SYLLABUS – MATH299C: Mathematics & Classical Music

Course Description: The aim of this course is to explore the historical discoveries in mathematics that have influenced Western classical music, as well as musical expressions of specific mathematical concepts. This course is not meant to be a rigorous introduction to music theory or mathematics; rather, it is focused on introducing students to classical music through mathematical ideas that appear in it. Students will also have an opportunity to explore mathematics through music in the form of a creative project.

Course Details

- **Course**: MATH299C
- **Prerequisites**: None, although math through precalculus may be useful. Prior knowledge of basic music theory will be helpful, but not necessary
- **Credits**: 1
- **Seats**: 20
- **Lecture Time**: TBA
- **Location**: TBA
- **Semester**: Fall 2019
- **Textbook**: None
- **Course Facilitators**: Jeffery Wack & Noah Whiteman
- **Faculty Advisor**: Dr. Niranjan Ramachandran

Topics Covered*

Syllabus may be subject to minor changes, but drastic revisions will require input of students/facilitators, and those involved will be notified immediately

- Basic math & music concepts
- Modes & cyclic permutations
- Horizontal structure of music
    - Rhythmic subdivisions
    - Pitch over time
- Defining music mathematically
    - Musical intervals & associated ratios
    - Pitches as frequencies
- Classical Era
    - Leonhard Euler & musical consonance
    - Mozart's formula
- 20th Century Music
    - Fibonacci sequence
        - Béla Bartók

        - Claude Débussy
    - Atonality
        - Serialism
        - Stochastic music
    - Transformations & symmetry
        - Paul Hindemith
- Miscellaneous topics
    - Beyond Western classical music
    - Statistics & musicology

*Subject to change at instructor/facilitator discretion.

Week (week of)	Topic	Assignment
1 (Jan 27)	Syllabus	Assigned: HW #1
2 (Feb 3)	Basic Math & Music Concepts	Due: HW #1 Assigned: HW#2
3 (Feb 10)	Modality & Cyclic Permutations	Due: HW #2 Assigned: HW#3
4 (Feb 17)	Horizontal Structure	Due: HW #3 Assigned: HW#4
5 (Feb 24)	Intervals	Due: HW #4 Assigned: HW#5
6 (Mar 3)	Midterm Review	Due: HW #5 Assigned: --
7 (Mar 10)	MIDTERM	Due: -- Assigned: HW#6
8 (Mar 17)	SPRING BREAK	--
9 (Mar 24)	Classical Era Musical Cryptograms	Due: HW #6 Assigned: HW#7
10 (Mar 31)	Serialism Stochastic Music	Due: HW #7 Assigned: HW#8

11 (Apr 6)	Fibonacci Sequence in Music	Due: HW #8 Assigned: HW#9
12 (Apr 13)	Miscellaneous Topics	Due: HW #10 Assigned: Final Project
13 (Apr 20)	Final Project Workshops	Due: Final Project Draft
14 (Apr 27)	Final Project Presentations	Due: Final Project

Grading

This course is graded out of 100 points, with a possible curve at the end of the semester. We will follow the typical grading scheme, i.e. A: 90-100; B: 80-89; C: 70-79; D or F: <70

Weighting

Title	Percentage	Description
Weekly Homeworks	45%	Weekly assignment based on material covered in class or assigned media
In-Class Participation	20%	Graded by instructors based on in class discussion
Midterm	15%	In class exam based on lecture material
Final Project	20%	Creative project based on a mathematical concept of your choosing

Assignments/Late Policy

- All assignments, with the exception of the midterm exam, will be submitted electronically through ELMS.
- Homework will be assigned after class each week and are due on ELMS at 11:59pm on the day of the following class. Homework assignments are graded for completion, and there will be a point deduction for late submissions.
- The midterm exam will be given in class. Students will be allowed to use their notes as well as a calculator on the exam.
- The final project will explore a mathematical topic of the student's choice and an explanation of how the composition illustrates it. Students will have the opportunity to present their work to the class.

The last day assignments may be submitted for credit is Thursday, April 30

Communicating with Course Staff

Other means of communication have not been chosen as of now. Interaction beyond the classroom is encouraged, but should be limited to important or more urgent issues. Topics that need not be addressed immediately can wait till class time.

Instructor Name and Email

- Dr. Niranjan Ramachandran - atma@math.umd.edu

Facilitator Name and Email

- Noah Whiteman - n.whiteman.00@gmail.com
- Jeffrey Wack - jeffwack111@gmail.com

Excused Absence and Academic Accommodations

See the section titled "Attendance, Absences, or Missed Assignments" available at Course Related Policies.

Disability Support Accommodations

See the section titled "Accessibility" available at Course Related Policies.

Academic Integrity

Note that academic dishonesty includes not only cheating, fabrication, and plagiarism, but also includes helping other students commit acts of academic dishonesty by allowing them to obtain copies of your work. In short, all submitted work must be your own. Cases of academic dishonesty will be pursued to the fullest extent possible as stipulated by the Office of Student Conduct.

It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu

Course Evaluations

If you have a suggestion for improving this class, don't hesitate to tell the instructor or facilitators during the semester. At the end of the semester, please don't forget to provide your feedback using the campus-wide CourseEvalUM system. Your comments will help make this class better.