

Tuning Theory

SYLLABUS

Instructor

Dr. Reginald Bain, Professor
Composition and Theory

Contact Information

E-mail: 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 2026
Format: MW: 10:50-11:40 pm, B3WEB¹
Location: Music Building, R213
Website: <<https://reginaldbain.com/vc/musc726t/>>
Blackboard: <<https://blackboard.sc.edu>>

COURSE MODULES

1. The Harmonic Series (Ch. 1-2)
 2. Generating Scales (Ch. 3)
 3. Pythagorean Tuning (Ch. 4)
 4. Just Intonation (Ch. 5)
 5. Meantone
Temperament (Ch. 6)
 6. Equal Temperament (Ch. 8)
- Selected Topics:
7. Well Temperament (Ch. 7)
 8. Extended Just Intonation (Ch. 9-11)
 9. Equal Divisions of the Octave (Ch. 12-13)

Description

Tuning theory for contemporary musicians with a focus on the theory, analysis, and practice of microtonality in historical and contemporary contexts.

Required Textbook

Gann, Kyle. 2019. *The Arithmetic of Listening: Tuning Theory and History for the Impractical Musician*.
Urbana, IL: University of Illinois Press.

Additional Course Materials

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

Course Goals and Objectives

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

- Explain how tuning theory informs music composition, performance, and related fields
- Analyze a wide variety of music that employs historical and contemporary tunings and temperaments
- Explain the mathematics behind tuning systems
- Navigate online resources for tuning theory research and pedagogy
- Compare/contrast microtonal/xenharmonic music in a wide variety of styles
- Select an advanced research topic in field of tuning theory to research and present an oral presentation with supporting digital media that includes musical examples and theoretical diagrams.

¹ 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/analysis, and assignments/activities as listed in the *Daily Schedule* and *Listening/Analysis*. Daily participation in class. Daily use of the course Blackboard page and website. There will be two online exams: a midterm exam, and a final exam. There will also be an instructor-mentored *Midterm Research Project* and a *Final Presentation* on a student-selected tuning theory research topic.

Technology 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 complete technical information, see *Links for Students > Blended Course Information* on the course website.

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, review sessions, workshop sessions, and student presentations. Assignments/activities are completed asynchronously by students in lieu of a Friday meeting. Most of the work for the course will occur online in Blackboard. The learning modules in Blackboard are organized into weekly modules that include links to readings, videos, scores, recordings, analyses, quizzes, software, exercises, 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. For more information, see *Links for Students > Blended Course Information* on the course website. 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.

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.

Attendance Policy

This course will follow the university's *Attendance Policy*, which is available online at:
<https://academicbulletins.sc.edu/undergraduate/policies-regulations/undergraduate-academic-regulations/>

GenAI Policy

This course will follow the CTE's guidelines for GenAI use, which is available online at:
https://sc.edu/about/offices_and_divisions/cte/teaching_resources/generative_ai/genai_teaching_guidelines/index.php

Student Services

Information about **Graduate Student Opportunities and Support**, **Wellness at the School of Music**, and **other student services** is 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, or phone (803) 777-6142.

Grading Scale

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

Grade Distribution

20% - Assignments/Activities
15% - Midterm Exam
20% - Midterm Research Project
30% - Final Presentation
15% - Final Exam

COURSE OVERVIEW

Week 1	Mon., 1/12 Wed., 1/14 Fri., 1/16 – <i>A</i> ²	Topic 1. THE HARMONIC SERIES	Reading Ch. 1 The Cosmic Joke; Ch. 2 The Harmonic Series Activity #1: <i>Music and Number</i>
Week 2	Mon., 1/19 Wed., 1/21 Fri., 1/23 – <i>A</i>	NO CLASS (Dr. Martin Luther King, Jr. Service Day)	Activity #2: <i>The Harmonic Series</i>
Week 3	Mon., 1/26 Wed., 1/28 Fri., 1/30 – <i>A</i>	2. GENERATING SCALES	Ch. 3 Generating Scales Activity #3: <i>Ancient Greek Music</i>
Week 4	Mon., 2/2 Wed., 2/4 Fri., 2/6 – <i>A</i>	3. PYTHAGOREAN TUNING	Ch. 4 The Pythagorean Scale Activity #4: <i>The Harmony of the Spheres</i>
Week 5	Mon., 2/9 Wed., 2/11 Fri., 2/13 – <i>A</i>	4. JUST INTONATION	Ch. 5 The Five Limit, the Second Dimension Activity #5: <i>Making Sound Visible</i>
Week 6	Mon., 2/16 Wed., 2/18 Fri., 2/20 – <i>A</i>	5. MEANTONE TEMPERAMENT	Ch. 6 Meantone Temperament and the Primacy of Thirds Activity #6: <i>Dimensionality in Art & Music</i>
Week 7	Mon., 2/23 Wed., 2/25 Fri., 2/27 – <i>A</i>	6. EQUAL TEMPERAMENT	Ch. 8 Twelve-Step Equal Temperament Activity #7: <i>Historical Temperaments</i>
MIDTERM EXAM ³			
Week 8	Mon., 3/2 Wed., 3/4 Fri., 3/6 – <i>A</i>	SELECTED TOPICS 7. WELL TEMPERAMENT	Ch. 7 Well Temperament & Key Color Activity #8: <i>The Search for Bach's Temperament</i>
Midterm Project Proposal – Due Fri., March 6, 11:59 pm			
Week 9	<i>Spring Break</i>		

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

³ The Midterm Exam will be posted on Wed., Feb. 25. The Midterm Exam is due Mon., March 2, at 10:50 am.

