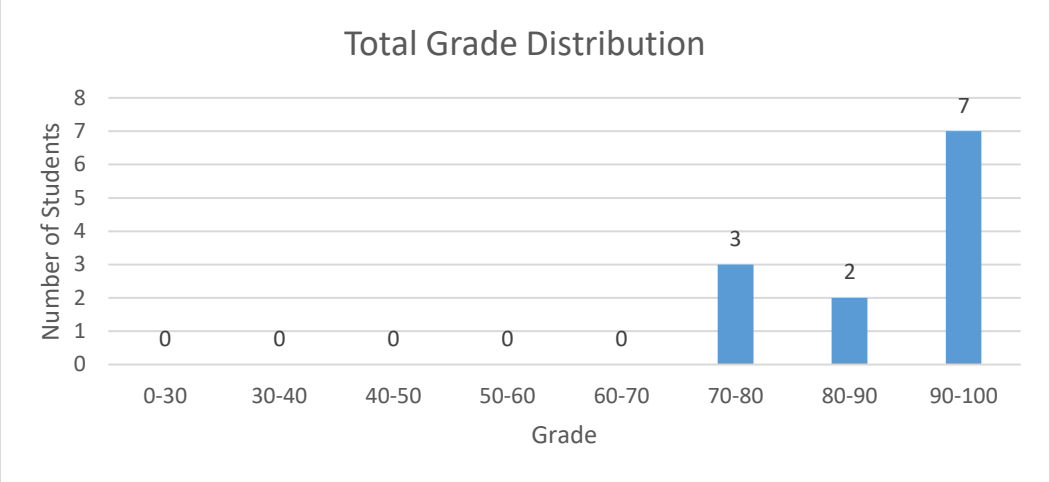
Final Exam Report

12/16/2024

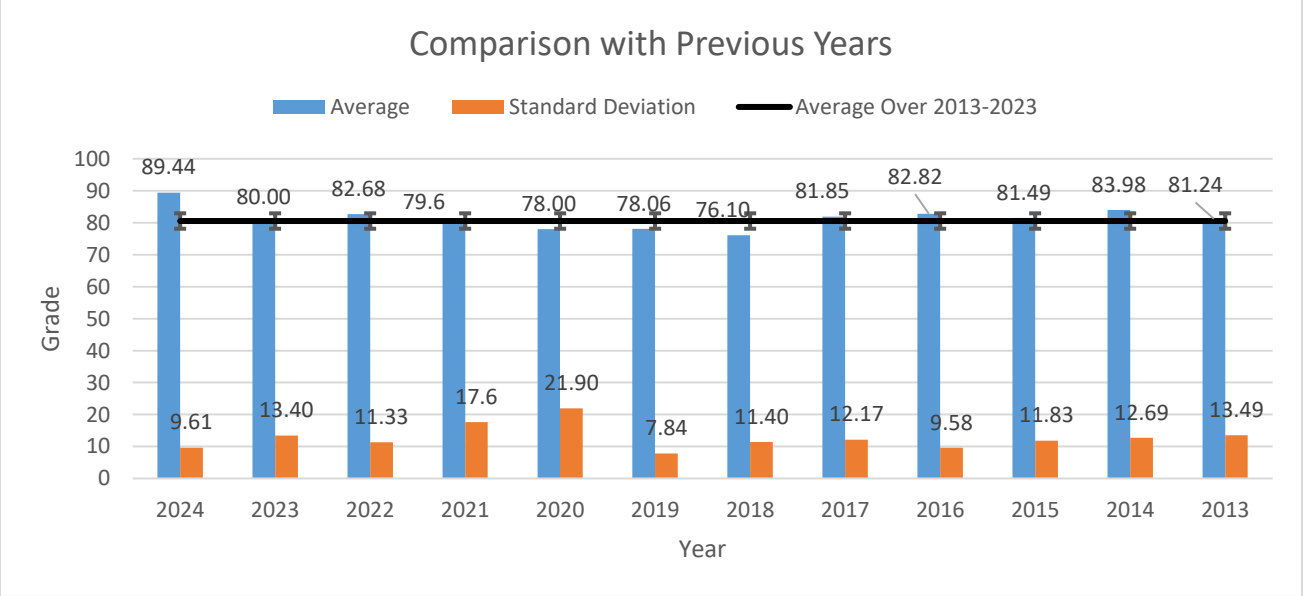
1. Summary

Total number of students	13
Attended	12
Missed	1
Number of problems	6
Average grade	89.44
Standard deviation of grades	9.61

