Math 109 – Mathematics for Design
Spring 2016

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Summary of Course Goals – In our contemporary culture the dialogue between math and art, while sometimes strained by misunderstandings, is a dynamic and living one. Art continues to inspire and inform mathematical thinking, and mathematics helps artists develop additional insight when reasoning about the content and structure of their work. The tools of mathematics also aid in the construction of conceptual frameworks that are useful in all aspects of life. This course will introduce students to ideas in mathematical thinking that are related to artistic considerations. Students will need to show proficiency with some mathematical ideas and then apply those ideas in creating their own works of art. In the process, students will also be called to analyze existing artwork with a mathematical eye. In this way, students will be provided a new tool to use in their approach to art and aesthetics.

Key Ideas for this course – Each assignment and class discussion will be aimed at expanding on these key notions:

- Mathematics and mathematical thinking involve a creative effort, not just rote memorization.

- There is a rich and complex connection between mathematics and art.

- Very basic mathematical concepts can be used to solve seemingly complex real-world problems.

Course Goals – As an F2 course, students are expected to gain a sense of how mathematics can be used for presenting and interpreting data. In this course specifically, I propose the following goals:

1. Students will be able to create an effective representation of data – this may be graphical, verbal, or numerical, depending on the data. Students will be able to effectively choose the appropriate method for presenting data, and will be able to create a presentation that is both useful and aesthetic.

2. Students will be able to recognize and discuss relevant mathematical content in new artwork. They will be able to discuss the intentionality of the mathematical content.

3. Students be able to create an original piece of art utilizing and/or illustrating mathematical concepts introduced in the class.

Course Materials – Students are responsible for bringing materials to class. Each student should purchase the following materials for use during the course. Items in bold should be brought to class every day.

1. **Required text** – Squaring the Circle: Geometry in Art and Architecture, by Paul Calter

2. **Pencils** – either mechanical pencils or wood pencils with a portable sharpener.

3. **Eraser** – the little nub on the back of your pencil is not enough. Buy a pink eraser.

4. **Ruler** – at least 12 inches (18 inches is even better), marked with both inches and centimeters

5. **Paper** – you should have 8.5 x 11 inch loose-leaf paper (lined, blank, or graph paper is fine). Do not submit work that has been ripped out of a spiral notebook.

Additional materials

You may need to purchase materials for completion of your projects during the semester.

If you have a computer of your own, I recommend, but do not require, purchasing the student's version of *Geometer's Sketchpad*. Information can be found at:
.   http://www.keypress.com/x26810.xml

You will be asked to complete several art projects during the semester. For these projects, you will want colored pencils, markers, or other media. You are responsible for acquiring the needed supplies to complete your project.

Course Scoring and Assessment –

NO GRADES! Rather than assigning "grades" for assignments, you will accrue points as you complete activities connected to the course. Class participation, completion of homework, strong performance on exams, compelling art projects: these will all contribute toward your total course score. The key sources of points for the course will come from:

- **In-class work** (quizzes, worksheets, reflective writing, etc): typically 5 points per day

- **Homework**: 5 points per assignment

- **Art projects**: 30 points for each of three projects

- *Sketchpad* **Activities**: 25 points for each of six projects

- **Class-wide project**: 50 points

- **In-class exams**: 75 points for each of two exams

- **Final exam**: 150 points

Preparation and Participation
To help foster a deeper discussion in class, you will be asked to read and reflect on new material before most class meetings. At the beginning of most classes, I will either collect a short writing response from the reading or give a short quiz about the reading – your work on these assignments will contribute to your in-class points per day.

If there is no reading preparation for the day, you will earn points based on your participation in the day's discussion/activities.

You cannot receive points for any reading response or quiz for a class that you miss. If you miss a class for any reason, you will not be able to earn in-class points for that day.

Homework
Homework assignments are meant to add to the learning experience. Ideas that we only touch on in class will be fleshed out more fully in the homework sets. Note that often we will not have time to discuss many of the homework problems in class – if you have questions about the homework, please stop by my office or email to talk!
Unless otherwise specified, all assignments are due by the beginning of the class period on the date due.

Sketchpad and Excel Projects
Geometer's Sketchpad and *Excel* are available on all campus computers – both Mac and Windows machines. In addition, you can purchase a student version of *Sketchpad* if you wish to install it on your own computer (http://www.keypress.com/x26810.xml – a student license is about $10).
Computer assignments will be completed and submitted electronically. Details will be provided with the first assignment.

