Math Seminar. Math 498-01. Spring 2013.
Rowan University

Professor: Dr. Christopher Simons, simons@rowan.edu
Web page: http://sites.google.com/site/cssimons/teaching

Office hours: M 1:45pm-2:30pm, 10:50am-11:40am, R 1:45pm-2:30pm in Mathematics department 229 F on the second floor of Robinson Hall [My office phone is (856) 256-4500 x3874, but voices messages left at (856) 556-0001 will get to me much more quickly.] I am very often available in my office throughout the week. Do ask questions before and after class as well.

Class: F 9:25am-12:05pm (with 10 minute break). Class attendance is required and will be recorded.

Goals: This course is the capstone of the mathematics major. It integrate's all of the topics of the major through substantial mathematical writing. Students will use the mathematical literature to research contemporary problems.

Prerequisites: Grades of "C-" or better in real analysis I, modern algebra I, ordinary differential equations, and at least one of probability random variables or college geometry.

Required materials:

- Textbook: Extending the Frontiers of Mathematics, Edward B. Burger
- Bound notebook for problem solutions
- Computer access for mathematical writing and mathematical literature

Grading:

- Problem solutions and participation: 15%
- Writings assignments and discussions: 20%
- Final paper & presentation: 35%
- Major Field Test: 15%
- Quizzes: 15%

Due to the nature of this course, full attendance is expected for every class. Absences will lower your grade.

Final paper and presentation: The final paper is a substantive, 15-page, expository paper developing a topic beyond what you have studied in your undergraduate curriculum. It requires external research and must contain significant mathematical content. A brief, 10-15 minute, presentation on your paper will be required. The paper and presentation must demonstrate your ability to learn independently, and to formally present this learning in both written and presentation form. By February 8 you most pick a general area for your project. By February 22 you should have a specific topic approved by the instructor. By March 29 an outline of the paper is due. By April 12 a rough draft is due. By April 26 the paper itself is due. The presentations will take place starting May 3. You should expect other members of the class will read and write reviews of your paper. Good topic will involve contemporary mathematical literature. A good listing of such literature is faculty.lasierra.edu/~wclarke/or/orsugg.pdf

Mathematical typesetting: Since you will be writing about mathematics it is important that your wrote include nicely typeset equations. I recommend that you learn the basics of latex for

to do this. Latex is the standard format in which mathematical papers are written in. It will useful for any mathematical writing that you do. As it is open source it is freely available. If you insist you may use alternate commercial (Mathematica, MathType, ...) or open source (LibreOffice, ...) so long as you can produce good results. As small writing assignment please typeset

$$\int_0^{\tanh(1)} \prod_{i=1}^{\infty} \frac{\nabla f(\zeta)}{1-p_i^{\zeta}} d\zeta$$

handing in both your output and your input by February 1.

Problems, quizzes, and writing assignments: Problems will be assigned throughout the course. There solutions may be handwritten in a journal book. Other writing assignments will be given throughout the course (in fact the first one was the response to the shapes paper simonsfoundation.org/features/science-news/mathematics-and-physical-science/getting-into-shapes-from-hyperbolic-geometry-to-cube-complexes-and-back/ due January 25, and the second is the typesetting problem due February 1). Writing problems are more formal and must be type and typeset. Some of our problems, quizzes, and writing assignments will be based on the following chapters of Frontier's of Mathematics textbook:

- Puzzles and patterns 1
- Relations 6
- Infinity 7
- Recursive functions 8
- Pythgorean triple 14
- Cantorian analysis 16
- Continuous analysis 17
- Group theory 18
- Algebraic structure of curves 19

Other problems, quizzes, and writing will come form Major Field Test / GRE Mathematics Subject Test type questions. Addition work problems, quizzes, and writing will come from mathematical literature readings. Additional work may include mathematics major

ETS major field test: Students will take the ETS major field test in mathematics. They test is similar to the GRE subject test in Mathematics that is commonly used to assess student knowledge during mathematics graduate school applications. During the semester we will discuss sample problems. Toward the end the the semester the formal major field test will be taken.

Plagiarism: Prof. Marcus Wright tells me that when he taught the course everyone cheated. [Actually I made this up]. Therefore we will use turnitin.com for all writing assignments as well as for the final paper. Please sign in for an account at turnitin.com using class ID: 5978785 and class password: isomorphism . In event that the software detects a problem, I will invite the student to discuss the assignment with me before taking further action.

Fine print: Any acts of of academic dishonesty will result in an grade of "F" for the course with a letter sent to the provost. Attendance and participation will impact your final grade. Engaging in disruptive activities during class is not permitted. See also student accommodation policy at http://www.rowan.edu/pdf/ACADEMICPOLICY_student_accommodation.pdf

Assignments:
Week 0 (due Jan 25): written response to shape paper, quiz #1 major field test

Week 1 (due Feb 1): written math typography, problem solving Burger chapter 1, written New Yorker Perelman, quiz #2 (?)

Week 2 (due Feb 8): problem solving Burger chapter 6, written article review, written general area for final topic, quiz #3 (???)

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Week 13

January 11, 2013

Papers:

simonsfoundation.org/features/science-news/mathematics-and-physical-science/getting-into-shapes-from-hyperbolic-geometry-to-cube-complexes-and-back/

http://www.newyorker.com/archive/2006/08/28/060828fa_fact2?currentPage=all

Software

http://www.codecogs.com/latex/eqneditor.php

www.writelatex.com