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VITAL INFORMATION



Course: MAT 5900: Mathematics Seminar

Instructor: Dr. Alexander Diaz-Lopez, SAC 373

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Class times and locations: T, Th 2:30 pm - 3:45 pm, Mendel 256

Office Hours: Mon. 2 pm - 3 pm, Wed. 2 pm - 3 pm, Thu. 3 pm - 4 pm

★ Please come and talk to me ★



WELCOME STATEMENT



You are almost there! Welcome to the Math Senior seminar! This course is what some call a capstone seminar. In short, you should use the skills you learned in your previous courses to engage in a project and create a presentation and a paper based on the project.

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COURSE OBJECTIVES / LEARNING OUTCOMES

After successfully completing this course, you will be able:

- (I) To enhance your reading and synthesizing skills by reading mathematics from a variety of sources, including textbooks, articles, presentations, and manuscripts.
- (II) To write a clear and organized article on a math topic of your choice, using the typesetting program \LaTeX on the website www.sharelatex.com.
- (III) To present mathematics clearly to an audience of your peers.
- (IV) To critique written proofs, including generating constructive criticism, recognizing a valid argument, and editing and clarifying proofs.



COURSE DESCRIPTION / FORMAT

The timeline and format of the course is as follows:

- I will lead the first few class sessions and discuss background related to the projects.
- After that, each of you will give an **introductory presentation** about your project.
 - ✓ This addresses learning outcomes I, II, III.
- You will then do a **draft of the final presentation**.
 - ✓ This addresses learning outcomes I, II, III, IV.
- A **final presentation** and **paper** are due the last week of classes and finals week.
 - ✓ This addresses learning outcomes I, II, III
- You are expected to provide feedback to other classmates' presentations and papers.
 - ✓ This addresses learning outcome IV.

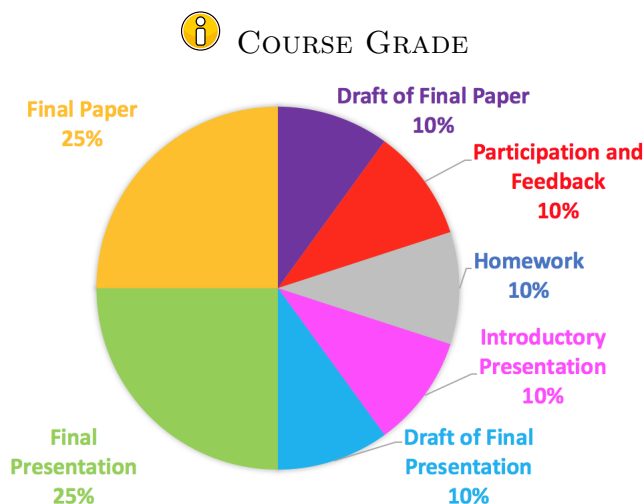


COURSE EXPECTATIONS

As the capstone seminar in mathematics, this course is different from all other math undergraduate courses you have taken. It is meant to give you a taste of what it means to do mathematics at a professional level. A lot will be asked of you, for example: your willingness to **engage** in a mathematical topic, your ability to **think of good questions**, and your **persistence and creativity** in answering these questions. The seminar is an opportunity for you to delve deep in a mathematics topic, challenge yourself (which usually includes a lot of failures before the big successes), and then present your findings.

This course will fulfill the objectives above if you do the following:

- (1) **Attend class regularly:** Active participation and attendance are necessary for success in this course. Most components of your grade depend on active participation. I have carefully planned the schedule of the course, so you can take full advantage of the activities and have enough time to prepare your presentations and paper. **If you miss a class, please contact me so we can devise a plan to get back on track.** Ideally, before the class period, but if not possible (life happens!) then as soon as possible after class.
 - ✓ This addresses learning outcomes I, IV.
- (2) **Work on your project consistently throughout the semester:** Due dates for drafts are given below.
 - ✓ This addresses learning outcomes I, II, III.
- (3) **Make changes/edits based on constructive criticism:** A large component of your final paper and presentation grades will depend on your response to previous suggestions from me and your classmates.
 - ✓ This addresses learning outcome IV.



There will be no extra credit available. Letter grades will be assigned using: A for 93 or above, A- for 90, B+ for 87, B for 83, B- for 80, C+ for 77, C for 73, C- for 70, D+ for 67, D for 63, D- for 60, F for less than 60.

? HELP

Counseling Services: It is common for college students to feel overwhelmed by academic or personal matters. The University Counseling Center offers individual counseling to discuss personal concerns. The Center is located in 206 Health Services Building; the phone number is 610-519-4050. See the website for more details: www.villanova.edu/counselingcenter.

ACADEMIC HONESTY

All students are expected to uphold Villanova's Academic Integrity Policy and Code. Any incident of academic dishonesty will be reported to the Dean of the College of Liberal Arts and Sciences for disciplinary action. For the College's statement on Academic Integrity, you should consult the [Enchiridion](#). You may view the university's Academic Integrity Policy and Code, as well as other useful information related to writing papers, at the [Academic Integrity Gateway web site](#).

OFFICE OF DISABILITIES AND LEARNING SUPPORT SERVICES

Students with disabilities who require reasonable academic accommodations should schedule an appointment to discuss specifics with me. It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. You must present verification and register with the Learning Support Office by contacting 610-519-5176 or at learning.support.services@villanova.edu. For physical access or temporary disabling conditions, please contact the Office of Disability Services at 610-519-4095 or email Stephen.mcwilliams@villanova.edu. Registration is needed in order to receive accommodations.