Art Projects

There will be three projects through the semester that will have you create a piece of artwork based on given parameters and write a short description of the artwork, including the role that mathematics played in your creation. The projects for this semester will be:

1. *Perspective drawing:* This will be pencil on paper – I recommend paper larger than the standard 8.5x11", but that is not required. You will use techniques from the class to make a perspective drawing of nearby location.

2. *Planar geometry project:* You may use your choice of material/method to create a 2-dimensional design exploring or illuminating an idea from planar geometry.

3. *Polyhedron project:* Make a three-dimensional representation of a polyhedral object, using the material/method of your choice.

A rubric and complete description for these activities will be provided during the semester.

Midterms and Final Exam

There will be two midterms: **Friday, February 26** and **Wednesday, March 30**. Be sure to mark these dates on your calendar, as make-up exams are generally not given. The final exam will be on **Wednesday, May 4 at 11:30am-1:30pm**.

The exams will be based on your reading of the text, our classroom discussion, problems given for homework, and the Sketchpad/Excel projects. Details will be provided preceding each exam.

Scoring - How does my score translate to a letter grade?

By the end of the semester, there are approximately 800 total possible points for you to earn. Your grade will be determined by the total number of points youâĂŹve accumulated by the end of the semester:

760 points	A
720 points	A-
700 points	B+
640 points	B
616 points	B-
584 points	C+
560 points	C
520 points	C-
480 points	D+
440 points	D
400 points	D-

Attendance and Classroom Norms – There are no "excused" or "unexcused" absences. If you miss a class, you will not be eligible for any in-class points awarded that day.

If you know that you will be missing a class, be sure to inform me as soon as possible so you may get any missed worksheets or assignments. **You are responsible for getting any homework to me even if you miss class.**

In addition, you may be deducted daily points if your conduct detracts from the learning environment in the classroom. Detractions include arriving late, texting during class, interrupting/disrespecting others, or refusing to participate.

Missing in-class activities
Your attendance in class is particularly important for certain activities. *Inform me in advance if you know you will miss a class.* Special arrangements may need to be made for you to get credit for these activities if you are not in class. Activities that your attendance may directly impact include:

- *Sketchpad/Excel projects*: The points earned for these computer projects depend in part on your in-class work.

- *Class Activities*: There will be a "barn-raising" activity on DATE. Your active work, including in-class work is necessary to earn maximum points for that activity.

- *Art projects*: On the dates the art projects are due, you will be asked to say a few words about your project. Discussion and critique of the projects will contribute to your point total for these assignments.

- *Midterms*: Missing a midterm will merit a zero points toward your course score.

Homework submission
If you cannot attend class, it is your responsibility to get any work due submitted. Work submitted after 4:00pm on the date due may incur a penalty. Late will only be accepted until scored homework is returned.

Chronic absences
If you find that you will be missing several class periods (due to a serious illness/injury or a similar reason), please inform both me as soon as possible. Special arrangements or considerations might be possible if you will have a long-term attendance issue.

New York trip Class will not be held on the day of the art trip to New York City.

Syllabus Status – This syllabus and the course contents are subject to change at the discretion of the instructor. Generally changes will be finalized only after discussion of the change with students in the class. Any updates to the syllabus will be announced in class and sent by email. Students are responsible for any announcements made in class and are expected to check email on a daily basis for course updates.

Canceled Classes – Class may be canceled due to weather or for some other reason. In the case of cancellation, the instructor will send an email to inform students of the cancellation. It is the student's responsibility to check email prior to each class period to determine if class is canceled.

e2Campus – In the event of an emergency the system called e2Campus allows Moravian College to send text messages to the cell phones of registered members of the campus community with information about what is happening and/or what precautions should be taken. Up to two cell phone numbers and two email addresses per user may be registered. This service is an integral part of the College's emergency response system. If you are not already registered on the system, please do so as soon as possible. To register for e2Campus, visit http"//intranet.moravian.edu/e2campus/index.asp from a computer on Moravian's campus.

Learning Disability Accommodations – Students who wish to request accommodations in this class for a disability should contact the Academic Support Center, located in the lower level of Monocacy Hall, or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Academic Honesty – The College academic honesty policy appears in your Student Handbook; you are expected to be familiar with it. This applies to work done outside of class as well as to in-class quizzes and tests. Please read them carefully. If you are unsure about the propriety of a particular procedure or approach, please consult with your instructor before continuing with the assignment.