

MATH 499S: Senior Seminar
Dr. Boersma
Winter 2023

Goals: This seminar is a capstone experience for mathematics majors. The primary goals are: 1) To assemble a portfolio demonstrating your proficiency in proof writing; 2) To learn about and discover a variety of applications of mathematics; 3) To read and summarize a recent mathematical paper; 4) To reflect on mathematical problem-solving strategies; and 5) To continue to improve your mathematical communication skills.

Office: Samuelson 221-A, phone: 963-1395, email Stuart.Boersma@cwu.edu. Office hours will be announced in class shortly. You may of course drop by anytime. If I'm not busy I'll be glad to talk with you.

Your Grade: There will be a variety of assignments, ten (10) are designated as **Required** and six (6) are designated as **Optional**. The required assignments will be graded as "Exceeds (E)" standards, "Meets (M)" standards, or "Not Yet". Optional standards will be graded as Complete or Incomplete. More details regarding each assignment, and their standards, will be given in class and/or described in Canvas. These assignments are grouped into four main categories:

- Proof Portfolio
- Applications of Mathematics
- Article Summary
- Problem Solving Strategies

Final grades Your final grade in the course is determined by the following table. Each grade has a requirement specified in its row in the table. **To earn a grade, you will need to meet all the requirements in the row for that grade.** A grade of F will be given if **none** of the rows have been fully completed.

Grade	# of Required	# of Optional
A	8 at E and 2 at M	4
B	5 at E and 5 at M	2
C	10 at M	0
D	7 at M	0

Plus/minus grades will be assigned at my discretion based on how close you are to the next higher grade level. While I will try to keep all grades in Canvas, the grade reported by Canvas may or may not accurately reflect the above grading scheme. The above grading scheme takes precedence over any totals reported by Canvas. Please contact me at any time with questions regarding your grade in this class.

Proof Portfolio

Complete a portfolio demonstrating non-trivial examples of proofs you have written. The portfolio must contain a proof of each of the following types: direct proof, proof by contrapositive, proof by contradiction, and proof by mathematical induction.

Each proof will constitute a **Required Assignment**. Please see Canvas for more details and deadlines.

Applications of Mathematics

You will write two short papers, each on a different application of mathematics. Each paper is a **Required Assignment**. There will also be an opportunity for you to give a brief oral report (2-3 minutes) on each of your application papers in class. Completing both of these oral reports constitutes a single **Optional Assignment**. Please see Canvas for more details and deadlines.

Article Summary

You will read a recent mathematical paper and 1) write a 3-5 page summary and 2) deliver a 10 minute presentation. The summary and presentation are both **Required Assignments**. There are several **Optional Assignments** related to this activity: Turning in a complete rough draft of your paper on time, participating in our in-class peer review activities, attending the oral presentations and providing peer feedback, etc. Please see Canvas for more details and deadlines.

Problem Solving Strategies

A couple of times in class you will be presented with some mathematical problems to work on, both individually and in small groups. As you work on these problems, you will be asked to think carefully about *how* you are approaching the problem and *what* problem solving strategies you tried. You will then write two short essays describing your work on two problems. Each essay is a **Required Assignment**.

Deadlines and Revisions

Deadlines for completing each assignment are in Canvas. By adhering to these deadlines and taking advantage of work done in class, you will have ample time to complete all assignments and have opportunities to revise and improve your performance on each assignment. Missing deadlines will keep you from receiving timely feedback to improve your work and could make it difficult or impossible to participate in certain in-class activities and optional assignments. If you are struggling to meet any particular deadline, please reach out to me, via email, to let me know so we can discuss the possible implications. Since we only meet once a week, waiting several days to speak to me in class is not the best option.

Students who have special needs or disabilities that may affect their ability to access information or material presented in this course are encouraged to contact me or the Center for Disability Services.