Course Policies – Math 122 - Math and Art

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CLASS MEETINGS: MWF 11:30-12:20 in Mars Science Center 1141
OFFICE HOURS: M 2:30-3:20, Tu 4:00-4:50, W 9:30-10:20, Th 12:00-12:50
     and by appointment, when necessary

COURSE-WEBSITE – PUBLIC:
  http://jsklensky.webspace.wheatoncollege.edu/home.html-Math 122: Math In Art
  Links to course policies, syllabus, homework, projects, and study guides

COURSE WEBSITE – PRIVATE:
  the OnCourse page for this course
  Links to the slides and in-class work from class, my schedule, additional readings (if any)

COURSE MATERIALS:

Required:

- A collection of selected readings, available from me for the cost of the materials and labor.

- A ruler (with inches and centimeters) - *bring to class every day*

- A basic calculator - this should be separate from your phone and your computer - does not need to be a graphing calculator, or capable of anything more complicated than exponentiation and logarithms - *bring to class every day*

Optional: Graph paper and some art supplies.

Additional materials will be available on-line, as will be most "handouts".

OVERVIEW

In this course, we will explore several math topics connected to visual art, including:

- *Systems of Proportions:* we will review the concepts of proportionality and ratios, in the context of how artists and architects use proportion in their work. We will study several specific systems of proportionality used by artists or architects over the millennia. We will also develop standards to help us conclude whether it is likely a specific system of proportions was used in building a temple or creating a work of art.

- *The Golden Ratio:* we will learn Euclid's definition of the Mean and Extreme Ratio and investigate how this leads to the famous constant φ, the Golden Ratio. We will investigate whether it appears in the Great Pyramid; through projects you may investigate various other works. After reviewing the geometric concept of similarity, we will

see how the Golden Ratio answers a question posed by the Greeks involving similar rectangles, and how that answer plays a role in art still.

- *Perspective:* we will learn the 3-dimensional coordinate system, and learn how we can combine this idea with geometry to develop some very precise rules for drawing with depth. We will use our ideas both to do some drawing and to investigate the perspective in classic art works.

- *Fractals:* we will learn about self-similarity, fractional dimension, iteration, and complex numbers. We will then see how these ideas lead to some very cool pictures, and create some ourselves. We will also briefly discuss how mathematicians and computer scientists use the idea of fractals to create very realistic looking clouds, mountains, and trees, and other natural objects that can be used in graphics.

- *The Fourth Dimension and Non-Euclidean Geometry:* we will learn about the concept of a fourth spatial dimension and, if time, a type of geometry where the concept of *parallel lines* doesn't exist in the way we are used to. We will discuss how the cubists were inspired by these ideas.

Is this the right math course for you?

This course is intended for students who are interested in art or art history. If you are not especially interested in these topics, we probably offer a different math class better suited to your interests. The more background you have in art and/or art history, the more you will get out of this class. For that reason as well as the fact that some majors require or recommend specific math courses, it can be a good idea to wait to take this class until you are at least a sophomore.

The only mathematical pre-requisites for this course are some basic algebra and geometry. Other than that, all that is required is a willingness to *truly* try, and an interest in the material.

Intellectual Integrity and the Honor Code

The purpose of the Honor Code is to give both students and professors more freedom – but with that freedom comes greater responsibility. The Honor Code gives students academic space to act as true scholars and also can create a strong bond among the student body, when most students buy into it. Presumably you believe in the power of the Honor Code, since you signed it when you matriculated.

As a reminder, all students at Wheaton are expected to conduct themselves with the highest level of academic integrity. In this class, this means that while you are encouraged to work with other students, you are each ultimately responsible for your own learning, all work turned in must reflect your own understanding, and you must document any help received, whether from a person or an online source.

It is much better for you (intellectually, morally, and for your grade) to turn in an honest but poor piece of work than it is to present work that is not your own. Not only is the penalty

for violating the Honor Code a 0, but your own work will give me a more realistic view of how the class as a whole is doing, which allows me to make adjustments when necessary.

