

College of San Mateo
Official Course Outline

1. **COURSE ID:** MUS. 292 **TITLE:** Sound Creation: Sampling and Synthesis

Units: 3.0 units **Hours/Semester:** 32.0-36.0 Lecture hours; 48.0-54.0 Lab hours; and 64.0-72.0 Homework hours

Method of Grading: Grade Option (Letter Grade or Pass/No Pass)

Prerequisite: MUS. 290

2. **COURSE DESIGNATION:**

Degree Credit

Transfer credit: CSU; UC

3. **COURSE DESCRIPTIONS:**

Catalog Description:

Create original sounds for composition, live performance, and sound effects. Fully utilize the technical and artistic potential of synthesizers and samplers. Study the nature of musical instruments and environmental sounds. From an historical as well as a technical perspective, analyze synthesized and sampled sounds found in experimental and popular music. Specific synthesis techniques covered include: analog modular synthesis, FM synthesis, additive synthesis, granular synthesis and physical modeling.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**

Upon successful completion of this course, a student will meet the following outcomes:

1. Describe the theory behind various synthesis and sampling techniques
2. Create original sounds using analog and digital synthesis
3. Create original sounds by recording, editing and processing audio samples
4. Integrate original sounds into original music composition

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**

Upon successful completion of this course, a student will be able to:

1. Describe the theory behind various synthesis and sampling techniques
2. Create original sounds using analog and digital synthesis
3. Create original sounds by recording, editing and processing audio samples
4. Integrate original sounds into original music composition

6. **COURSE CONTENT:**

Lecture Content:

The Physics of Sound

How do human beings distinguish between sounds

Understanding timbre and the overtone series in musical instruments

The nature of sounds in our environment

Analog Synthesis

History of analog synthesis

Survey of analog synthesis techniques

Digital Synthesis

History of digital synthesis

Comparison of analog and digital timbres

Survey of digital synthesis techniques including: FM, Wavetable, Fourier,

Granular Synthesis and Physical Modeling

Sampling

History of sampling

Ethical and legal issues involving sampling

Survey of sampling techniques including: making beats from samples, acoustic instrument emulation, creating special effects sounds, vocal sampling

Comparison of sampling live audio vs pre-recorded material

Creating Original Music using Original Sounds

History of electronic music related to synthesis and sampling

Survey of digital music tools for sound design and composition

Lab Content:

1. Create sounds using the following modular analog synthesis techniques:
 - ADSR envelope generators
 - LFO Controllers
 - Filter Sweeping
 - Sample and Hold
 - AM, FM and Ring Modulation
 - Envelope Following
2. Create sounds using the following digital synthesis techniques:
 - Digital FM Synthesis
 - Additive (Fourier) Synthesis
 - Wavetable Synthesis
 - Physical Modelling
 - Granular Synthesis
3. Create sounds using sampling techniques:
 - Looping
 - Editing and Truncating
 - Reversing
 - Cross-fading
 - Pitch-shifting
4. Audio and MIDI signal processing for sound design
 - Modify sounds via reverb, chorusing, delay, feedback etc.
 - Create original sound effects via plug-ins and hardware digital signal processors
 - Control timbre in real-time performance
 - Map MIDI real-time controllers
5. Create original musical works incorporating original sound design
 - Use original analog and digital synthesized sounds in a composition
 - Using original samples to create drumbeats and rhythm tracks
 - Using original samples to create special effects and simulate acoustic instruments

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Lab
- C. Other (Specify):
 1. (Lectures) Lectures incorporate presentations, discussions and analysis of contemporary and historical sound creation practices and technologies.
 2. (Labs) Labs provide demonstrations and hands-on instruction in pertinent sound design techniques including: analog synthesis, FM synthesis, granular synthesis, physical modeling and sampling. Musical examples of numerous electronic music genres and eras are presented and analyzed in the classroom and the lab.
 3. (Listening Activities) Midterm and final projects give students the opportunity to combine theory, technology, and musical creativity into cohesive works. Works are critiqued by instructor and students.
 4. (Creative Projects) Midterm and final projects give students the opportunity to combine theory, technology, and music creativity into cohesive works. Works are critiqued by instructor and students.

8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

Writing Assignments:

- Project proposals
- Project reports
- Concert program notes

Reading Assignments:

- Textbook reading assignments
- Related articles

Electronic music equipment manuals

Other Outside Assignments:

Digital audio lab assignments
Class presentation
Creative musical projects
Performance of original work

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Lab Activities
- B. Projects
- C. Quizzes
- D. Students are evaluated on the basis of: written quizzes, lab assignments, oral presentation, creative projects and concert performance.

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Pejrolo, A.a and S. Metcalfe. *Creating Sounds from Scratch: A Practical Guide to Music Synthesis for Producers and Composers*, ed. Oxford University Press, 2017
- B. Manzo, V.J.. *Foundations of Music Technology*, ed. Oxford University Press, 2016

Origination Date: September 2020

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Course Originator: Christine Bobrowski