Course Goals
It is the goal of this course that each student—upon successful completion—gains a theoretical and practical understanding of intermediate electronic synthesizer and sampling techniques. These will include a working knowledge of electronic synthesizers, effect processors and the components of the synthesis process. To reach this goal, each student must successfully accomplish the objectives described below.

Course Objectives
• Using contemporary production techniques, demonstrate proficiency of fundamental concepts in sound theory by applying them to practical real-world examples
• Create original presets, patches and recorded audio sound-sets using electronic synthesis including: subtractive, additive, physical modeling, frequency modulation, sample-based, wavetable and granular
• Synthesize, process and catalog sounds for personal music libraries
• Describe, explain, and demonstrate the process of making musical sounds with electronic synthesizers and various additional tools and technology
• Create and produce musical compositions and arrangements with synthesized and processed sounds

Requirements, Exams and Grading Information
Student assessment in MTEC 474b will consist of exercises, a mid-term and a final project. Unless otherwise noted, all exercises are due one week from the date assigned. All assignments are to be turned in to the class folder on the music technology lab server and must carefully follow file naming conventions, file management and format guidelines.

The final project will consist of a sequence of 20-25 musical parts, 3 to 4 minutes in length. Students will document their workflow and explain it in a, no longer than 7 minute, screen capture. In addition, students will submit a cataloged library of patches, device presets and impulses responses designed for their composition. Further instructions will be available at a later date.
Grading Summary

1. Participation 10%
2. Exercises 35% total
3. Mid-term Project 10%
4. Final Exam 15%
5. Final Project 30%

Class Texts


Supplementary Materials

1. Headphones (Sony, MD 7506 or the equivalent required)
2. USB Memory Stick and/or other external storage device
3. Screen Capture software (QuickTime Player, Screen Flow or equivalent)
4. Syntorial https://www.syntorial.com/ (Recommended)

Communication

Please make it a habit to use/check your USC email account. Any emails I send to the class will use that account. In addition all course materials and class grades will be posted on BlackBoard (http://blackboard.usc.edu). For example, the course syllabus can be found under Syllabus and class notes under Content.

Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.-5:00 p.m. Monday through Friday. The phone number for DSP is 213/740-0776.

Grading Scale:

92 – 100 = A
82 – 88 = B
72 – 78 = C
62 – 68 = D
90 – <92 = A-
80 – <82 = B-
70 – <72 = C-
60 – <62 = D-
88 – <90 = B+
78 – <80 = C+
68 – <70 = D+
<60 = F
Assignments are due by the beginning of the class period (9:59AM) indicated in the course outline below. Assignments turned in after 12:00pm on their due date will be marked late and penalized 10% for that day as well as 10% for each additional day or portion of a day that they are late. Allow for slow Internet connections and server upload time so that your files are completely uploaded before the deadline. The Final Project may not be submitted late. Final projects not turned in by the deadline will receive a grade of zero.

Notes
*Each class will contain both theoretical and practical experiences. In general, I will present the day’s subject material during the first part of the class then work on it for the remainder. Should the needs of the class so dictate, I reserve the right to change the course outline. You will be notified of any substantive schedule changes.

Schedule

Week 1 (8/24) Workflow Strategies, Course Outline, Expectations
  Introduction
  Policy and procedures
  Preferences, settings and standards
  Overview - software synths
  Reading: Creating Sounds from Scratch chapter 1
  Audio/Video Examples: Creating Sounds from Scratch chapter 1
  Exercise 1: Subtractive presents, Submit a music example

Week 2 (8/31) Tools, Texture, Timbre, Tonality
  Tools for the task: Considerations, Categories, Characteristics
  Recognition - Ear training (simple and complex waveforms)
  Experimenting with harmonics, partials and overtones
  Critical listening and ear training
  Production techniques:
    Strategies for recreating sounds
    Backwards engineering patches and presets
  Audio/Video Examples: Creating Sounds from Scratch chapter 2 and 3
  Reading: Creating Sounds from Scratch chapter 2 and 3
  Exercise 2: Reconstructing sounds from audio examples

Week 3 (9/07) Additive Design - Sine Waves, Fundamentals and Overtones
  Characteristics of Additive Synthesis
  Resynthesis, Cross Synthesis and Spectral synthesis
  Production techniques: Alchemy (NI Razor)
Controlling harmonics: envelope, pitch, pan
Layering sources for evolving pads and sound effects
Combining additive and spectral synthesis
Reading: Creating Sounds from Scratch chapter 6 (pp. 175-192)
Logic Pro X Instruments Reference Guide (Chapter: Alchemy)
Audio Examples: Creating Sounds from Scratch chapter 6
Exercise 3: Sound design: Resynthesis, Spectral, Resynthesis + Spectral