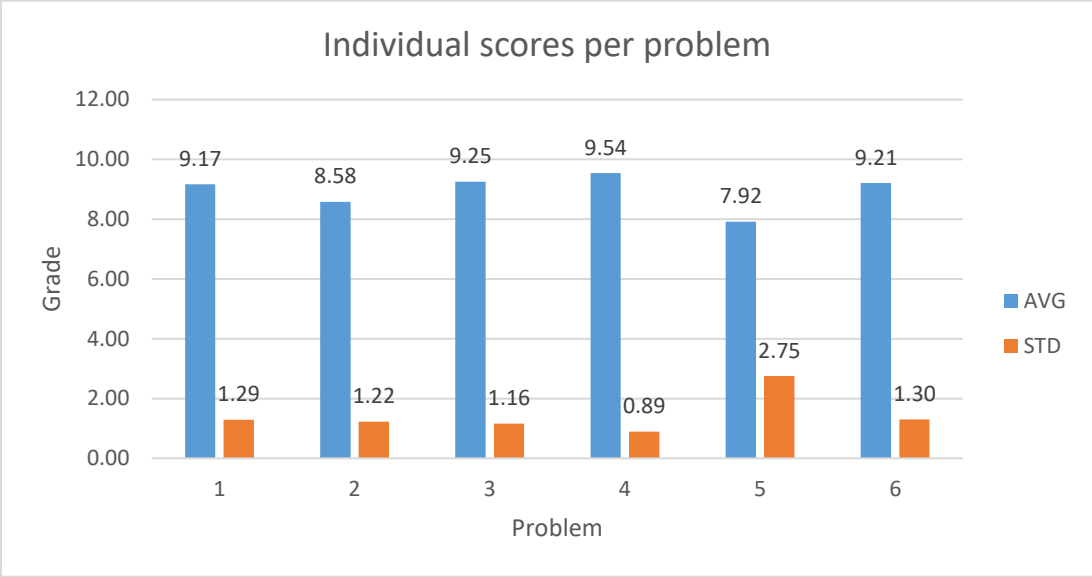
2. Grade distribution



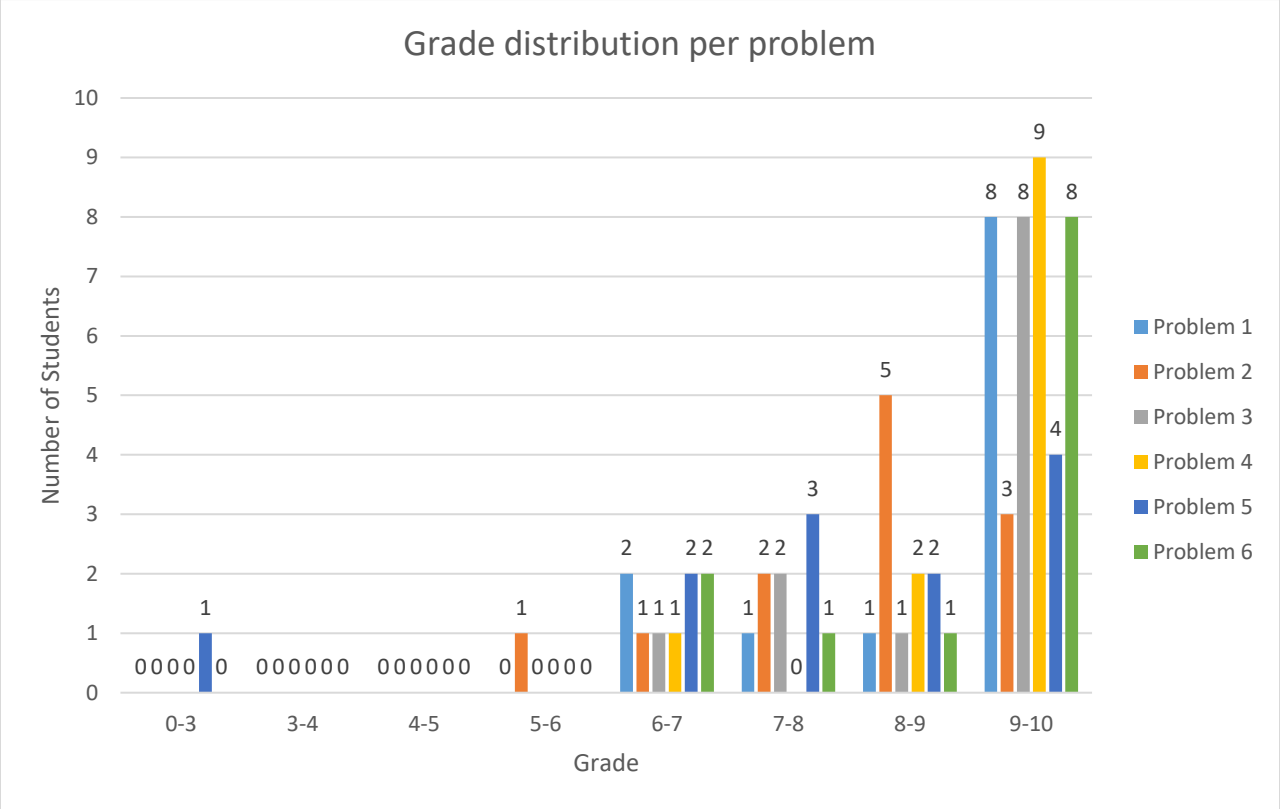
3. Comparison with past years



4. Individual problem breakdown



5. Grade distribution per problem



6. Comments

PROBLEM 1

- Most student setup the problem correctly.
- Some students used the wrong signs for the momentum components, resulting in error in the evaluation of the forces.
- Some students made numerical errors when evaluating β.

PROBLEM 2

- All students correctly simplified the continuity equation.
- Most students obtained the correct general velocity field.
- Some students made mistakes in applying the BCs at R_2, assuming $V_\theta = \omega$ instead of $V_\theta = \omega R_2$.
- Some students made mistakes in the evaluation of C_1 and C_2, resulting in a wrong velocity field.

PROBLEM 3

- Most students solved the problem correctly.
- One student could not apply similarity to get the velocity of the scaled truck.
- Some students could not obtain the correct moment balance around the truck wheels, to evaluate the tipping velocity.
- Most students correctly concluded that the tipping velocity increases if the wind arrives with a 45deg angle.

PROBLEM 4

- Most students solved the problem correctly, or with minor mistakes.
- Some students evaluated δ without considering the x coordinate along the blade.
- Most students obtained the correct ω.

PROBLEM 5

- Three students solved this problem correctly.
- Most students correctly solved for a), obtaining the velocity in the pipe.
- Some students could not obtain the system of equations needed for b), or they only used the energy equation in pipe B or C, without including the continuity equation: $Q_A = Q_B + Q_C$.

PROBLEM 6

- Eight students solved the problem correctly
- Three students could not obtain the velocity field correctly from the stream function.
- Two students consider both V_θ and V_r to evaluate the velocity at the point on the surface.
- Most students wrote down Bernoulli's equation, and obtained the correct mass of the dome.