As part of the Honor Code, you are required to write

I have abided by the Wheaton College Honor Code in this work

followed by your signature, on all written assignments. If at any time you do not feel you can truthfully submit the pledge, please speak to me (or the Chair of the Math Program, or your advisor - whoever you feel most comfortable with) immediately.

For a discussion of how the Honor Code specifically applies to the various assignments and exams in this class, please see the last several pages of these policies.

Connections:

This course forms a two-course connection with the old Art History 111/211. A proposal is also being prepared by the relevant faculty to form a flexible two- or three-course connection between this course, ARTS 111 (2D design), and/or either Introduction to Italian Renaissance Art or Evie Staudinger's course. We should know whether it has been approved by the middle of the semester. (Note: if you took ARTH 198: Introduction to Italian Renaissance Art last term and would like the connection, let me know – because it was an experimental course at the time, you will not automatically get the connection – we'll have to send over a blanket petition for every student who wants the connection).

Course Structure, Goals, and Expectations:

The main goals for this class are to

- use your interest in art to motivate learning mathematics that can be used to create, analyze, or understand various works of art, thus honing your logical abilities,

- encourage you to appreciate how beautiful math can be,

- give you a deeper understanding that math is universal, rather than an isolated esoteric field

- give you a deeper and more layered appreciation for some of the art you see.

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. The course is structured to give you repeated opportunities to work with the material, in varying forms and levels of depth and complexity.

More and more studies of how students best learn math indicate that watching a professor introduce material for 50 minutes at a time 3 or 4 times a week is not ideal: students benefit immensely from having already read the material, the professor illustrating a few key ideas, then giving students the opportunity to both practice what they've learned and to discuss the concepts with fellow students.

You must therefore read the text before each class. Class itself will often combine a discussion of more difficult points, or an example or two, with opportunities for in-class work in small groups on introductory problems so that you may *do and discuss* what I've just shared. These efforts should help crystallize your understanding of the material, *or* to help you identify where some confusion is arising.

These initial exposures are followed by weekly homework problem sets consisting of a combination of drill problems and more conceptual questions. Projects will proved a variety of opportunities to further deepen your understanding of the mathematics and how it relates to art. Exams will encourage you to look at the big picture and fit the material into its place in the course, as well as to re-visit the material after you've learned the basics and to see it more clearly.

The expectation for all classes taught at Wheaton is that you spend 2 to 3 hours of work outside of class for every hour in class. Since this class meets for 3 hours a week, no matter what your experience has been in other classes, you should

> plan to spend *at least* 6 hours a week on this class outside of class!

Classroom Etiquette:

I would like to provide a classroom atmosphere with minimal distractions for both you and me, in which all students feel comfortable asking a question or contributing to a discussion.

This not only means that I ask that you not talk or whisper while someone else is speaking, but that in class you refrain from:

- texting

- using a computer. If you need a computer to take notes, please bring the accommodations letter to me as quickly as possible.

Ask questions when you do not understand something. I can guarantee that 95% of the time, if you have a question, so do at least three other people in the classroom.

When we are covering material that you've seen before or which comes easily to you, please be considerate of those for whom it is new or difficult.

Class Participation

As with any class, you will get more out of it if you actively participate, so I count class participation toward your overall grade. This includes attendance, being on time, asking constructive questions, answering my questions, listening respectfully and with interest, working with classmates when I ask you to, and other similar aspects of good academic citizenship.

Each day, active participation will earn 1 point; appearing interested, respectful, and working when asked but otherwise not participating will earn 0 points, while being a distraction, or not paying attention will early -1 point. The first two absences will earn 0 points; each subsequent absence will result in an increasingly large number of lost points for that day.

PROBLEM SETS

Most of the focus of this class will be on learning math – and to help you with this, I will be collecting homework. My reasons to collect and grade problem sets: so that your grade doesn't rely solely on exams; to give you feedback on your mastery of material; to give me feedback as to whether I need to spend more (or less) time on material.

