Honors 301 – Special Topics   Spring 2016
Mathematics and the Arts

Prof. Jan Minton
      Office: 461 Trexler
      Phone: 375-2488
      Email: jminton@roanoke.edu
      Office Hours: Monday and Wednesday 2:30-4:30
                      Tuesday and Thursday 1:30-2:30

Course Description: The purpose of this course is to find commonality between mathematics and the arts. Students will explore the aesthetics of mathematics as well as the mathematical underpinnings of various art forms. Creativity, beauty, and elegance of the art world are also hallmarks of mathematical inquiry and discovery. Perspective, symmetry, and proportion from the world of mathematics are among the essential tools used in the art world.

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

1. Acknowledge that a mathematical idea, while convincing by its logic, can also be moving by its beauty
2. Compare the creative processes of artists and mathematicians.
3. Use the geometry of perspective to create three dimensional realism in simple drawings.
4. Create patterns/figures based on symmetry and alternate geometries.
5. Derive the Golden Ratio by calculation and construction and consider its presence in visual arts and music.
6. Explain the basic notion and features of fractals and give examples of their artistic possibilities.

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

Textbooks: *Proof* a play by David Auburn
                Picasso at the Lapin Agile a play by Steve Martin
                Art a play by Yasmina Reza
                Flatland: A Romance in Many Dimensions by Edwin A. Abbott

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
                Possibly others …

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 March 3 and the final exam is 2:00 – 5:00 Wednesday, April 27.

Paper: The one major paper (5 page minimum) will be due on March 15. This paper should be based on at least one academic source that relates mathematics to the art world. Your paper should serve as an example of either "Math _____ Art" or "Art _____ Math"   in the spirit of the Doris Schattschneider essay

Group Presentation: Students in teams of 2 will research a topic that connects to an original mathematical artwork. Teams will teach the topic as well as create/grade an assignment. Prof. Minton will suggest topics and consider other proposals. Presentation times will be spaced out over the semester.

Art Work: Each team will create an artwork related to the team presentation topic.
               All artwork is due by April 12.

Other Graded Work: In and out of class assignments may be collected for grading. Also, brief quizzes are a possibility. 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 group presentation assignments and discussion make-up papers are not droppable.

Attendance: 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 additional hours per week.

Academic Integrity And Electronic Devices   The college policy is fully supported. All tests and quizzes will be closed book and closed notes. Any work done for a grade (with the exception of the group study presentation) 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**   Students are required 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.

Course Grades:

Paper	15%
Group Presentation	15%
Art Work	15%
Other Graded Work	15%
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