***HNRS 241 Mathematical Reasoning*** ***Mathematics and Art***

Spring 2019

**Prof. Jan Minton**

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**Office Hours:** By appointment: Monday & Wednesday 1:30-3:00 and Tuesday & Thursday 1:30-2:30
Make appointments online at **jminton.youcanbook.me**

**Focus of Inquiry:** *How can Mathematics deepen our understanding of Art? How Can Art illuminate Mathematical concepts?* These twin questions launch an investigation of the interplay of two subjects typically considered to be disjoint. The first question leads to an exploration of pattern, symmetry, and dimension. The companion question seeks an alternative to the use of standard mathematical symbols and notation as the means of engaging mathematics. Use of color opens the door to more visual representations of mathematics, facilitating "Aha!" moments to a broader audience.

**Intended Learning Outcomes for HNRS 241:** By the end of this course, successful students will be able to ...

1. Describe and apply methodologies of mathematics appropriate for the course's topic
2. Write about course topics clearly and effectively
3. Interpret quantitative information related to the course topic.
4. Connect course content to their lives and to communities beyond the classroom.

**Materials:** Coloring implements (pencils, markers, whatever … your choice)
Tracing paper
Materials as needed for individual art project

**Books:** *Proof* a play by David Auburn
*Picasso at the Lapin Agile* a play by Steve Martin
*Flatland: A Romance in Many Dimensions* by Edwin A. Abbott
ONE of the following: *A Writer's Reference*, Diana Hacker RC Custom Edition
OR *Easy Writer*, 6e by Lunsford

**Other Readings:**

Mathematics and Art – So Many Connections an essay by Doris Schattschneider
*A Mathematician's Lament* an essay by Paul Lockhart
*Fractals and an Art for the Sake of Science* an essay by Benoit B. Mandelbrot
*The Regular Division of the Plane* transcript of lecture by M.C. Escher

**Videos:** The Proof - Andrew Wiles' journey to the proof of Fermat's Last Theorem
Beautiful Math – What do Mathematicians think is beautiful about math?

**Exams:** There will be a midterm exam and the final exam. Each will be a mixture of short answer, short essay, and math "problems". The mid-term is scheduled for February 28 and the final exam time is Wednesday, April 24 2:00-5:00. Make up exams will be given only in *very extenuating* circumstances.

**Paper:** The one major paper (5 page minimum) will be due on March 14. Fill in the blank with your choice of verb to title your paper either "How does Math _____ Art?" or "How does Art _____Math? The paper must address the question using at least two academic sources as well as your own thoughts and reflection. Expect to meet with Prof. Minton to discuss your topic, source, and paper outline approximately one month before the final due date. A full draft of your paper must be brought to class for peer review approximately two weeks before the final due date.

**Art Work:** The class as a whole will create a cohesive mathematical art show. Planning for the project will take place in class. Students will work on projects outside of class once the overall plan is in place. Students will give tours of the exhibition concurrent with a Math and Art reception during the last week of class. Each student must participate in at least one tour.

**Other Graded Work:**

Short writing assignments will accompany each reading and video. Mathematical assignments will be given frequently as well as small art assignments. There will be no make-ups of "other graded work" except in the case of a college related absence. One item of "other graded work" will be dropped. Grades from discussion make-up papers or alternate assignments (see below) are not droppable.

**Honors e-Portfolio:**

Don't forget to post your work in this course to your Honors e-Portfolio.

**Attendance:** Class attendance is critical. Mathematical content will come from class notes rather than a mathematics textbook. Students are expected to contribute to in-class discussions. Any student who is absent on a discussion day must submit a 2 page make-up paper on the discussion topic or else a grade of 0 will be added in the "Other" category.

**Overall Workload:**

In addition to the 3 hours of class time, you are expected to work outside of class for a minimum of 9 hours per week.

**Academic Integrity And Electronic Devices**

The college policy is fully supported. Mid-term and final exams are closed book and closed notes. Any work submitted for a grade must be done individually unless otherwise clearly specified.

The use of any electronic device during a quiz or exam is strictly prohibited. Exceptions may be made regarding the use of calculators. Cell phones are never permitted. **Any use of a non-approved device during a quiz, test, or exam will be considered a breach of academic integrity.**

**Inquire Policy**

All assignments along with details will be posted on Inquire. Students are expected to be knowledgeable of all postings on Inquire. It is each student's responsibility to consistently (at least daily) monitor Inquire for course information. Any assignment that requires an Inquire upload will not be accepted in any other form. Also, to receive credit for uploads, the file must be immediately readable on the instructor's college computer. It is the student's responsibility to make successful submissions. It is the student's responsibility to resolve technology problems through the college's IT department.

All grades will be posted to the Inquire Gradebook. However, Inquire will be used for individual grade communication and storage only – not for averaging. Any averages that may appear on Inquire for this course should not be trusted.

**Course Grades:**

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|---|---|
| Major Paper | 20% |
| Major Art Work | 20% |
| Other Graded Work | 20% |
| Mid-Term Exam | 20% |
| Final Exam | 20% |

Final course averages guarantee as a minimum the following course letter grades:

| | | |
|---|---|---|
| A 93-100 | B- 80-82 | D+ 67-69 |
| A- 90-92 | C+ 77-79 | D 63-66 |
| B+ 87-89 | C 73-76 | D- 60-62 |
| B 83-86 | C- 70-72 | F below 60 |