GUIDELINES FOR INTRODUCTORY PRESENTATION

For the presenters: The introductory presentation will be a 7 - 10 minutes presentation of your project. Your goal is to inform the audience of the project you will work on. The four main points you should focus on are:

- **Motivation:** You should motivate the project with examples, pictures, and/or any other technique you find appropriate.
- **Engagement:** You should engage the audience. Ask them a question, poll them, get them to ask questions; be creative.
- **Clarity:** You should present your project in a clear way. At the end of the presentation, everyone should have a clear idea of the problem you will work on.
- **Time:** You should finish the presentation within the time period given. Finishing early is not too bad. Finishing late is considered rude. I will let you know once you have 3 min left and 1 min left.

For the audience: You will pair with a classmate to provide constructive feedback for the presenter(s). You will fill an online form with your feedback and send it to me via email.



GUIDELINES FOR DRAFT OF PRESENTATION

The draft of the final presentation will last 17-20 minutes. It should include material from the introductory presentation (although not a copy of it), plus the new material you have discussed since then. This presentation (which is %10 of your grade) should give you a clear idea about how much material you can discuss during your final presentation (which is %25 of your grade). However, it should still be a stand alone presentation and should have an introduction to your project, some partial results, and a conclusion which can be a teaser or question to be answered in the final presentation.

For the presenters: In addition to the four main points discussed in “Guidelines for Introductory Presentation”, namely: **Motivation, Engagement, Clarity, Time**, you should also focus on **Content**. In the introductory presentation, the goal is onefold: to present a problem/project. In the draft of the final presentation your goal is twofold: to present a problem/project and the results you have obtained.

For the audience: You will pair with a classmate to provide constructive feedback for the presenter(s). You will fill an online form with your feedback and send it to me via email.



GUIDELINES FOR FINAL PRESENTATION

The final presentation will last 27-30 minutes. It should include material from the introductory presentation and the draft of the final presentation (although not a copy of them), plus the new material you have discussed since then.

For the presenters: You should focus on **Motivation, Engagement, Clarity, Time**, and **Content**. In the final presentation, the goal is threefold: to present a problem/project, results you have obtained, and a conclusion that would clearly wrap up your project.

For the audience: You will pair with a classmate to provide constructive feedback for the presenter(s). You will fill an online form with your feedback and send it to me via email.



GUIDELINES FOR DRAFT OF FINAL PAPER

The paper you will produce is a technical mathematical document with definitions, examples, theorems, and proofs. It should contain all the results you have obtained, as well as any supporting information in order to understand these results.

Writing a paper requires creating multiple drafts and multiple rounds of editing and feedback. Initially, your peers will provide the initial feedback on your paper. Then, you will submit a draft of the paper with all the information you have up until that moment. A rubric about how the paper will be graded will be shared at a later time.



GUIDELINES FOR FINAL PAPER

The final paper should be a complete technical mathematical document about the project you have chosen. You should incorporate the feedback your peers and myself have provided. A rubric about how the paper will be graded will be shared at a later time.

CONSTRUCTIVE FEEDBACK

A portion of your grade is dependent on your feedback to your classmates. Your feedback must be constructive. Constructive feedback is information-specific, issue-focused, and based on observations. We will hold a conversation about constructive feedback before the start of the presentations. Here are two examples:

- (1) Instead of simply writing “Good presentation,” write about what made it good. For example, “You were clear when introducing xyz topic and I was able to follow along.” or “I enjoyed learning about the topic of your presentation, in particular, about xyz.”
- (2) Instead of writing “Your presentation was boring,” you can express the reason behind your comment. For example “I didn’t quite understand the first slide and as a result I tuned out.” or “I wish you had engaged the public a little more early on the presentation.”

 CALENDAR

Date	Topics
Aug 28	Growth Mindset & SET
Aug 30	SET
Sep 4	Sudoku
Sep 6	Rubik's Cube
Sep 8	Peaks and descents of permutations
Sep 11	Peaks and descents of permutations
Sep 13	Choosing topics and groups
Sep 18	TBA
Sep 20	Individual Meeting
Sep 25	Individual Meeting
Sep 27	Groups 1 - 3 Intro
Oct 2	Groups 4 - 6 Intro
Oct 4	Groups 7 - 8t Intro
Oct 9	Work on project
Oct 11	Work on project
Oct 16	FALL BREAK
Oct 18	FALL BREAK
Oct 23	Feedback on paper
Oct 25	Feedback on paper
Oct 30	Work on your own paper
Nov 1	Work on your own paper
Nov 6	Draft of paper due
Nov 8	Individual Meeting
Nov 13	Individual Meeting
Nov 15	Groups 1 - 3 Practice P.
Nov 20	Groups 4 - 6 Practice P.
Nov 22	Thanksgiving Break
Nov 27	Groups 7 - 8 Practice P.
Nov 29	TBA
Dec 4	Groups 1 - 2 Final P.
Dec 6	Groups 3 - 4 Final P.
Dec 11	Groups 5 - 6 Final P.
Dec 13	Groups 7 - 8 Final P.

* Certain sections of this syllabus contain notes and comments made by colleagues Kathryn Haymaker and Jesse Frey.