

Geometrical Music Theory

SYLLABUS

Instructor

Dr. Reginald Bain, Professor
Composition and Theory

Contact Information

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Office: Music Building, R227
Office Hours: MW 1:00-2:00 pm, or by appointment

Course Information

Term: Spring 2025
Format: MW: 10:50-11:40 pm, B3WEB¹
Location: Music Building, R214
Website: <<https://reginaldbain.com/vc/musc726g/>>
Blackboard: <<https://blackboard.sc.edu>>

COURSE MODULES

1. Introduction
2. The Geometry of Pitch
3. The Geometry of Rhythm
4. Visualizing Musical Structure
5. Special Topics
6. Research

Description

An introduction to the theory and analysis of music using geometric models.

Course Materials

Reading assignments, scores, recordings, and analytical media will be made available via Blackboard.

Instructional Methods

This course will be taught using multiple instructional methods that include lecture, group discussion, and student-centered learning approaches; e.g., active learning exercises, flipping, online activities, etc. Students will complete assignments/activities that focus on theories and analyses of works that illustrate the main topics of the course. The capstone project for the course is an instructor-mentored student presentation with associated critical discussion.

Learning Outcomes

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

- Explain how music and geometry are related
- Analyze a wide variety of Western (classical, pop/rock, jazz, folk, film, etc.) and non-Western music using approaches from *geometrical music theory* and related fields including pitch-class set theory, scale theory, rhythm theory, Neo-Riemannian theory, and transformational theory
- Compare/contrast theories and analyses by leading researchers in the field
- Navigate online resources for music and mathematics research
- Engage in, and lead, an analytical discussion
- Plan, research, develop and present an analytical oral presentation with supporting digital media that includes musical examples and 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* list. Due dates/times are available in the *Daily Schedule* and in Blackboard. Daily participation in class. Daily use of the course Blackboard page and website. There will be an online midterm exam and final exam. There will also be a Midterm Project and Final Presentation. The later will be an oral presentation with supporting digital media on an instructor-approved geometrical music theory 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 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. For complete 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/>

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 Project
30% - Final Project
15% - Final Exam

COURSE SCHEDULE

Week 1	Module	Topic (Reading); Assignments/Activities (#)
Mon., 1/13 Wed., 1/15 Fri., 1/17 – A ³	1. Introduction	HEARING WITH OUR EYES (Hook 2002) The Five Components of TONALITY (GOM, Ch. 1) ² 1. Conjunct Melodic Motion, 2. Acoustical Consonance, 3. Harmonic Consistency, 4. Macroharmony, 5. Centricity #1: What Makes Music Sound Good?
Week 2 Mon., 1/20 Wed., 1/22 Fri., 1/24	2. The Geometry of Pitch	HARMONY AND VOICE LEADING (GOM, Ch. 2) Linear Pitch Space; Circular Pitch-Class Space; Transposition and Inversion; OPTIC Operations; #2: Pitch Space Geometry
Week 3 Mon., 1/27 Wed., 1/29 Fri., 1/31		CHORDS A Geometry of Chords (GOM, Ch. 3) 2-D Chord Spaces; 3-D Chord Spaces; Chord Progressions #3: Chord Geometry
Week 4 Mon., 2/3 Wed., 2/5 Fri., 2/7		SCALES, MACROHARMONY & CENTRICITY Scales (GOM, Ch. 4) Macroharmony & Centricity (GOM, Ch. 5) #4: Scale Geometry
Week 5 Mon., 2/10 Wed., 2/12 Fri., 2/14	3. The Geometry of Rhythm	RHYTHM What is Rhythm? (GOR, Ch. 1) ⁴ A Steady Beat (GOR, Ch. 2) #5: Rhythm Geometry
Week 6 Mon., 2/17 Wed., 2/19 Fri., 2/21		RHYTHMIC TIMELINES Rhythmic Timelines, Ostinato and Meter (GOR, Ch. 3) The Clave Son (GOR, Ch. 6) #6: The Clave Son
Week 7 Mon., 2/24 Wed., 2/26 Fri., 2/28		PROPERTIES OF RHYTHMS Six Distinguished Rhythm Timelines (GOR, Ch. 7) Timeline Properties #7: What Makes a ‘Good’ Rhythm Good?
MIDTERM EXAM		
Week 8 Mon., 3/3 Wed., 3/5 Fri., 3/7	4. Visualizing Musical Structure	SPACES The Space Metaphor (Hook 2022) Triadic Transformations (Burststein & Straus 2020) #8: The PLR Group
<i>Spring Break</i>		
Week 9 Mon., 3/17 Wed., 3/19 Fri., 3/21		The Tonnetz (Engebretsen and Broman 2007) Neo-Riemannian Theory #9: The Tonnetz

² GOM – Tymoczko 2010.

³ Fridays are asynchronous (A). For asynchronous assignments/activities, see *Daily Schedule* and *Listening/Analysis* list.

⁴ GOR – Toussaint 2019.

Week 10 Mon., 3/24 Wed., 3/26 Fri., 3/28		Hexatonic Systems (Cohn 1996) Transformational Analysis (Crans, Fiore & Satyendra 2009) #10: Cube Dance
Week 11 Mon., 3/31 Wed., 4/2 Fri., 4/4	5. Special Topics	THE KLEIN-FOUR GROUP & GOLDEN RATIO Twelve-Tone Music & The Klein-Four Group (Morris 2007) Fibonacci Numbers and the Golden Ratio (Roberts 2016) #11: The Golden Ratio
Week 12 Mon., 4/7 Wed., 4/9 Fri., 4/11		FRACTAL MUSIC Music, Maths & Chaos (Steinitz 1996) Fractal Patterns in Music (McDonough & Herczyński 2023); The Fractal Nature of Music (Brothers 2023) #12: Fractal Music
Week 13 Mon., 4/14 Wed., 4/16 Fri., 4/18	6. Research	Project Consultation Day 1 Project Consultation Day 2 #13: Current Topics 1
Week 14 Mon., 4/21 Wed., 4/23 Fri., 4/25		Student Presentations Day 1 Student Presentations Day 2 #14: Current Topics 2
Week 15 Mon., 4/21 Wed., 4/23 Fri., 4/25		Student Presentations Day 3 Student Presentations Day 4 #15: Current Topics 3
Week 16 Mon., 4/28		Student Presentations Day 5

FINAL EXAM

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MAIN BIBLIOGRAPHY

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The complete course bibliography is available online at:
 < <https://reginaldbain.com/vc/musc726g/pub/biblio.html> >