect to spend about half an hour to an hour on each one. The patches you make in these assignments can be used as parts of Projects 1 and 2.

Listenings
Each week, you will be asked to listen to one or two pieces. Much of this will occur in class but if it does not, you should do it on your own time. They should be done without distraction, in stereo (with headphones or monitor speakers if possible). We will discuss these in class. The audio files are available in the 'Listenings' folder on the shared Google Drive folder.

Listening Reports
You are asked to write four (4) short listening reports each between 100 and 200 words, responding to the elements of the music you find interesting, meaningful, and/or challenging. Feel free to write about your reaction to the pieces, but you may also comment on the technique(s) used. The first and second are due the Friday before Spring Break and the third and fourth are due on the last day of classes.

Readings
You are asked to read one or two short essays per week on synthesis. The total reading per week will not exceed 15 pages. Be prepared to discuss these in class, though they are mostly for your information and I won't focus on them that much. Readings are in the 'Text' folder.

Project 1 - Interactive/Performable Synthesis
Construct a patch that is playable/interactive. The source of control for this patch can be a MIDI keyboard or an audio source such as an acoustic instrument or voice. The types of sounds used are entirely up to you. Perform a 2-5 minute piece using the patch you make. More information will be provided 4 weeks before the project is due.

Project 2 - Generative Synthesis
Construct a patch that generatively plays itself. In this assignment, you are to use percussive sounds, pitched sounds, and unpitched sounds. The exact nature of these sounds, how they are used, genre, and style are all up to you. You will create a system of modulators (envelopes, LFOs, sequencers, etc.) that control the sounds in the patch and play the piece with little to no input from you. This project will be presented during the last week of classes. More information will be provided 4 weeks before the project is due.

Submitting Assignments and Information

There is a shared Google Drive folder containing all of the assignments, listenings, and readings in this class. I will also have a shared folder for all of your assignments that is private.

Grading

As an ExCo, the grading in this course is P/NP. Above 65%=P, below 65% = NP.
- 7 Synth Assignments   20%
- 4 Listening Reports   20%
- Project 1   30%
- Project 2   30%
  Missing more than 3 classes will result in a grade of NP as is ExCo policy.

Statement on Inclusion

I am committed to creating an inclusive environment in my classroom. As such, it is imperative that we all treat each other with respect. Discrimination and/or mistreatment of others on the basis of ability, race, ethnicity, religion, sexuality, and/or gender will not be tolerated and is grounds for withdrawal from the course.

Disability Access
If you have a disability that requires accommodations, feel free to send me the letter from the Office for Disability and Access. If you do not have a letter, but feel you need some accommodations, feel free to contact me to discuss your needs and I will do my best to meet them.

Software *see Reference folder for more*

Analog Synthesis
In this class, we will primarily focus on analog synthesis, and the main application we will use is called **VCV Rack.** *available here*. VCV Rack is a free analog synth emulator.

FM Synthesis
We will use Dexed (Yamaha DX7 VST) to explore FM Synthesis. It is free and available *here*. There will be a DX7 available for you all to use in the TIMARA Gallery.

Digital Audio
You will likely need to record/edit the audio of your patches, so you will want to get or use a digital audio workstation (DAW) such as **Reaper, Ableton Live,** or **Logic X.** If you do not wish to buy one, you can use **Audacity**, *available here*, which is free and can be used with VSTs. Reaper is not free, but they do not enforce their license agreement so long as you do not publish your results, and it is less expensive than other DAWs while being much more capable than Audacity or Garage Band. Garage Band is an option, but it is less desirable.

Hardware

Computer
A decent computer is recommended for this class. If your computer is not powerful enough to run the patches you make, you may use the computers in the TIMARA Lobby located in the basement of Bibbins, available to all students via swipe access.

Listening/Speakers
A set of headphones/monitors is recommended. Earbuds are ok, but not preferable. Computer/laptop speakers are not acceptable for listening to your work.

Interface
I have one Focusrite® Audio Interface available for borrowing for those of you interested in controlling a synth using external audio for Project 1, yet I will obtain more as needed.

MIDI Controllers
There will be some MIDI controllers available for those of you who wish to play your Project 1. using MIDI.

Schedule

Week 1 - February 7
Class Introductions
Listening: Switched on Bach, Brandenburg Concerto 3, by Wendy Carlos
Lecture: Intro to the Physics of Sound: Analog and Digital Audio, Transduction
for next week:
read this Syllabus and bring questions if you have any
read 'An Analog Synth's Glossary of Terms' and bring questions for 02/14.
complete VCV Assignment 1 (download VCV Rack, install modules)

Week 2 - February 14
DUE: VCV Assignment 1
discussion: Carlos - What do you notice about the different sounds she uses and what do you think of them?
lecture: Fundamentals of Subtractive Synthesis
listen: any section or all of Turning Point by Lisa Bella Donna
for next week:
reread An Analog Synth's Glossary of Terms, bring more questions for 02/23
complete VCV Assignment 2 (on waveforms, filtering)

Week 3 - February 21
DUE: VCV Assignment 2
discussion: Bella Donna - How do you think Bella Donna created the synth sounds in this album?
lecture: Voltage Control
listen: Silver Apples of the Moon by Morton Subotnick
for next week:
complete VCV Assignment 3 (on modulation sources, pitch control, and modulation mixing)

Week 4 - February 28
DUE: VCV Assignment 3
discussion: Subotnick - How does Subotnick use timbre to develop his ideas?
lecture: Synthesizer History: Moog, Buchla, Theremin, and others
listen: Studie Twei by Karlheinz Stockhausen
for next week:
complete VCV Assignment 4 (create a lead and monophonic pad)
write a proposal for what you would like to do for Project 1 (<100 words)
read Acousmatics by Pierre Shaeffer

Week 5 - March 6
DUE: VCV Assignment 4
DUE: Project 1 Proposal
lecture: Additive Synthesis, External Control Methods
listen:
for next week:
work on Project 1 (Interactive and External Control)
Week 6 - March 13
Project 1 in-progress presentation
workshop: Interactivity and External Control
for next week:
finish Project 1

Week 7 - March 20
DUE: Project 1 Presentations/Performances
DUE: Readings
DUE: Listening Reports 1 and 2
This is a very important day to be present!

Week 8 - April 3
listen: Industrial Symphony by Julia Bondar
lecture: Percussion Synthesis: Noise and Feedback
for next week:
complete VCV Assignment 5 (create a drum synth)

Week 9 - April 10
DUE: VCV Assignment 5
lecture: Generative and Algorithmic Control
listen: Laura Palmer's Theme and Twin Peaks Title Theme by Angelo Badalamenti
for next week:
complete VCV Assignment 6 (on sequencers, random sources and cross-modulation)
write a proposal for Project 2 (<100 words)

Week 10 - April 17
DUE: VCV Assignment 6
DUE: Project 2 Proposal
lecture: Introduction to FM Synthesis
listen: Brian Eno's Generative Works
for next week:
complete Assignment 7 (create an FM synth sound in Dexed)
work on Project 2 (Generative and Algorithmic Control)

<u>Week 11 - April 24</u>
DUE: Assignment 7
discuss: Eno - How do you think Eno controlled the synth sounds in the works you explored by him?
work on Project 2
check-ins, individual meetings with David and I if you want/need them
for next week
work on Project 2

<u>Week 12 - May 1</u>
Project 2 in-progress presentation
workshop: Generative and Algorithmic Control
for next week:
finish Project 2

<u>Week 13 - May 8</u>
DUE: Listening Reports 3&4
DUE: Project 2 Presentations - feel free to invite friends to see your work
This is also a very important day to be present!