

**College of San Mateo**  
**Official Course Outline**

1. **COURSE ID:** MUS. 398    **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; 96.0-108.0 Homework hours; 192.0-216.0 Total Student Learning hours  
**Method of Grading:** Grade Option (Letter Grade or Pass/No Pass)  
**Prerequisite:** MUS. 298
  
2. **COURSE DESIGNATION:**  
**Degree Credit**  
**Transfer credit:** CSU; UC
  
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. Use of Microprocessors in Music Performance
  - 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
- B. Jensenius, A.. *A NIME Reader: Fifteen Years of new Interfaces for Musical Expression*, 1st ed. Springer, 2017
- C. Bjorn, K.. *Push Turn Move - Interface Design in Electronic Music Book*, 1st ed. Bjooks, 2021

**Origination Date:** October 2021

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**Effective Term:** Fall 2022

**Course Originator:** Christine Bobrowski