

MAT 5900: Senior Seminar, Explorations in Mathematics, Fall 2011

Instructor:	Dr. Amanda Knecht	Office:	SAC 323
E-mail:	amanda.knecht@villanova.edu	Phone:	610.519.6659
Office Hours:	M 1:30-4:30, R 10-11am and by appointment		

Contents

The course is designed to show you how new mathematics is actually created. In this course I will help you learn how to solve problems and create your own mathematics through experimentation, making models and guesses, critical thinking, and discussions with one another. This is very exciting!!! It can also be a little scary if you have never been asked to do it before. Do not worry, though, this is how mathematics has been done since ancient times ... It works! This course also serves to develop useful skills, including how to write and typeset a math paper and poster, making oral presentations, and computing with mathematics software systems such as Maple.

Structure

The course is divided into two halves, before fall break and after fall break. Before the break the class sessions will be a little more structured. Each week you will work in groups on a new open ended problem. I will give a short intro to the problem on Wednesday, and then on Friday and Monday, you will work on the problems. By the following Tuesday night, you will turn in a write-up of what you have discovered about the problem, and I will choose students to present their findings in Wednesday's class. The last week before the break you will form your final project pairs and pick a topic for your term paper, poster, and presentation.

Once we return from Fall break, you will spend the first few weeks of class time working in your groups on your project. I will periodically have you present your progress to the class so that we can all see how things are developing and give suggestions to help your project. After Thanksgiving, the pairs will present their findings in a formal forty minute presentation.

Goals

My biggest hope is that when you leave this course in December you will no longer fear difficult problems and you will celebrate the struggle of thinking. Along the way I hope that you all develop the following skills:

- an ability to communicate ideas effectively
- an ability to teach others
- an ability to teach yourself
- a willingness to make mistakes
- a passion and curiosity for learning
- an ability to create questions
- an understanding of what mathematicians do

Participation

As you may have gathered from the structure and philosophy of the course, attendance and participation are very important. I will keep track of how much effort you've put into each day's work, and how often you volunteer your thoughts in the explanation portion of class. Your participation in class and in labs will account for 10% of your final grade. **Don't skip class!** Clearly, when you skip a class, you miss out on the participation component of the course. However, there may be even more serious consequences...

Serial Absenteeism Clause

You are allowed up to two (2) unexcused absences from class. (The instructor decides what constitutes an excused absence on a case-by-case basis.) Coming to class more than five minutes late or leaving early counts as an absence. For each absence beyond those two, your final grade for the class will drop by one letter grade.

Topic write-ups

Each week you will type your write-up on the previous weeks topic in \LaTeX and submit it through Blackboard. All but the first write-up are due by 11:59pm on Tuesday evening. Your cumulated write-up scores will account for 25% of your final grade. Even though you will work in groups, you may not copy the written work of another student or allow another student to copy your written work. What you submit should be your own work: written by yourself and in your own words. **Late homework will not be accepted** in the absence of divine intervention or matters of similar weight. Unexcused, late, or missing papers count as zeroes.

I will grade homework on the following scale, so do not expect a perfect score at the beginning of the semester. The goal is for your mathematical writing to improve.

Perfection or close to it	–	10
Great Ideas and Explanation	–	9
Good Ideas but needs work	–	8
Turned something relevant in	–	7
Turned something semi-relevant in	–	6
Turned nothing in or something in late	–	0

Journals

You will be required to write in a journal this semester. The point of the journal is to keep all of your work and thoughts in one place, so that you do not lose anything when it comes time to write it all up. You should date each page and try to keep your notes as orderly as possible. If you look in my office you will see paper everywhere. I hope to keep you from falling into my disorganizational habits! On the day of your final presentation, I will collect your journal and it will count as 10% of your final grade.

Final Project

The weeks after Fall Break will be spent working on your final project. Each pair will present their project after Thanksgiving, write a joint term paper, and make a poster for the poster session. The presentation will last 40 minutes so that we have 10 minutes for questions. The term paper will be typed in \LaTeX . I will give you a sheet with more formatting details when the time comes. The poster will also be typed in \LaTeX and will be presented at our poster session during our allotted finals time.

Grade Distribution

Participation	–	10%	
Journal	–	10%	<i>(turn in the day of your presentation)</i>
Write-ups	–	25%	
Final Presentation	–	15%	
Final Poster	–	15%	<i>(Thu, Dec 15, 2:30 - 5:00)</i>
Final Paper	–	25%	<i>(Thu, Dec 15, 2:30)</i>

Getting Help

As the course goes along, you will quickly realize the benefit of regularly attending office hours. You are encouraged to make appointments when necessary, especially if the regular office hours don't fit well with your schedule. Always feel free to email with questions about the course in general or to set up an appointment. As a rule, homework related questions are best answered during office hours. But if the need arises I will try to respond to email questions within one business day. *Emailing questions after 3pm on a Tuesday is definitely not a good idea.*

Known Deadlines

September 6	–	Topic 1 Write-Up Due
September 13	–	Topic 2 Write-Up Due
September 20	–	Topic 3 Write-Up Due
September 27	–	Topic 4 Write-Up Due
October 4	–	Topic 5 Write-Up Due
October 4	–	Final Topic and Pairs Picked
October 7	–	Introduction to Paper Due
November 28	–	Draft of Paper Due
December 15	–	Final Paper and Poster Due