University of South Carolina
School of Music

BAIN MUSC 726
Topics in Music Theory

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, B3WEB[1]
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 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	1. Introduction	Quadrivium (Critchlow 2010, 2-5)
Wed., 1/15		Euclid's *Elements* (Fitzpatrick 2008, 1-8)
Fri., 1/17 – A[2]		Activity #1: The Harmony of the Spheres
Week 2		
Mon., 1/20	*M.L.K. Day of Service*	
Wed., 1/22	2. The Geometry of of Pitch	Julian Hook, Hearing With Our Eyes: of Tonal Space (Hook 2002, 123-126)
Fri., 1/24		Activity #2: Mathematics: The Science of Patterns
Week 3		
Mon., 1/27		Julian Hook, Hearing With Our Eyes:
Wed., 1/29		The Geometry of Tonal Space (Hook 2022, 126-134)
Fri., 1/31 – A		Activity #3: Cymatics
Week 4		
Mon., 2/3		Brian McCartin, Prelude to Music Geometry
Wed., 2/5		(McCartin 1998, 354-360)
Fri., 2/7 – A		Activity #4: Symmetry
Week 5		
Mon., 2/10		Dmitri Tymoczko, Five Components of Tonality
Wed., 2/12		(Tymoczko 2011, 3-7)
Fri., 2/14 – A		Activity #5: What Makes Music Sound 'Good'?
Week 6		
Mon., 2/17		Dmitri Tymoczko, Musical Objects (OPTIC)
Wed., 2/19		(Tymoczko 2011, 35-40)
Fri., 2/21 – A		Activity #6: Music and Color
	MIDTERM EXAM[3]	
Week 7		
Mon., 2/24	3. The Geometry of Rhythm	Godfried Toussaint, The Rhythm that Conquered the
Wed., 2/26		World (Toussaint 2011, 1-5)
Fri., 2/28 – A		Activity #7: Repetition and Musicality
Week 8		
Mon., 3/3		Godfried Toussaint, The Rhythm that Conquered the
Wed., 3/5		World (Toussaint 2011, 5-13)
Fri., 3/7 – A		Activity #8: Properties of Rhythmic Loops
Week 9		
	Spring Break	

[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.

Week 10			
Mon., 3/17	4.	Exploring Musical Spaces	Bryn Hughes, Neo-Riemannian Triadic Progressions (Hughes 2023)
Wed., 3/19			
Fri., 3/21 – A			Activity #9: Negative Harmony
Week 11			
Mon., 3/24			Bryn Hughes, Neo-Riemannian Triadic Progressions (cont.)
Wed., 3/26			
Fri., 3/28 – *A*			Activity #10: Transformational Analysis

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

Week 12			
Mon., 3/31	5.	Special Topics	Mathematics and the Twelve-Tone-System
Wed., 4/2			Number as Form and Content (Evans 1992)
Fri., 4/4 – *A*			Activity #11: Pattern-Free Music
Week 13			
Mon., 4/7			Stephen Ornes, Hunting fractals in the music of J.S. Bach (Ornes 2014) Harlan Brothers, The Fractal Structure of Coltrane's Iconic Solo (Brothers 2022)
Wed., 4/9	6.	Student Research	Presentation Consultations
Fri., 4/11 – *A*			Activity #12: Bach & Fractals
Week 14			
Mon., 4/14			Presentation Consultations (cont.)
Wed., 4/16			Student Presentations: Day 1
Fri., 4/18 – *A*			Activity #13: Geometries of Pitch and Time in Music
Week 15			
Mon., 4/21			Student Presentations: Day 2
Wed., 4/23			Student Presentations: Day 3
Fri., 4/25 – *A*			Activity #14: Musical Rhythm through the Lens of Computational Mathematics
Week 16			
Mon., 4/28			Student Presentations: Day 4

Final Presentation: Reflections and File Submission
(Due Wed., 4/30, 11:59 pm)

FINAL EXAM[4]

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BIBLIOGRAPHY

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

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