

Geometrical Music Theory

SYLLABUS

Instructor

Dr. Reginald Bain, Professor
Composition and Theory

Contact Information

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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. Exploring Musical Spaces
5. Special Topics
6. Student Research

Description

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

Course Materials

Reading assignments, scores, recordings, and other media will be made available via Blackboard and the class website.

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 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*
- 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*. 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 two exams: an online midterm exam, and online final exam. There will also be a Midterm Research Project and Final Presentation. The later will be a 10 min. 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, 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 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 Research Project
30% - Final Presentation
15% - Final Exam

COURSE SCHEDULE

Subject to Change

Week 1	Module	Reading, Assignments & Activities
Mon., 1/13 Wed., 1/15 <i>Fri., 1/17 – A²</i>	1. Introduction	Quadrivium (Critchlow 2010) Euclid's <i>Elements</i> (Fitzpatrick 2008) Activity #1: The Harmony of the Spheres
Week 2 Mon., 1/20 Wed., 1/22 <i>Fri., 1/24</i>	<i>M.L.K. Day of Service (NO CLASS)</i> 2. The Geometry of Pitch	The Geometry of Tonal Space: One-Dimensional Representations (Hook 2002, 123-126) Activity #2: Mathematics: The Science of Patterns
Week 3 Mon., 1/27 Wed., 1/29 <i>Fri., 1/31 – A</i>		Two-Dimensional Representations (Hook 2022, 126-129) Representations of Chords & Key Areas (Hook 2022, 129-134) Activity #3: Cymatics
Week 4 Mon., 2/3 Wed., 2/5 <i>Fri., 2/7 – A</i>		Prelude to Music Geometry (McCartin 1998) Activity #4: Symmetry
Week 5 Mon., 2/10 Wed., 2/12 <i>Fri., 2/14 – A</i>		Exploring Musical Space (Hook 2006) The Geometry of Musical Chords (Tymoczko 2006) Activity #5: What Makes Music Sound 'Good'?
Week 6 Mon., 2/17 Wed., 2/19 <i>Fri., 2/21 – A</i>		Geometrical Music Theory (Hall 2008) Generalized Voice-Leading Spaces (Callender, et al. 2008) Activity #6: Music and Color
MIDTERM EXAM³		
Week 7 Mon., 2/24 Wed., 2/26 <i>Fri., 2/28 – A</i>	3. The Geometry of Rhythm	What is Rhythm? (GOMR, Ch. 1); ⁴ Isochrony, Tempo, Performance (GOMR, Ch. 2); Timelines, Ostinatos, and Meter (GOMR, Ch. 3) Activity #7: Repetition & Musicality
Week 8 Mon., 3/3 Wed., 3/5 <i>Fri., 3/7 – A</i>		The Clave Son (GOMR, Ch. 6); Six Distinguished Six Distinguished Rhythm Timelines (GOMR, Ch. 7); The Distance Geometry of Rhythm (GOMR, Ch. 8) Activity #8: Properties of Rhythms
Week 9		<i>Spring Break</i>

² Fridays are asynchronous (*A*). For assignments/activities, see the *Daily Schedule*.

³ The online Midterm Exam will be posted on Wed., 2/19. It is due Mon., 2/24, 10:50 am.

⁴ Toussaint, Godfried T. 2019. *The Geometry of Musical Rhythm (GOMR): What Makes a "Good" Rhythm Good?*, 2nd ed. Boca Raton, FL: CRC Press.

Week 10

Mon., 3/17
 Wed., 3/19
 Fri., 3/21 – A

4. Exploring Musical Spaces Neo-Riemannian Triadic Progressions (Hughes 2022)
 Activity #9: A Platonic Model of Funky Rhythms

Week 11

Mon., 3/24
 Wed., 3/26
 Fri., 3/28 – A

- Transformation in Post-Tonal Music (Roeder 2014)
 Activity #10: The Art of Post-Tonal Analysis

Midterm Research Project

(Due Fri., 3/28, 11:59 pm)

Week 11

Mon., 3/31
 Wed., 4/2
 Fri., 4/4 – A

5. Special Topics Number as Form and Content, (Evans 1991);
 Mathematics and the Twelve-Tone-System (Morris 2007)
 Activity #11: Pattern-Free Music

Week 12

Mon., 4/7
 Wed., 4/9
 Fri., 4/11 – A

- The Nature of Fractal Music (Brothers 2022);
 Music, Maths & Chaos (Steinitz 1996)
 Activity #12: Bach & Fractals

Week 13

Mon., 4/14
 Wed., 4/16
 Fri., 4/18 – A

6. Student Research Presentation Consultations: Day 1
 Presentation Consultations: Day 2
 Activity #13: Current Topics 1

Week 14

Mon., 4/21
 Wed., 4/23
 Fri., 4/25 – A

- Student Presentations: Day 1
 Student Presentations: Day 2
 Activity #14: Current Topics 2

Week 15

Mon., 4/21
 Wed., 4/23
 Fri., 4/25 – A

- Student Presentations: Day 3
 Student Presentations: Day 4
 Activity #15: Current Topics 3

Week 16

Mon., 4/28

- Student Presentations: Day 5

Final Presentation: Reflections and File Submission

(Due Wed., 4/30, 11:59 pm)

FINAL EXAM⁵

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BIBLIOGRAPHY

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

⁵ The online Final Exam will be posted on Wed., 4/30. It is due Mon., 5/5, at noon.