

# **Applied Linear Algebra Project Guidelines**

Instructor: Nick Fisher

Submission Deadline: December 12<sup>th</sup>

Submission Method: Upload to Written Report Canvas and email code as a zip file.

## **Overview**

This project is designed to help you apply the concepts of linear algebra to a real-world problem using MATLAB. The goal is to enhance your understanding of the theory through computational experiments and collaborative problem-solving.

You will work in groups of 4-5 to:

1. Solve a practical problem using linear algebra techniques.
2. Document your methods, results, and interpretations in a written report.

## **Objectives**

- Apply linear algebra concepts such as matrix operations, eigenvalues/eigenvectors, or least squares to a practical problem.
- Develop computational skills using MATLAB.
- Enhance teamwork and collaborative problem-solving abilities.
- Communicate your findings effectively in a professional report.

## **Project Topic Options**

Choose one of the topics in the provided ProjectOptions.pdf

## **Deliverables**

### **1. MATLAB Code:**

- o Your code should be well-documented with comments explaining each step.
- o Ensure that the code runs without errors and includes sample input/output.

## 2. Written Report:

Your report should include the following sections:

- o Title Page: Include the project title, group members' names, course name, and date.
- o Introduction: Provide an overview of your chosen problem and its relevance.
- o Methods: Describe the linear algebra concepts and computational techniques used. Include explanations of any MATLAB code or algorithms.
- o Results: Present your findings, including plots, tables, or other visualizations as appropriate.
- o Discussion: Interpret your results, discuss challenges, and explain how the methods addressed the problem.
- o Conclusion: Summarize key takeaways and any potential extensions or future work.
- o References: Cite any resources, papers, or tools you used.

## 3. Group Contributor Statement:

Include a brief statement outlining each member's contributions to the project.

## **Grading Rubric**

Your project will be evaluated based on the following criteria:

1. Mathematical Accuracy (25%)
  - o Correct application of linear algebra concepts.
2. Compactional Implementation (20%)
  - o Functionality, efficiency, and documentation of MATLAB code.
3. Report Quality (35%)
  - o Clarity, structure, and depth of analysis in the written report.
4. Visualizations and Presentation (10%)
  - o Use of plots, diagrams, or other visual aids to enhance understanding.

## 5. Group Collaboration (10%)

- o Evidence of equitable contribution and teamwork.

### **Group Formation**

- Minimum group size: 4
- Maximum group size: 5
- Groups must be formed by March 4<sup>th</sup>, and you should submit the list of group members via email.

### **Policies**

- Late Submissions: No Late projects will be accepted. Please start your project as soon as possible.
- Academic Integrity: All work should be original. Plagiarism or copying will result in a grade of zero for the project.
- Help and Support:
  - o Attend office hours for assistance with MATLAB or project-related questions.
  - o Utilize online MATLAB resources, such as documentation or tutorials.

If you have any questions or concerns, feel free to contact me or stop by during office hours. I look forward to seeing your creative applications of linear algebra!