Week 10	Mon., 3/16 Wed., 3/18 Fri., 3/20 – A	8. EXTENDED JUST INTONATION	Ch. 9 The Seven Limit and Johnston Notation Activity #9: <i>Just Intonation in the Renaissance</i>
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Week 11	Mon., 3/23 Wed., 3/25 Fri., 3/27 – A	EJI (cont.)	Ch. 10 The Eleven Limit and the Fourth Dimension Activity #10: <i>Just Intonation in the Twentieth Century</i>
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Midterm Research Project
(Due Fri., March 27, 11:59 pm)

Week 12	Mon., 3/30 Wed., 4/1 Fri., 4/3 – A	EJI (cont.)	Ch. 11 The Thirteen Limit and Beyond Activity #11: <i>Isomorphic Keyboards</i>
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Week 13	Mon., 4/6 Wed., 4/8 Fri., 4/10 – A	9. EQUAL DIVISIONS OF THE OCTAVE	Ch. 13 Twelve-Based Equal Temperaments Activity #12: <i>Spectralism</i>
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Week 14	Mon., 4/13 Wed., 4/15 Fri., 4/17 – A	<i>Consultation Day 1</i> Student Presentations: Day 1	Ch. 12 Non-Twelve-Divisible Equal Temperaments Activity #13: <i>How Jacob Collier Uses Microtonality</i>
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Week 15	Mon., 4/20 Wed., 4/22 Fri., 4/24 – A	Student Presentations: Day 2 Student Presentations: Day 3	Ch. 14 A Few Numbers Drawn from Non-Western Musics Activity #14: <i>Now & Xen</i>
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Week 16	Mon., 4/27	Student Presentations: Day 4	Ch. 15 Brief Miscellaneous Thoughts
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Final Presentation Reflections & File Submission
(Due Wed., April 29, 11:59 pm)

FINAL EXAM⁴
(Due: Mon., May 4, at 11:59 pm)

⁴ The Final Exam will be posted on Wed., April 29.

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
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 Just Intonation (EJI): 7-limit
Ch. 10	Interlude H	Partch, Barstow	EJI 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>	EJI 13-limit and beyond
Ch. 12	Interlude L	Vicentino, <i>Musica Prisca Caput</i>	31-edo
Ch. 13	Interlude M Interlude N	Hába, <i>String Quartet No. 2, Op. 7</i> Ives, <i>Three Quarter-Tone Pieces</i> Wyschnegradsky, <i>24 Preludes</i> Sims, <i>String Quartet No. 5</i>	24-edo 72-edo

MUSIC BY

<p>Ancient Greek Music Theory Archytas Aristoxenus Eratosthenes Ptolemy</p> <p>Middle Ages Machaut, Guillaume de</p> <p>Renaissance Benedetti, Giovanni Battista Bull, John Galilei, Vincenzo Gibbons, Orlando Kepler, Johannes Lassus, Orlando di Tallis, Thomas Vincentino, Nicola</p> <p>Baroque Bach, J.S. Biber, Heinrich Ignaz Franz Krieger, Johann Philipp Reiche, Gottfried Scarlatti, Domenico</p> <p>Classical and Romantic Beethoven, Ludwig van Chopin, Frédéric Haydn, Franz Joseph Mozart, Wolfgang Amadeus</p>	<p>20th and 21st 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 Dufourt, Hugues Eaton, John Erose, Zheanna Estrada, Julio Fullman, Ellen Gamer, Carlton Grisey, Gérard Haas, Georg Friedrich Hába, Alois Harrison, Lou Harrison, Michael Harvey, Jonathan Haverstick, Neil Hefele, Anna-Maria Hiller, Lejaren Ives, Charles Johnston, Ben Kagel, Mauricio Kodály, Zoltán Lachenmann, Helmut Lutosławski, Witold Mannfishh Murail, Tristan</p>	<p>Oliveros, Pauline Partch, Harry Polansky, Larry Riley, Terry Saariaho, Kaija Sabat, Marc Scelsi, Giacinto Sevish Sims, Ezra Stockhausen, Karlheinz Susam, Taylan Tenney, James Twining, Toby Vivier, Claude Walker, Elaine Wyschnegradsky, Ivan Saariaho, Kaija Xenakis, Iannis Young, La Monte</p> <p>Non-Western Musical Traditions (See Gann, Ch. 14) Indian classical music, pp. 232-233 Arabic music, pp. 234-235 Indonesian Gamelan, pp. 235-238 Thai classical music, pp. 239-240 Turkish Makam music (see Mungan et al. 2017) Tuvan throat singing (see Levin and Edgerton 1999)</p>
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