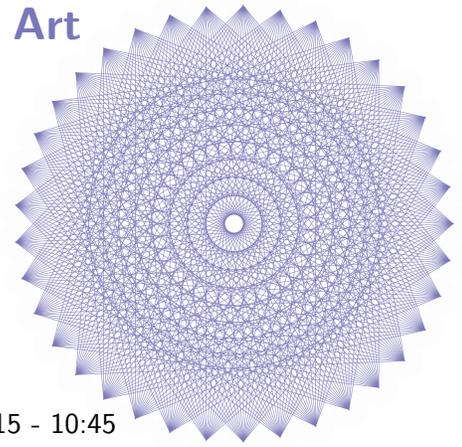


# MATH 110 Math Applications: Art

## Fall 2016 · Syllabus



### Class Information

**Instructor:** Dr. Lauren Williams

**Class Meeting:** TTh 9:30 - 10:45, Hirt 209

**Office:** Old Main 404 (Tower)

**Office Phone:** (814) 824-2226

**Office Hours:** Mon 9:15 - 10:45, Wed 12:15 - 1:45, Thur 12:30 - 3:00, Fri 9:15 - 10:45

**Email:** [lwilliams2@mercyhurst.edu](mailto:lwilliams2@mercyhurst.edu)

**Website:** <http://math.mercyhurst.edu/~lwilliams/math110/Art/index.html>

### Course Description

Many fundamental concepts of mathematics have been used by visual, literary, and film artists for centuries. As society's understanding of mathematics has improved and new discoveries are made, artists have found ways of incorporating these ideas in their work. On the other hand, many areas of mathematics were developed in response to observations made by artists, so the relationship between math and art has certainly not been one sided. This class will explore those connections, and leave you with an appreciation of the beauty and relevance of mathematics.

In each of our class meetings, we will discuss a different topic that showcases the connections between mathematics and art. We will

- explain the impact of a mathematical understanding of linear perspective in art
- discuss the use of symmetry and the golden section in works of art
- explore how artists have attempted to illustrate complex mathematical ideas in their work, leading to entirely new genres of art
- review some of the different types of geometries, and how artists like MC Escher have visually described them
- explore how ancient societies viewed mathematics, and its impact on their works of art
- find examples of mathematics in fiction and film
- explain how geometry is used to create large scale works, such as architecture, and how these methods have changed over time
- view some examples of how computers can be used to create art based on mathematical algorithms

### Course Learning Outcomes

After completing the course, students will be able to

- find connections between mathematics and the creative world
- apply techniques in mathematics to create their own works of art
- define basic mathematical terms and provide descriptions of the major fields of mathematics introduced in class
- solve basic algebraic problems and equations as related to the course

## Textbook

No textbooks or other materials are required for this course. A short story will be assigned during the semester. This text is available free online, or available as an inexpensive paperback. Additional resources may be recommended throughout the semester for those interested in learning more about a topic, but will not be required. If art materials beyond pencils, pens, and paper are needed for an assignment, they will be provided.

## Projects and Assignments

Several assignments and projects will be assigned throughout the semester. These may include brief writing assignments or creative works based on topics in class. Artistic skill is not required - the goal of the course is to use mathematics to create and analyze works of art. You will generally have at least one week to complete an assignment.

At least one assignment will require the use of a digital camera and the ability to submit photographs electronically. If you do not have access to a camera, let me know. If you are having trouble with an assignment, please come talk to me during office hours, ask questions in class, or seek help from a classmate.

## Class Project

Near the end of the semester, the entire class will participate in a project that will involve the material we've learned in class. The exact topic and goal of the project will be determined as the course progresses. Your participation is all that is required to satisfy this component of the class; individual effort will not be graded.

## Exams

There will be a midterm and a final exam for this course. A comprehensive review sheet will be provided for each exam at least one week in advance. This exam is scheduled for **Tuesday, October 11**. If you know in advance that you will not be able to attend class that day, please see me to schedule a time to take the exam in my office.

The final exam is scheduled for **Thursday, December 15, 8:00 - 10:00**.

## Final Grades

Grades will be calculated as follows:

- 60% - Assignments and Projects
- 15% - Class Project
- 10% - Midterm Exam
- 15% - Final Exam

Grades will be posted on Blackboard, so you can keep track of your progress at any time. There are no opportunities for extra credit or additional points, and a curve will not be applied to the grades.

Grading scale:

F	D	D+	C	C+	B	B+	A
0-59	60-64	65-69	70-77	78-83	84-89	90-93	94-100

## Support of the Mercy Mission

This course supports the mission of Mercyhurst University by creating students who are intellectually creative. Students will foster this creativity by: applying critical thinking and qualitative reasoning techniques to new disciplines; developing, analyzing, and synthesizing scientific ideas; and engaging in innovative problem solving strategies.

## Learning Differences

In keeping with college policy, any student with a disability who needs academic accommodations must call Learning Differences Program secretary at 824-3017, to arrange a confidential appointment with the director of the Learning Differences Program during the first week of classes.

**Math 110 Math Applications: Art**  
Course Schedule - Fall 2016

Week 1	Aug 25	Class Introduction, Numbers
Week 2	Aug 30	Perspective
	Sep 1	Projection
Week 3	Sep 6	Anamorphic Art
	Sep 8	Shapes and Polyhedra
Week 4	Sep 13	Groups
	Sep 15	Symmetry
Week 5	Sep 20	Tessellations and Tilings
	Sep 22	MC Escher
Week 6	Sep 27	Wallpaper Groups
	Sep 29	Higher Dimensions
Week 7	Oct 4	Flatland
	Oct 6	Cubism
Week 8	Oct 11	Midterm Exam
	Oct 13	No Class: Mid Semester Break
Week 9	Oct 18	Non Euclidean Geometries
	Oct 20	The Golden Ratio
Week 10	Oct 25	Mathematical Envelopes
	Oct 27	Architecture
Week 11	Nov 1	No Class: Advising Day
	Nov 3	Mathematics of Color
Week 12	Nov 8	Iteration and Recursion
	Nov 10	Fractals
Week 13	Nov 15	Computer Generated Art
	Nov 17	Music
Week 14	Nov 22	Music
	Nov 24	No Class: Thanksgiving
Week 15	Nov 29	Math in Literature
	Dec 1	Knots and Braids
Week 16	Dec 6	Making Knots
	Dec 8	Additional Topics and Student Showcase