

SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

SYLLABUS (*Tentative*)

MATH 105: *Liberal Arts Mathematics: Music and Mathematics*

OBJECTIVES: To introduce students to some of the many connections between mathematics and music, and to explore mathematical questions that follow naturally from standard musical considerations such as intonation, melody, rhythm, and variations on a theme.

INTENDED FOR: Liberal Arts Majors, particularly those with an interest in music.

PREREQUISITES: High School Algebra II or a college algebra course. (*Some experience with music – in particular, the ability to read music from a staff – is preferred, but it is not a strict requirement for this course.*)

TEXT: “The Math Behind the Music,” by Leon Harkleroad; Cambridge University Press, First Edition, 2006.

TECHNOLOGY: A basic scientific calculator (not necessarily a graphing calculator) that handles exponents and logarithms. (*This type of calculator usually costs between \$10 and \$20. DO NOT invest a large amount of money in a calculator if it is to be used only for this class.*)

Topics	Weeks
Pitch <i>Frequency; octaves and other intervals; overtones</i>	1
Intonation <i>The twelve-tone scale; Pythagorean tuning; just intonation; equal-tempering; alternate divisions of the octave</i>	3
Variations <i>Transpositions; retrogrades; inversions; musical operations; groups</i>	3
Counting <i>Combinations and permutations; the multiplication principle; counting melodies and chords; time signature and rhythm</i>	3
Bells and Groups <i>Change-ringing; permutations; patterns, subgroups and cosets</i>	2
Additional Topics (as time permits) <i>Patterns in music; randomized music; music and geometry; electronic music</i>	1
Tests, Review & Other Activities	1

EVALUATION

Tests	30-50%
Final Exam	20-40%
Homework, Class Work & Quizzes	20-40%