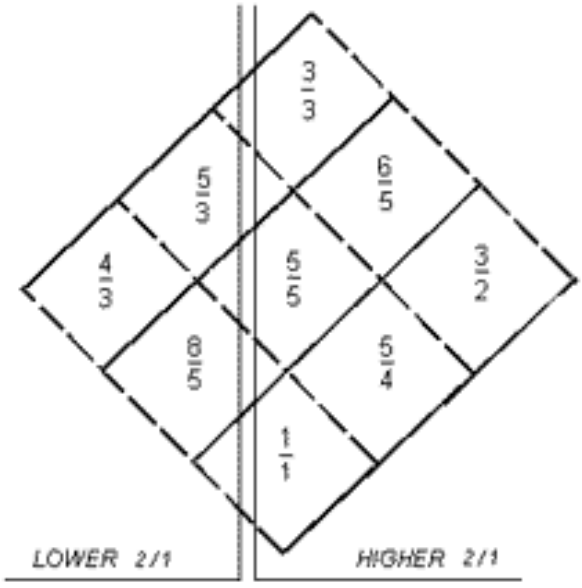
Tuning and Temperament

Summer II, 2020
Class Location
Class Days and Times



Course Description

While we in the West have become accustomed to 12-tone equal temperament, the issue of musical tuning has a complex history with many avenues explored, settled upon and abandoned. This course will present an overview of various tuning and temperament systems that have been and are used in Western music. Included are equal temperament, just intonation, meantone temperament, well temperament, and exotic flavors of scales, some purely theoretical. There will be a significant listening portion to the course, focused primarily on musical examples. A list is given below.

To maximize your chances of success in this course you should understand basic musical concepts and be able to read music at a very basic level (the latter is not necessary but will help in some contexts). In addition, you should be comfortable with basic math, ratios, and multiplying fractions.

DISCLAIMER: This course may be detrimental to composers who may become so enthralled at new possibilities that they eventually find themselves in remote regions of musical thought, alone, with neither sustenance nor shelter.

Instructor

Jacob Sundstrom
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Office: WLH 2148
Course Website: http://notthatintomusic.com/courses/tuning2020

Office Hours
SOME DATE, SOME TIME. Also available by appointment.

Course Learning Outcomes

Upon completion of this course, students will be able to:

- Understand why tuning is an issue in music.
- Understand the origins of our current 12 tone system and its historical predecessors.
- Understand how to create justly intoned scales using any prime.
- Create their own temperaments and write short etudes using the created temperament.

Course Materials and Tools

There are no required textbooks for this course. However, there is a significant list of required listening, a shorter list of required reading, and a further list of recommended perusing below. Keep in mind that this list is not necessarily complete; any and all updates will be posted to the course website. A simple program will also be made available such that scales can be created, heard, and etudes can be written.

Recommended Perusing

Hermann von Helmholtz, *On the Sensations of Tone*
Harry Partch, *Genesis of a Music*
William Sethares, *Tuning, Timbre, Spectrum, Scale*
Jan Haluska, *The Mathematical Theory of Tone Systems*
The Cambridge History of Western Music Theory, ed. Thomas Christensen
James Frederic Mountford, *The Musical Scales of Plato's Republic*

Listening

Pythagorean Tuning
Harry Partch: *Two Studies on Ancient Greek Scales*

Just Intonation
Harry Partch: *Delusion of the Fury*
Lou Harrison: *String Quartet Set*
La Monte Young: *The Well-Tuned Piano*
Syzygys (band)

Meantone Temperament
J.S. Bach: *Toccata and Fugue in D minor* (meantone organ)
Vito Trasuntino (31 tone extended meantone, very close to 31TeT)

Well Temperament
J.S. Bach: *The Well-Tempered Clavier*

8TeT
Gordon Mumma: *Octal Waltz*

19TeT
Fabio Costa: *Meditation*

31TeT
Vito Trasuntino (31 tone extended meantone, very close to 31TeT)
Nicola Vicentino (31 tone extended meantone, very close to 31TeT)
Fabio Costa: *Aphoristic Madrigal*

Tuning Programs
I've created a very simple program that allows one to define a scale and play a monophonic or polyphonic sequence. Documentation is here: https://notthatintomusic.com/courses/tuning2020/tuner.

If you're really ambitious and computer savvy, you can try to build Scala (http://www.huygens-fokker.org/scala/). It's very fun to work with and it easily connects with MIDI controllers.

Grading Information

Summary of Grade Criteria

Assignment	Weight
Discussion and Participation	10%
Assignments (x4)	50%
Final Project	40%
	100%

Grading Scale

A = 90-100% **B** = 80-89% **C** = 70-79% **D**=60-69% **F** = 59%-belov

Assignments
Weekly assignments will consist of scale construction or creation exercises, written discussions, and/or etudes written in the tuning systems we study.

