

Math 420 Final Project

Objective

The objective of this assignment is for you to apply the concepts of experimental designs to a real-life problem. You will be responsible for designing, conducting, and analyzing an experiment of your choice.

Guideline

Choose a problem or question that can be addressed with an experiment This should be something relatively easy to implement, feel free to review our course textbook for ideas.

Identify the factors, experimental units and response variables in your experiment Factors could be random or fixed based on the purpose of your experiments. Experimental units can be homogeneous or heterogeneous as long as your design accounts for that.

Choose an appropriate experimental design Some design ideas are: completely randomized designs, factorial designs, fractional factorial designs, nested designs, split-plot designs, variance component analysis etc.

Develop a detailed experimental design plan The plan should include the following information:

- A description of the factors, experimental units and the response variables you are measuring
- The levels of each factor
- The number of replicates for each treatment
- The method of assigning treatments to experimental units
- The method of collecting data

Conduct your experiment Follow your design plan to conduct the experiments and collect the data

Provide detailed data modeling and analysis Use appropriate statistical methods to analyze your data and draw conclusions about your experiment. This may include ANOVA, t-tests, interaction plots and other visualization tools.

Articulate results and conclusions Conclude your analysis based on the data collected, share learnings, conclusions and next steps. Cite any references used.

Timeline

The following are the key due dates for the project:

- **December 2, 2023** : Outline of final project (will be part of HW 5)
- **December 19, 2023**: Write-up of final project

Collaboration

You may choose to do your project individually, or form a team of up to three people. In the case of a group project, please note that a cover page of division of responsibilities will be needed, and 5 points of your final assignment will be assessed by your fellow team mates.

Writing and communication guidelines

Please keep your project write-up as concise as possible. Check the structure of your work to make sure it is coherent, include any exhibitions to facilitate your ideas, and cite all sources properly.