You will have *weekly* problem sets, due Wednesdays *at the beginning of class*. The problem sets reflect an entire week's worth of material, and should be worked on steadily throughout the week.

> Late problem sets will have points deducted!

If turned in on Wednesday from the time I collect it to 3:30, I will deduct 0-10%. Problem sets turned in after 3:30 pm Wednesday and before 3:30pm Thursday will have 10%-30% deducted. After that, I will not accept it.

PROJECTS

For some, projects that allow you to create art work using the mathematical ideas you've learned is a fun and challenging way to reinforce the material you've been learning. For those of you who feel your talents lie elsewhere, there are some less artistic project options.

Your goal is to earn 100 points on projects –just as your goal is to earn 100 % on anything. To earn these points, you will do several of the 13 project options. Different projects have different maximum point potentials, and how many *you* earn on your projects will depend upon the extent to which you incorporated math in the work, the correctness and the sophistication of the math you used, the clarity of your explanation, and (if the project involves creating art) the creativity and effort you put in to the art, and to a lesser extent (as this is not an art class) the quality of the art. Keep doing projects until you reach 100 points. Most students find that between 4-7 projects suffice.

Several projects consist of using mathematical ideas to construct a work of art, and of writing a description of the intersection of math and art you've created. Others consist of analyzing a work of art, reading books or articles and analyzing them, and writing stories. In order to give you the opportunity to (to some extent) choose those projects which most appeal to you, best fit your schedule, and have a chance of adding up to 100 points, I have listed the 13 projects, along with their due dates, on the web. Follow the links from the public course web page. Be aware that the points listed are the *maximum* possible – how many I would give to a very strong work that fulfilled every aspect of the project's description.

You may also propose other ideas for projects to me, if I've missed a good possibility.

I will announce in class when a project is within 2 weeks of being due. Most projects will be due on Fridays at 3:00pm.

> Late projects will have points deducted!

Please note that I can not accept the projects due on the last day of class at any time after 5pm that day. With those exceptions: If turned in on Friday after 3:00pm but before 5:00pm, I will deduct 0-10%. Projects turned in after 5:00 pm Friday and before 9:00am Monday will have 30% deducted. Projects turned in after 9:00am Monday and before 5:00pm Wednesday will have between 30% and 50% deducted. After that, no late projects will be accepted.

EXTRA CREDIT: There are a few ways to earn extra credit in this class:

- (The most reliable way) If you earn more than 100 points on the projects, the extra points will count as extra credit.

- Finding mistakes or making suggestions on how to improve the chapters I have written for this course – the introduction, Chapter 1, and Chapter 2. A non-math related typo=just a few points; a math related type=several points; a substantive clarification of a mathematical explanation=still more points.

- If there are relevant and accessible math seminars this term, attending it and writing a brief description will earn extra credit.

EXAMS AND FINAL:

I will give three midterm exams to encourage you to pull together the concepts and skills we have covered. These are designed for you show me how well you've mastered the underlying mathematical ideas.

Barring unforeseen circumstances, the exams will be given on Wednesday evenings from 6-8pm; students with accommodations may begin earlier. Look at the syllabus now, and let me know as soon as possible if you have a conflict. I will not make alternative plans within 24 hours of the scheduled time.

The final will be cumulative and will be 3 hours long. The date and time is on the syllabus; make your travel plans accordingly.

Notify me in advance if you will be missing a midterm exam. If your reason for missing is acceptable, we will arrange that you take the exam **early**. If you miss an exam without notifying me in advance, I reserve the right not to give you a make-up exam. I will not give any student more than one make-up exam during the semester, without extensive documentation of a significant reason backed up by the advising office.

ATTENDANCE:

As I mentioned earlier, once you miss two classes, your absences will begin to count against your participation grade: 1 point for the third missed class, 2 points for the fourth, etc.

Also, much of this course is only available through the classes, so missing class should be avoided. If you **do** miss class, you are responsible for the material that was covered – it is not my responsibility to teach it to you outside of class.

