

College of San Mateo
Official Course Outline

1. **COURSE ID:** MUS. 680MM **TITLE:** New Interfaces for Making Music II
Units: 4.0 units **Hours/Semester:** 48.0-54.0 Lecture hours; 48.0-54.0 Lab hours; and 96.0-108.0 Homework hours
Method of Grading: Grade Option (Letter Grade or Pass/No Pass)
Prerequisite: MUS. 298

2. **COURSE DESIGNATION:**
Degree Credit
Transfer credit: CSU

3. **COURSE DESCRIPTIONS:**
Catalog Description:
A continuation of MUS 298 New Interfaces for Making Music. Students gain experience with more complex sensors, microprocessors and computer-human interaction for musical expression. Focus on designing and building an original, stand-alone musical interface for live musical performance. Additional supplies may be required.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
Upon successful completion of this course, a student will meet the following outcomes:
 1. Create and control sound in an artistic and expressive way using multi-dimensional sensors and complex human-computer interaction.
 2. Design and build an original, stand-alone, digital music interface.
 3. Critically analyze, describe and demonstrate one's own new interface for making music in the context of performance.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
Upon successful completion of this course, a student will be able to:
 1. Create and control sound in an artistic and expressive way using multi-dimensional sensors and complex human-computer interaction.
 2. Design and build an original, stand-alone, digital music interface.
 3. Critically analyze, describe and demonstrate one's own new interface for making music in the context of performance.

6. **COURSE CONTENT:**
Lecture Content:
 - A. Survey of Continuous Sensors
 - a. Motion sensors (X,Y,Z axes)
 - b. Force sensors
 - c. Distance sensors
 - d. Color sensors
 - e. Accelerometers
 - f. Heat sensors
 - g. Infrared sensors
 - h. Light sensors
 - i. Vibration sensors
 - j. Flex sensors
 - k. Temperature sensors
 - B. Mapping Sensor Data to Control Sound and Music
 - a. Amplitude
 - b. Frequency
 - c. Timbral Spectrum
 - d. Sound Envelopes
 - e. Sound Modulation
 - f. Rhythm
 - g. Melody
 - h. Dynamics

- i. Tempo
- C. Microprocessors
 - a. Arduino
 - b. Teensy
 - c. Analog Ins and Outs
 - d. Digital Ins and Outs
 - e. Programming
- D. MIDI (Musical Instrument Digital Interface) in Musical Interface Design
 - a. MIDI hardware – ports, cables
 - b. MIDI software
 - 1. MIDI Protocol
 - 2. Programming with MIDI
 - 3. Arduino MIDI Library
- E. Final Project – Original New Interface for making Music
 - a. Concept proposal
 - b. Design
 - 1. Human-Computer Interaction Design
 - 2. Physical Materials and Build Design
 - 3. Circuitry Layout
 - c. Milestones and time management
 - d. Prototype
 - e. Build-Out
 - 1. Soldering or circuit printing
 - 2. Physical Construction
 - 3. Enclosure
 - 4. Power and Cable Connections
 - f. Final presentation and -performance demonstration

Lab Content:

- A. Sensor experimentation and selection (Week 1-2)
- B. Breadboarding (Week 3-4)
- C. Microprocessor programming (Week4-5)
- D. Design and Proof of Concept (week 6-7)
- E. Iterative prototyping (Week 8-10)
- F. Build (Week 11-14)
- G. Musical Performance Exploration (Week15-16)
- H. New Interface for Music Making Final Project Demonstration Week 17(Final)

7. REPRESENTATIVE METHODS OF INSTRUCTION:

Typical methods of instruction may include:

- A. Lecture
- B. Lab
- C. Activity
- D. Critique
- E. Discussion
- F. Experiments
- G. Observation and Demonstration

8. REPRESENTATIVE ASSIGNMENTS

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

Writing Assignments:

- Paper on an electronic music artist or instrument inventor incorporating new musical interfaces in their work.
- Written project proposal including timelines and milestones.
- Written project reports describing the conceptual ideas and techniques used.

Reading Assignments:

- Essays and articles
- Textbook Chapters
- Manual excerpts

Other Outside Assignments:

- Lab Assignments
- Creative Group and Individual Projects
- Oral Presentation
- Demonstration and Performance Using Final Project

9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

- A. Class Participation
- B. Class Performance
- C. Class Work
- D. Exams/Tests
- E. Final Class Performance
- F. Final Performance
- G. Final Public Performance
- H. Group Projects
- I. Homework
- J. Lab Activities
- K. Oral Presentation
- L. Papers
- M. Projects
- N. Quizzes

10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

- A. Collins, N.. *Handmade Electronic Music, The Art of Hardware Hacking*, 3rd ed. Routledge, 2020

Origination Date: October 2021

Curriculum Committee Approval Date: October 2021

Effective Term: Fall 2022

Course Originator: Christine Bobrowski