

## ***Tuning Theory***

### **SYLLABUS**

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#### **Instructor**

Dr. Reginald Bain, Professor  
Composition and Theory

#### **Contact Information**

E-mail: [rbain@mozart.sc.edu](mailto:rbain@mozart.sc.edu)  
Phone/Voice mail: (803) 777-8183  
Office: Music Building, R227  
Office Hours: MW 12:00-1:00 pm, or by appointment

#### **Course Information**

Term: Spring 2024  
Format: MW: 10:50-11:40 pm, B3WEB<sup>1</sup>  
Location: Music Building, R214  
Website: <<https://reginaldbain.com/vc/musc726t/>>  
Blackboard: <<https://blackboard.sc.edu/>>

#### **COURSE MODULES**

1. The Harmonic Series
  2. Generating Scales
  3. Pythagorean Tuning
  4. Just Intonation
  5. Meantone  
Temperament
  6. Equal Temperament
  7. Selected Topics
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#### **Description**

Tuning theory for contemporary musicians with a focus on the theory, analysis, and practice of microtonality in historical and contemporary contexts. (*Prerequisite:* Undergraduate tonal harmony and voice leading.)

#### **Required Textbook**

Gann, Kyle. 2019. *The Arithmetic of Listening: Tuning Theory and History for the Impractical Musician*. Urbana, IL: University of Illinois Press. There is a hard copy on reserve in the Music Library and you can access the Ebook via the EBSCOhost link on the course website. Or for more convenient access, you may purchase the paperback book or eBook at the university bookstore, or University of Illinois Press: <<https://www.press.uillinois.edu/books/?id=p084416>>.

#### **Additional Course Materials**

Digital scores, recordings and analytical media will be made available via Blackboard and course website.

#### **Course Goals and Objectives**

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

- Understand how tuning theory informs musical performance, composition, and related musical fields
- Analyze music that employs historical and contemporary tuning systems
- Understand the mathematics behind tuning systems
- Compare/contrast xenharmonic music composed in a wide variety of styles
- Propose, research, and create two tuning-theory presentations (with supporting digital media)

#### **Technical Requirements**

A computer, Web access, and a university-provided Blackboard account are required to access the digital course materials and submit work via Blackboard. Microsoft Word (.docx), Excel (.xlsx), and PowerPoint (.pptx) are the preferred document creation formats. These programs are available for free to all USC students. For more info., see *Links for Students > Blended Course Information* on the course website.

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<sup>1</sup> Blended/Hybrid Up to 49% web. Course that is taught both face-to-face and online with 49% or less of the course offered online. Course meets in-person on Monday/Wednesday and assignments/activities are completed asynchronously online by students in lieu of a Friday meeting.

## Course Requirements

Weekly reading, score study, listening, and asynchronous assignments/activities (see the *Daily Schedule* and *Listening/Analysis*) for detailed information. Daily participation in class. Daily use of the course Blackboard page and website. There will be an online midterm exam and an online final exam. There will also be two project presentations: 1. *Teaching Demo* and 2. *Final Project*, both with required supporting digital media.

## Course Format & Policies

This course is being offered as a blended course. The course meets face-to-face (f2f) twice per week (Mondays and Wednesdays). Typical activities in the f2f classroom include lecture, interacting with your instructor and classmates, analytical discussions, open Q & A sessions, and review sessions. Assignments/activities are completed asynchronously by students in lieu of a Friday meeting. Much of this work will occur online in Blackboard. The learning modules in Blackboard are organized into weekly assignments/activities that include links to videos, scores, recordings, analyses, quizzes, exercises, software for computer-aided analysis, etc. Online activities and in-class activities are designed to build on each other. Weekly assignments/activities will be posted on Wednesday and are due the following Monday at class time (unless otherwise stated). Completion of the online assignments/activities in a timely manner, and active participation in class, are critical to success in this course. Late work cannot be accepted – except in the case of a documented excused absence. Work that is not submitted is averaged into the student's grade using a score of zero. For more info., see *Links for Students > Blended Course Information* on the course website.

## University Policies

As described on the university's *Carolinian Creed*, *Honor Code* and *Center for Teaching Excellence* websites, students are expected to practice the highest possible standards of academic integrity and classroom etiquette. For more detailed info., see *Links for Students* on the course website.

## Student Services

Information about **Graduate Student Opportunities and Support**, **Wellness at the School of Music**, and **other student services** is also available on the course website under *Links for Students*.

## Student Disability Resource Center

If you are registered with the Student Disability Resource Center (SDRC), please make sure I receive a copy of your accommodation letter by the first day of class so I may work with you (and with SDRC as necessary) to make sure your accommodations are met. The SDRC is located in Close-Hipp, Suite 102. You may reach the SDRC via e-mail [sadrc@mailbox.sc.edu](mailto:sadrc@mailbox.sc.edu), or phone (803) 777-6142.