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Accommodations:

Wheaton is committed to ensuring equitable access to programs and services and to prohibit discrimination in the recruitment, admission, and education of students with disabilities. Individuals with disabilities requiring accommodations or information on accessibility should contact Abigail Cohen, Assistant Dean for Accessibility and Assistive Technology. She is available to discuss appropriate accommodations that may be recommended for students with disabilities, learning differences, or access needs. Schedule an appointment with her at the Filene Center for Academic Advising and Career Services by emailing her at `cohen_abigail@wheatoncollege.edu`, or calling her at (508)286-3794.

Evaluation

I expect to use the weights below, although I reserve the right to change them if necessary:

Class Participation	5%
Problem Sets	25%
Projects	20%
Midterm Exams	30%
Final Exam	20%

Note: While getting above 100% on the projects earns you extra credit, there is a limit to its effectiveness. For instance, if your exam average is below 60%, no amount of extra credit will result in your earning above a B in the class (even achieving a B would require an extraordinary amount of effort on the projects that may be better spent spread more evenly throughout the aspects of the course).

Discussing Grades with me: If you question the accuracy of any score or believe I did not see or understand something that you wrote, *of course* I would be happy to look at it again **within a week** of you receiving it. I also welcome discussing the scoring of work (within a week), if your questions are about the nature and nuance of the material and why I considered an explanation to be incomplete or unconvincing.

However, if it seems to me that your goal is neither to point out an error I made nor academic in nature, but simply to get more points, then I reserve the right to lower your score on that assignment, test, or overall total.

More on the Honor Code

Below, I detail how the Honor Code relates to the various assignments and exams in this course.

- **If you see a violation of the Honor Code occurring that relates to this course, you are bound by the Honor Code to report it.** If you do not feel comfortable reporting it to me, report it to the chair of the Math program.

- **For all assignments and projects:** To help you figure out the concepts of a problem, you may discuss the work or use references, *but* you may not use anybody or anything which either gives you the answer or leads you directly to the solution.

- **When you do use references** (friend, classmate, tutor, online resource, book), you *must* cite them. For instance, if you work with friends on an individual problem set, or if you get help from a tutor, write something like *I worked with Joe Friend on this assignment*, or *I received help from Jane Tutor on Problems 3, 4, and 7.*

- **Group Problem Sets:** Groups may only consist of 2 or 3 people. You must understand all the work that is being submitted under your name. This means:

  - You must make every effort to be present at all group meetings. You may not purposely exclude any member from a meeting.

  - **You may not divide the work!**

  - You must make every effort to participate and aid in finding the solutions. If you don't understand what someone else is saying, you must ask them to explain it. If someone asks you to explain your ideas, you must take the time to explain them.

  - **Do not put your name on, or allow your name to be put on, any assignment to which you did not substantially contribute mathematically.** If for whatever reason you do *not* participate in the development of the solutions, your name may not appear on the group's work. If you miss your group's meetings, work on it on your own. Sometimes you can merge solutions at a later meeting; other times you'll have to turn in your own version (but that's only acceptable if I've given permission ahead of time). If you feel lost at the beginning of the assignment, do not just sit back and let others do the work or let people explain to you without your understanding it: make every effort to learn the material and to understand it by the time the assignment is turned in. Asking others to explain their thought process can serve as a significant contribution - they will understand it better (and it may be that the reason you don't understand what they're saying is because they are mistaken).

  - **Similarly, do not allow anyone else's name to be put on your group assignment unless they worked hard with you to understand the material involved.** Do not allow a sympathetic understanding of how difficult that person's week was to overcome this – a student who has had a difficult week should come speak to me, and I will make a note of it on my grade sheet.

- **Individual Problem Sets:** Write the results on your own, in your own words.

- **Projects:** Both the art work and the explanation of it must represent your own work.

- **Midterm and Final Exams:** You may not have your phone, or any device with access to the internet or phone lines, out at any time during the exam. You may not use any notes, books, friend or colleague. You may not look at anybody's exam until after all exams have been returned. You may not use a calculator unless I specify that you may, and you may not use a calculator that is part of a phone or MP3 player.