Assignment 1

In exactly one single-spaced page, describe the problem of tuning and Pythagoras' attempt to solve it. What is the primary interval in Pythagorean tuning? How did he deal with the comma?

Assignment 2

Using an extant justly tuned scale or one of your own creation, write a short etude that exploits idiosyncratic properties of the scale. Must be accompanied by a few paragraphs describing the tuning system used, construction method, and/or diagrams. Be prepared to show in class.

Assignment 3

Using a variation of meantone, well-temperament, or equal temperament (not 12TeT), create a short polyphonic etude. Must be accompanied by a few paragraphs describing the tuning system used, construction method, and/or diagrams. Be prepared to show in class.

Assignment 4

Write a short proposal for your final project including the format and topic. Due by the end of week 4.

Late or Missing Assignments

Given the extremely short summer session, late assignments will *not* be accepted without forewarning. Plan accordingly.

Final Project

The final project will consist of one of two things: a short research paper (8 pages, 12 point font, double-spaced) on a temperment discussed, including its history, implications, and usage; or a longer etude (~3 minutes) using a temperament of your own creation. The latter must be accompanied by an equally brief discussion of the tuning system and its implications (2-3 pages, 12 point font, double-spaced). These papers should also include diagrams as needed.

FINAL PROJECT IS DUE THE SATURDAY OF WEEK 5 BY 11:59PM PST.

For those that choose an etude, you will be showing it in the final class of the session although the completed project (etude + short paper) is due on Saturday. For those that choose a research paper, you will have a short (≈15min) presentation on your topic. Prepare accordingly.

Grading Procedure and Feedback

Students are graded on an absolute scale and are expected to complete all assignments on time. Assignments will typically be assigned on the last meeting that takes place during the week and will be due at the first meeting in the following week (i.e. class is Tuesday/Thursday. Assigned Thursday, due Tuesday). Every effort will be made to provide useful feedback in a timely manner.

Attendance and Participation

Attending class is critical to have a firm grasp of the material. You will be graded on your participation in in-class discussions which mandates your appearance in class.

Course Schedule (tentative)

Week	Activities, assessments, and due dates	Reading
1	*Down the rabbit hole…* Introduction of what tuning is in Western music and the problem of musical tuning. Introduction of the tools and terminology of the course.	TBA
	Early Musical Tunings Early tuning systems including discussions of Pythagoras, Ptolemy, and other early theoretical paradigms and divisions of the tetrachord.	TBA
2	*Just Intonation I* Introduction to just intonation including prime limits, scale construction, and practical difficulties. **Assignment 1 due.**	TBA
	Just Intonation II Further discussion of just intonation including utonality. Overview of notational methods including Partch and the Helmholtz-Ellis Accidentals.	TBA
3	*Meantone and Well Temperament* Tuning systems of the Renaissance and Baroque period. **Assignment 2 due.**	TBA
	Equal Temperament I Equal temperament in 8, 12, 19, 24, 31, etc. divisions. Discussion of why it is that Western music settled on this convention.	TBA
4	*Equal Temperament II* Continuation of equal temperment. **Assignment 3 due.**	TBA
	Exotic Tuning Systems Bohlen–Pierce scale, A12 scale, 833 cents scale, etc.	TBA

5	*DIY Temperaments* Grow your own temperament. Discussion of final projects.	TBA
	Final Project Presentations Listening to and discussing final projects. **Final is due on Saturday at 11:59PM.**	TBA

Course Expectations

What I expect of you	**What you can expect of me**
Be informed. Read this syllabus carefully and completely so you understand the course structure and expectations.	**Enthusiasm.** To be prepared for each class and to bring my enthusiasm for teaching to each lecture, lab, and office hour meeting.
Be attuned. Keep up with readings and lab assignments, as each one builds on the previous one.	**Responsiveness.** To respond to emails within 24 hours. For those that know me already, you know that I usually respond faster than this. Emails received on weekends or while I'm traveling may take longer.
Ethical. A good attitude and maintenance of honest and ethical principles towards me, your classmates, and the execution of the course. Please read UC San Diego's Principles of Community and Conduct Code.	**Timely feedback.** To make every effort to return graded assignments within one week of the submission date and to post solutions or code as soon as is reasonably possible after the submission date.
Integrity. An honest, fair, responsible, respectful, trustworthy, and courageous effort on all academic work and collaboration. Please read UC San Diego's Policy on Integrity of Scholarship. Then, take the integrity pledge!	**Integrity.** To uphold integrity standards and create an atmosphere that fosters active learning, creativity, critical thinking, and honest collaboration.
Be flexible. Sometimes my schedule gets affected by unavoidable work travel, necessitating some office hour rescheduling at the last minute.	**Reasonable** accommodation and understanding for student situations that arise; however, I will not make exceptions for one person that are not available to every other person in the course.