## Attendance Policy

This course will follow the university's *Attendance Policy* available online at:

<https://academicbulletins.sc.edu/undergraduate/policies-regulations/undergraduate-academic-regulations/>

## Classroom Policies

I am committed to making each day we meet an active, focused, positive, and distraction-free learning environment for everyone in the class. I expect all students to follow the university guidelines for classroom *safety* and *acceptable conduct*, as well as the *classroom etiquette* guidelines below:

- Please do not enter the classroom while music is playing. You may enter the classroom (as quietly as possible) when the instructor indicates that the current active listening exercise has ended.
- Cell phones should be put in silent mode before the class begins.
- The use of laptops and tablets can be a significant distraction to others. Please be sensitive to this fact and limit their potential for distraction by using your electronic devices only for class-related activities.
- In the case of *illness* or *extended absence*, be sure to keep me informed via e-mail.
- Students are expected to be *fully attentive* to *presentations of work by colleagues*.
- Students are expected to communicate ideas clearly and effectively. All work must reflect *acceptable standards of written English*. If you need help with your writing, the USC Writing Center (703 Byrnes Building, 803-777-2078) is committed to helping students take advantage of all the opportunities for learning that exist within the writing process.

## Grading Scale & Distribution

A = 90-100%; B+ = 85-89%; B = 80-84%; C+ = 75-79%; C = 70-74%; D+ = 65-69%; D = 60-64%; F = 0-59%

- 20% - Assignments/Activities
- 15% - Midterm Exam
- 20% - Teaching Demo Project
- 30% - Final Project
- 15% - Final Exam

## COURSE OVERVIEW

Week	Topic	Reading
<b>Week 1</b>	Mon., 1/8 Wed., 1/10 <i>Fri., 1/12 – A<sup>2</sup></i>	1. THE HARMONIC SERIES  Ch. 1 The Cosmic Joke Ch. 2 The Harmonic Series
<b>Week 2</b>	Mon., 1/15 Wed., 1/17 <i>Fri., 1/19 – A</i>	NO CLASS (Dr. Martin Luther King, Jr. Service Day) <i>cont.</i>
<b>Week 3</b>	Mon., 1/22 Wed., 1/24 <i>Fri., 1/26 – A</i>	2. GENERATING SCALES  Ch. 3 Generating Scales
<b>Week 4</b>	Mon., 1/29 Wed., 1/31 <i>Fri., 2/2 – A</i>	3. PYTHAGOREAN TUNING  Ch. 4 The Pythagorean Scale
<b>Week 5</b>	Mon., 2/5 Wed., 2/7 <i>Fri., 2/9 – A</i>	4. JUST INTONATION  Ch. 5 The Five Limit, the Second Dimension
<b>Week 6</b>	Mon., 2/12 Wed., 2/14 <i>Fri., 2/16 – A</i>	5. MEANTONE TEMPERAMENT  Ch. 6 Meantone Temperament and the Primacy of Thirds
<b>Week 7</b>	Mon., 2/19 Wed., 2/21 <i>Fri., 2/23 – A</i>	6. EQUAL TEMPERAMENT  Ch. 8 Twelve-Step Equal Temperament
<b>MIDTERM EXAM<sup>3</sup></b>		
<b>Week 8</b>	Mon., 2/26 Wed., 2/28 <i>Fri., 3/1 – A</i>	7. SELECTED TOPICS  <i>Well Temperament</i>  Ch. 7 Well Temperament & Key Color
<b>Teaching Demo Proposal</b> – Due Fri., March 1, 11:59 pm		
<b>Week 9</b>	<i>Spring Break</i>	
<b>Week 10</b>	Mon., 3/11 Wed., 3/13 <i>Fri., 3/15 – A</i>	Extended Just Intonation (EJI)  Ch. 9 The Seven Limit and Johnston Notation

<sup>2</sup> Dates in italics indicate asynchronous (*A*) instruction days. For a detailed listing of asynchronous assignments/activities, see the *Daily Schedule* and *Listening/Analysis*.

<sup>3</sup> The Midterm Exam will be posted on Wed., Feb. 21. The Midterm Exam is due Mon., Feb. 26, at 10:50 am.

<b>Week 11</b>	Mon., 3/18 Wed., 3/20 <i>Fri., 3/22 – A</i>	<i>Guest Speaker TBA</i>	<b>Selected Topics (TBA)</b> Ch. 10 The Eleven Limit and the Fourth Dimension <ul style="list-style-type: none"> <li>• 11-limit</li> <li>• Harry Partch</li> </ul>
<b>Week 12</b>	Mon., 3/25 Wed., 3/27 <i>Fri., 3/29 – A</i>	<i>Teaching Demo Presentations</i>	Ch. 11 The Thirteen Limit and Beyond <ul style="list-style-type: none"> <li>• 13-limit, 17-limit, 19-limit &amp; 23-limit</li> <li>• Harmonic Series: 29-limit &amp; beyond</li> <li>• Array Notation</li> </ul>
<b>Week 13</b>	Mon., 4/1 Wed., 4/3 <i>Fri., 4/5 – A</i>	<i>Final Project Consultations</i>	Ch. 12. Non-Divisible Equal Temperaments <ul style="list-style-type: none"> <li>• 19tet, 31tet, 53tet</li> <li>• Bosanquet’s Theory of Temperaments</li> <li>• Blackwood, Darreg &amp; Haverstick</li> </ul>
<b>Week 14</b>	Mon., 4/8 Wed., 4/10 <i>Fri., 4/12 – A</i>	<i>Final Project Presentations</i>	Ch. 13 Twelve-Based Equal Temperaments <ul style="list-style-type: none"> <li>• Spectralism</li> </ul>
<b>Week 15</b>	Mon., 4/15 Wed., 4/17 <i>Fri., 4/19 – A</i>	<i>cont.</i>	Ch. 14 A Few Numbers Drawn from Non-Western Musics <ul style="list-style-type: none"> <li>• Indian Classical Tuning</li> <li>• Arabic Music</li> <li>• Indonesian Gamelan</li> <li>• Thai Classical Music</li> </ul>
<b>Week 16</b>	Mon., 4/22	<i>cont.</i>	Ch. 15 Brief Miscellaneous Thoughts

