INSTRUCTOR:　Janice Sklensky　　　　　　　　　　　　　　　OFFICE: SC 109
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OFFICE HOURS:　M 12:15-1:15, Tu 11:00-12:00, W 1:30-2:30, Th 3:00-4:00.
If you can't make any of my office hours, please feel free to arrange an appointment.

COURSE MATERIALS: This course does not have a book, per se. I will provide you with materials to read, and with problems to work on.

OVERVIEW
This course is an experimental course, in preparation for the new curriculum. In it, we will explore how math and art are connected. We will move in roughly chronological order, beginning with the ancient Egyptians and Greeks, and moving along to the present. The topics we will study will include (but may not be limited to):

- The Golden (or Divine) Ratio, Golden Rectangles, and Gnomons: their connection to the Great Pyramid and the Parthenon, how the Greeks devised the Golden Ratio, the connection between the Golden Ratio and sequence of numbers $1, 1, 2, 3, 5, 8, 13, 21, \ldots$, how artists have used the Golden ratio in paintings for centuries and how it continues to be used today.

- Perspective: how geometry is used to give depth to paintings and sculptures, and how perspective helped further the development of science and mathematics.

- Symmetry: what types of symmetry there are, how are a manhole cover and a stained glass window are similar, how to construct a rotation or a reflection knowing just a few points, how many different types of frieze (border) patterns there are.

- Fractals: creating extremely complex and beautiful pictures using mathematical ideas, how mathematicians and computer scientists use math to create very realistic looking clouds, mountains, and trees, art (both old and new) that is fractal-like and nature.

COURSE STRUCTURE, GOALS, AND EXPECTATIONS:
The main goals for this class are to

- use your interest in art to motivate learning the mathematics needed to understand, classify, or construct works of art, thus honing your logical abilities,

- help you gain an appreciation for how beautiful math can be by actually being able to *see* some of what it can do,

- begin to give you a feel for how universal a language math is, rather than the isolated field many people believe it to be.

In this class, as with all others, how much you actually learn is entirely up to you. Math is a subject you can only learn by doing–observing me (and others) may give you a start, but it is certainly not enough. Class will combine lecture with time for in-class work so that you may *do* what you've been hearing about.

The rule of thumb for how much work you should expect to spend on any college class is 2 to 3 hours of work outside of class for every hour in class. No matter what your experience has been in other classes,

> Plan to spend at least 8 hours a week on this class outside of class!

Of course, some weeks you may spend more than 8 hours on this class, especially when working on a project, while others you may spend less, but it's best if you have the time set aside to work on this class.

CLASS PARTICIPATION
As with any class, you will get more out of it if you actively participate. To encourage you, I am including class participation in your overall grade. This includes asking questions in **and out** of class, answering questions that I pose, listening respectfully to your classmates, working with classmates to investigate problems when I ask you to, giving helpful feedback to classmates when that is required, an aura of interest, and other similar aspects of good academic citizenship.

I plan to pay attention each day to the ebb and flow of communication and participation; active and constructive participation will earn you a point, lack of participation will earn you no points, and active destructive participation (distracting class-mates, repeated absence, a lack of focus during in-class work times, for instance) will take away a point from your total.

PROBLEM SETS
While part of this class will focus on how math has appeared in art, most of the focus will be on learning the math itself – and to help you with this, I will be collecting homework. There are numerous reasons to collect and grade problem sets: so that your grade does not rest solely on a few projects; to give you feedback as to whether you're understanding the material; to give me feedback as to whether anyone is having trouble, and whether I need to spend more (or less) time on material.

I have found that collecting homework every day is overwhelming to you, to me, and to the homework grader. For that reason, you will have *weekly* problem sets, due Wednesdays. Let me emphasize, however, that the problem sets do reflect an entire week's worth of material, and should be worked on steadily throughout the week. While you may occasionally be able to get away with procrastinating until Monday or Tuesday, it is not the best way to absorb material, and can set you up for disaster when the problem set is more time-consuming than you expected.

I will put the problem sets on the course web site, and it is your responsibility to check the web site for homework. (Some weeks I may display the assignment, but just because I don't display an assignment doesn' t mean there isn't one!)

