

# **The Sound of Music: How It Works**

OLLI Spring 2020

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This course will be an exploration of the wonders of the musical experience from the standpoint of a non-musician with scientific curiosity. We will seek to understand just what makes music so compelling, what its essential elements are, how it works, and why it is organized just so. Hopefully, this approach will offer unexpected insights for everyone with an interest in music -- from the musically challenged, to knowledgeable aficionados, and even to expert musicians.

## **Syllabus**

### **Week 1. Building Blocks**

Some basic concepts underlying our approach to understanding how music works. These will include suggested references, elements of music, elementary properties of sound waves, overtones and harmonics, beats, the Octave, and visualization of musical sounds. Demos will be used.

### **Week 2. Resonance: Building Musical Sounds**

Discussion and demonstrations of various resonant systems used in producing music, including vibrating strings, pipes, drums and other resonators. We will discuss the properties important for music production.

### **Week 3. Hearing: The Ear and the Auditory parts of the Brain**

How hearing works, especially with respect to musically important sounds. How the construction of the ear and its associated neurological processing determines what aspects of sounds we can perceive, and what parts we are deaf to. Absolute Pitch. Demonstrations. Your hearing will be tested and challenged.

### **Week 4. Musical Scales and Note Systems: The Fodder of Music**

A fresh look at the ways in which different musical traditions, principally Western ones, have organized and codified the sounds used in music. Hopefully, we will cut through a lot of complexity and get to a few simple organizing principals. Importance of the Octave, Temperament, Microtonal music, chords and important intervals.

### **Week 5. Musical Instruments**

Discussion and demonstrations. How common (and less common) musical instruments work, drawing on all the earlier Weeks' discussions. What makes them sound different. The strengths and weaknesses they have. How they are tuned.

## **Week 6. The Human Singing Voice *and* Musical Notation**

The human voice as a musical instrument, and how it works. Ranges, formants. The need for transposing musical pieces to accommodate voice capabilities.

A brief introduction to musical notation systems, principally standard Western musical notation. Strengths and weaknesses. A bit of history explaining how it developed. Alternative notations.

## **Week 7. Harmony and Dissonance: Chords and Progressions**

How Harmony works, based on the working of the human ear. Lots of demonstrations. Opportunities to “vote” on perceptions of dissonance. Importance of temperament and the Temperament Wars, and their relationships to the construction of musical instruments. This week’s discussion is at the very heart of this course.

## **Week 8. Combining the Elements of Music**

Resolution of the different aspects of music covered in the course. Demonstrations of Rhythm, Melody, and Harmony. The idea of Tonality and the techniques composers use to get you hooked. Modulation of keys. The roles of learning and cultural expectations vis-à-vis natural preferences. How norms have evolved over the centuries. Non-Western music contrasted with Western genres.