**Final Project Proposal** – Due Fri., March 29, 11:59 pm

**FINAL EXAM<sup>4</sup>**

ANALYTICAL INTERLUDES (Gann 2019)

Chapter	Interlude		System
Ch. 3	Interlude A	Ptolemy and Ancient Greek “Parts”	Ancient Greek Scales
Ch. 4	Interlude B	Machaut, <i>Notre Dame Mass</i>	Pythagorean Scale
Ch. 5	Interlude C	Riley, <i>The Harp of New Albion</i> and Johnston’s <i>Sonata for Microtonal Piano</i>	Just Intonation (JI): 5-limit (and beyond)
Ch. 6	Interlude D	Meantone Examples by Gibbons, Bull, Scarlatti, and Mozart	Meantone Temperament
Ch. 7	Interlude E	Bach, Beethoven, and Temperament	Well Temperament
Ch. 9	Interlude F Interlude G	Young, <i>The Well-Tuned Piano</i> Johnston, <i>String Quartet No. 4</i>	Extended JI
Ch. 10	Interlude H	Partch, Barstow	JI 11-limit
Ch. 11	Interlude I Interlude J Interlude K	Johnston, <i>String Quartet No. 7, III</i> Gann, <i>Hyperchromatica</i> Twining, <i>Chrysalid Requiem</i>	JI 13-limit and beyond
Ch. 12	Interlude L	Vicentino, <i>Musica Prisca Caput</i>	31edo
Ch. 13	Interlude M Interlude N	Alois Hába, <i>String Quartet No. 2, Op. 7</i> Charles Ives, <i>Three Quarter-Tone Pieces</i> Ivan Wyschnegradsky, <i>24 Preludes</i> Ezra Sims, <i>String Quartet No. 5</i>	24edo  72edo

<sup>4</sup> The Final Exam will be posted on Wed., April 24. The Final Exam is due Mon., April 29, at 11:59 pm.

## EXPLORE MUSIC BY

### **Middle Ages**

Machaut, Guillaume de

### **Renaissance**

Benedetti, Giovanni Battista

Bull, John

Galilei, Vincenzo

Gibbons, Orlando

Kepler, Johannes

Lassus, Orlando di

Tallis, Thomas

Vincentino, Nicola

### **Baroque**

Bach, J.S.

Biber, Heinrich Ignaz Franz

Krieger, Johann Philipp

Reiche, Gottfried

Scarlatti, Domenico

### **Classical and Romantic**

Beethoven, Ludwig van

Chopin, Frédéric

Haydn, Franz Joseph

Mozart, Wolfgang Amadeus

### **Twentieth and Twentieth-First Century**

Arkbro, Ellen

Bartok, Béla

Blackwood, Easley

Branca, Glenn

Britten, Benjamin

Burt, Warren

Carl, Robert

Carlos, Wendy

Carrillo, Julián

Coats, Gloria

Collier, Jacob

Darreg, Ivor

Eaton, John

Estrada, Julio

Fullman, Ellen

Gamer, Carlton

Grisey, Gérard

Haas, Georg Friedrich

Hába, Alois

Harrison, Lou

Harrison, Michael

Harvey, Jonathan

Haverstick, Neil

Hiller, Lejaren

Ives, Charles

Johnston, Ben

Kagel, Mauricio

Kodály, Zoltán

### **Twentieth and Twentieth-First Century (cont.)**

Lachenmann, Helmut

Lutosławski, Witold

Murail, Tristan

Oliveros, Pauline

Partch, Harry

Polansky, Larry

Riley, Terry

Saariaho, Kaija

Sabat, Marc

Scelsi, Giacinto

Sevish

Sims, Ezra

Stockhausen, Karlheinz

Susam, Taylan

Tenney, James

The Rasa

Twining, Toby

Vivier, Claude

Walker, Elaine

Wyschnegradsky, Ivan

Xenakis, Iannis

Young, La Monte

Etc.

### **Non-Western Musical Traditions** (Gann, Ch. 14)

Tuvan throat singing (see Levin and Edgerton 1999)

Indian classical music (pp. 232-233)

Arabic music (pp. 234-235)

Indonesian Gamelan (pp. 235-238)

Thai Classical Music (pp. 239-240)

Etc.