Here are some quick guidelines for how your finished problem sets should be worked on and presented:

- **Feel free to work with others, but do not divide the problems.** You are responsible for understanding the solution to each problem, and for writing your description of the solution in your own words. You are cheating yourself *and* violating the honor code if you divide the problems up among yourselves. (The honor code violation is because you are taking credit for work that is not your own.)

- **Summarize the problem** before showing the solution. You really do learn much more from the homework (and make it less likely that you have misunderstood the intent of the problem) if you copy or summarize the problem first.

- **Your homework should not simply consist of the final answer to each question assigned**. Because the way you really learn anything is by explaining it, you should include the work or mathematical reasoning behind your answers.

- **Make your homework handsome and readable.** Homework that is easy to read not only is more pleasant to grade (thus putting the grader in a good mood), it also gives that always-important good first impression. One way to do this is to use pencil rather than pen. If you must use pen, only use one side of the paper. (Feel free to use the clean side of paper that's been once through the printer.)

- **Leave space between the problems, and within each problem, leave space between ideas.** This not only looks neater, but gives the grader room to respond. Do not try to fit your entire problem set onto one page. While the trees would undoubtedly benefit from your economy, my eyes do not.

- **Staple your papers together.** Please do not use paperclips, or fold over the corners in the vain hope that this will keep your assignment together. It will only get caught up with other assignments, not to mention making your assignment unsightly.

- **You put a lot of effort into your homework–make it look like it!**

MIDTERM PROJECTS AND SHORT WRITING ASSIGNMENTS:
For each topic that we cover, I expect to ask you to create artwork that demonstrates the mathematics we have learned, and write a mathematical analysis of your work. When I am assessing these projects, I will look at three aspects:

1. the artwork will be assessed according to content, technique (mathematical, that is), aesthetics, and – if applicable–innovative solutions to problems you ran into. I am not an artist (and this is not an art class), so it would not be fair, reasonable, or even possible for me to put much emphasis on aspects which to me are nebulous, like artistic merit. However, I clearly am going to give more credit to someone who has put a lot of effort into it and created something creative, interesting, and well-done than I am

to someone whose work appears to have been done at the last minute. Specifically, I will be looking for creativity, effort, accuracy in measurement.

2. the mathematical analysis will be graded on the sophistication (and correctness) of the analysis, the clarity of the presentation, and on the extent to which the mathematics in the project uses, or even supersedes, what is done in class.

3. the project will also be assessed according to how creatively and correctly you have integrated the math and the art.

For each project, we will also have a show, where you will display your work, and perhaps give a brief and informal description of how you integrated the math and art. My current idea is to have a secret vote for the student whose project best displays the mathematical ideas we've been learning, and that this student will receive some extra points on that project.

MATH AWARENESS MONTH:
Every year, April is Math Awareness Month, and this year, the focus is on (how timely!) Math and Art. With your permission, I think it would be great if we could create a display of your projects to celebrate this month.

RESEARCH PROJECT AND PRESENTATION:
You will also be doing a semester-long research project, for which you will choose a topic we are not covering in this class. You will research the history and mathematics of your topic, find existing examples of works of art that either were created using this mathematics or which demonstrate it in some way, and create your own artwork demonstrating these mathematical ideas. You will then write a paper explaining all you have learned and done, and during the time set aside for the final, you will display your artwork and give a presentation describing the mathematics behind it. This will be assessed in a manner similar to the way I'll grade the smaller projects; however, all aspects of this project will require more preparation and effort. See the attached handout for more information on this project.

QUIZZES OR EXAMS:
At the moment, I am not planning on giving any quizzes or exams, but I will be paying attention to how the semester is going: how you seem to be absorbing the material, whether the grading is going to fairly reflect your understanding and effort, whether *you* seem to feel the need for some extra form of assessment, etc. If it seems necessary, I will add quizzes or exams to the assessment mix.

EVALUATION
I expect to use the weights below, although I reserve the right to change my mind if the semester does not go as expected.

Class Participation	10%
Problem Sets	30%
5 Midterm Projects and Short writing assignments	30%
Research Project and Presentation	30%