

# MATH W84: Music and Mathematics

## Syllabus, Interim 2021

**Material.** The course is exploratory in nature, investigating further some of the topics arising in the 12 lectures of David Kung in The Great Courses series, "How Music and Mathematics Relate." Resources such as **Music: A Mathematical Offering**, by Dave Benson will be used as appropriate to dig into the details of topics such as harmonic analysis, what makes timbre vary from one instrument to another, temperament, consonance and dissonance, transformations and symmetry, rhythm, and digitizing sound. We will make use of Octave to explore the concepts.

**Learning Outcomes.** The student who successfully completes this course, will be able to

- describe new connections between mathematics and music she was formerly unaware of, as well as articulate with greater mathematical substance some connection previously known but unexplored.
- describe a process by which a sound can be digitized and later played in a manner so that the hearer thinks the recorded sound is substantially the same as the original.
- understand and explain what is meant by the phrase, "no piano is ever in tune."
- identify and explain several auditory illusions.
- use theoretical and software tools to carry out various tasks assigned as exercises.

**Class Policies.** You are expected to attend class faithfully, both during the online phase (first half), and after students are allowed to return to campus. Most every day something will be assigned, either for you to do individually or as a group activity. You should present your work at least informally to others of your group in space provided in Microsoft Teams and, on those occasions when something more formal is required (a prepared document, a presentation, a quiz), participate fully. Demonstrating a healthy interest in the content of the course, displaying diligence in your work, both individually and in cooperation with others, and providing helpful/respectful feedback to others in the class are the benchmarks that will be used to assess your performance in the class.

As for general practice, please

- submit quiz responses and formal assignments by the due date/time.
- Look at your messages to see if I have posted any notices to the class, and take action accordingly.
- Once we have returned to campus, be present in the classroom ahead of time and ready to go. If you clean your work area, presume that others have followed a "pre-sanitation", not a "post-sanitation" routine.)

Occasionally there are special circumstances that require class policies be adjusted for a particular student. In such cases, it is the responsibility of the student to inform me of the situation **as soon as possible**, so that appropriate arrangements can be made. This includes, but is not limited to, students with documented disabilities.

**Accommodations.** Calvin University has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Like so many things this fall, the need for accommodations and the process for arranging them may be altered by the COVID-19 changes we are experiencing and the safety protocols currently in place. Students with disabilities who may need some accommodation in order to participate fully in this class are urged to contact Disability Services in the Center for Student Success ([disabilityservices@calvin.edu](mailto:disabilityservices@calvin.edu)) as soon as possible to explore what arrangements need to be made to assure access. The three of us (student, instructor, and Disability Services) will work together to find an appropriate solution.

**Grading.** The various weights will be as follows:

- Attendance: 15%
- Participation in informal assignments: 25%
- Reflections/journaling: 15%
- Formal assignments: 45%

You are expected to be transparent about your work, open acknowledging anything borrowed from a fellow student or an outside source, pulling your weight in group work, and producing your own write-up whenever an assignment is for individuals. We learn better together, and discussion of problems with classmates is encouraged, subject to these guidelines. Read more in Calvin's [Student Conduct Code](#).

**Exceptions.** I reserve the right to make changes or exceptions to course policies, including those described in this document, either for the entire class or for individuals. The ultimate goal in this course is **learning**, and formal requirements should not unnecessarily stand in the way of that. Thus, if you think that any of the conditions of the course are interfering with learning, please speak with me about this, and we will consider what can be done.