

**Aerodynamics
SYE 3801
Spring 2015**

Group Project

Due: April 23rd, 2015, before 3:00pm

Project Presentations: April 23rd, In-class

Via email: tfallon@spsu.edu

Total Points: 100

Project Weight = 20%

Several project ideas are listed below. Pick one of the following topics for the semester project. You may also suggest a different topic of your choice. If you are going to work on a different topic from the ones listed below, please get the instructor's approval before starting the work.

1. Helicopter flight simulator controller

http://wn.com/Home_Flight_Simulator_Helicopter_Controls

<http://www.maxflightstick.com/index.html>

2. Blimp - Use it for Aerial photography / surveillance

3. Platform for force measurement using variable pitch propeller

4. Design and build a wind tunnel. Use weighing scales to measure lift and drag

5. Build a mechanically correct scaled model of Wright Flyer I.

6. Build a surveillance mount system for live video feed to the ground capability - for installation on large UAV (payload 5lbs)

7. Design and build a water tunnel. The aerodynamic test item can be moved on rails in the stationary water.

8. Design an aircraft using CAD. Build it and measure lift and drag in wind tunnel. Compare the results using a virtual wind tunnel (CFD).

9. Salvage aircraft cockpit and create a flight simulator

Note:

- Students can work together in groups of up to 3 students. Please inform the instructor at the beginning of the project if you are planning on working as a group.
- You may give each other assistance on general methodologies, but each team must do their own work. Do not share files such as spreadsheets.
- You may also share data sources such as links to useful sites for project ideas.
- Student submissions will be either a Word document or a .pdf file.
- This is a group project. Everyone in the class needs to participate to be able to get credit. Each student is required to do the following:
 - Keep a log of all the work they have performed.
 - Write a report in your own words; include the details of the aircraft specifications, background, and technical details. All sources must be clearly identified and documented. You may use the internet, library or other resources.

Deliverable:

- The end product of the project should be tangible. The only exceptions are the CAD design and a CFD analysis. The goal is to put the apparatus you develop in the Aerospace laboratory.
- **A written report.** Describe the problem and your approach to solving it. Be sure to enumerate assumptions and cite outside resources utilized.
- Your report must include evaluation criteria, results (detailed calculations may be included in an annex to the report), a thorough description of your analysis, summarized results, and your recommended decision. Utilize visual aids such as graphs, tables, and/or pictures as appropriate to clearly present your analysis and recommendation.
- A presentation file is required from each group. Students will be asked to make a presentation of their accomplishments at the end of the semester.

Suggested Framework for Report

Remember the goal is to design or develop something that could be used for demonstration or experimentation in the laboratory. Include the following items in the report.

•Executive Summary

–Briefly describe the problem. State your recommendation and discuss relevant factors, assumptions, etc...

•Alternatives

–Describe with sufficient detail for the decision maker to understand the alternatives and why they are being considered.

•Main Body

–Do not write this report as if you were reporting to a professor. You are presenting your analysis and recommendation to a decision maker.

–Briefly describe what you did and present the results of your calculations.

•Annexes

–This is where you should include more technical / academic details.

–You should use this section to delve into the details of your computations.

Your paper is expected to generally meet the following **requirements**:

1. Your paper should have *about* 5 pages of narrative (not including drawings, pictures, the first page and references). Pages are to be numbered-bottom left, 12pt, double-spaced times New Roman font.
2. An executive summary should appear on page 1.
3. The paper shall also include a cover page with the student's name, instructor's name, the course (SyE3801) and title of the report.

4. Papers should be understandable in a single rapid reading and be substantially free of errors in grammar, spelling, punctuation, mechanics and usage.
5. Papers should be concise but should adequately address all relevant aerodynamics and design principles covered in the course. (Stating only the obvious is not adequate.)
6. All sources used to support concepts in each paper should be properly cited whether or not there is a direct quote.
7. A 'Reference' section should be included at the end of the paper that lists all sources used/cited in your paper.
8. Papers are to adhere generally to MLA standards.

Grade:

Your grade will reflect the professional quality of your paper, both relative to your peers and in an absolute measure. Your grade will be based on the following components: your level of participation in the project, content of the report, organization, clarity and reflective analysis with respect to relevant aerospace engineering design principles. Although this is not an essay for English class, I do expect you be familiar with how to properly use the grammar and spell check features in your word processing program.

Last Update: January 5, 2015