Week 4 (9/14) Advanced Modulation Techniques and Effects Manipulation
Filters and routing
Modulators - Alchemy
  LFO, AHDSR, MSEG, ModMap, Sequencer
Auxiliary and master effects
Production techniques: Alchemy (NI Razor)
  Sound sculpting (Ethereal to Aggressive)
  Looped and tempo synced sources
Reading: Creating Sounds from Scratch chapter 6 (pp. 192-202)
Logic Pro X Instruments Reference Guide (Chapter: Alchemy)
Audio Examples: Creating Sounds from Scratch chapter 6
Exercise 4: Creating Sounds from Scratch chapter 6

Week 5 (9/21) Percussive Plucks and Resonating Arpeggiation
Characteristics of Physical Modeling
Components: Resonator, Generator, Damper
Production techniques: Sculpture, NI Prism, Collision
  Percussive plucks for rhythms and melodies
  Arpeggiated sequences and syncopated ostinato phrases
Reading: Creating Sounds from Scratch chapter 8
Logic Pro X Instruments Reference Guide (Chapter: Sculpture)
Audio/Video Examples: Creating Sounds from Scratch chapter 8
Exercise 5: Creating Sounds from Scratch chapter 8

Week 6 (9/28) Bass and Drums with Physical Modeling and Modal Synthesis
Production techniques:
  Building an electric bass (NI Prism)
  Synthesizing drums and percussion (Collision)
Reading: TBD
Exercise 6: TBD

Week 7 (10/05) Evolving Pads and Experimental Ambience
Characteristics of WaveTable synthesis
WT position, intensity
Vector Synthesis
Lookup Table
Modulating/Automating Lookup Tables - Massive
Creating WaveTables for Alchemy
Production techniques:
  Evolving pads and leads
  Experimental effects and ambience
Reading: *Creating Sounds from Scratch* chapter 9 (pp. 291-314)
Audio/Video Examples: *Creating Sounds from Scratch* chapter 9
Exercise 7: *Creating Sounds from Scratch* chapter 9 (ex. 9.1, 9.2)
  Mid-Term Project - Original Sequence (Due Week 8)

Week 8 (10/12) Audio Manipulation Techniques - Granular Synthesis
Granular software synthesizers overview
Grain splitting
Separating pitch and time
Creative warping for sound design
Production techniques -
  Max for Live: Granulator II - Turning inharmonic sounds harmonic
  Alchemy - Granular preset creation
Reading: *Creating Sounds from Scratch* chapter 9 (pp. 315-324)
Audio/Video Examples: *Creating Sounds from Scratch* chapter 9
Exercise 8: *Creating Sounds from Scratch* chapter 9 (ex. 9.3, 9.4)

Week 9 (10/19) Harnessing Feedback, Noise and Distortion
Feedback in Frequency Modulation
Turning simple waves complex: Waveshaping
Bit reduction
Production techniques:
  Drum programming with bit reduction
  Waveshaping leads with Saturator
Reading: TBD
Final Project Discussion
Exercise 9: TBA

Week 10 (10/26) Creative Convolving
Capturing impulse responses
Convolving hardware and software
Production techniques: Texturizing through convolution
Amalgamating impulse responses
Advanced modulation techniques
Reading: TBA
Exercise 10: Capture impulse responses and modify for personal sound libraries and composition

Week 11 (11/02) Designing Custom Instruments and Effects
   Introduction to Object Oriented Programming
   Building instruments and devices racks - Ableton Live
   Parallel and serial effects routing
   Max for Live Essentials
   Exploring and implementing Max for Live devices
   Production techniques:
      Designing creative instruments and effects
   Reading: Ableton Live Reference Manual chapter 18, 25, 26
   Exercise 11: TBA

Week 12 (11/09) Individual and Small Group Hands-on Exercises
   Reading: TBA
   Exercise 12: TBA

Week 13 (11/16) Individual and Small Group Hands-on Exercises
   Reading: TBA
   Exercise 13: TBA

Week 14 (11/23) Thanksgiving Holiday

Week 15 (11/30) Final Project Work Session

12/05: Final Project Due 10PM

12/10: Final Exam - 8-10:00AM