

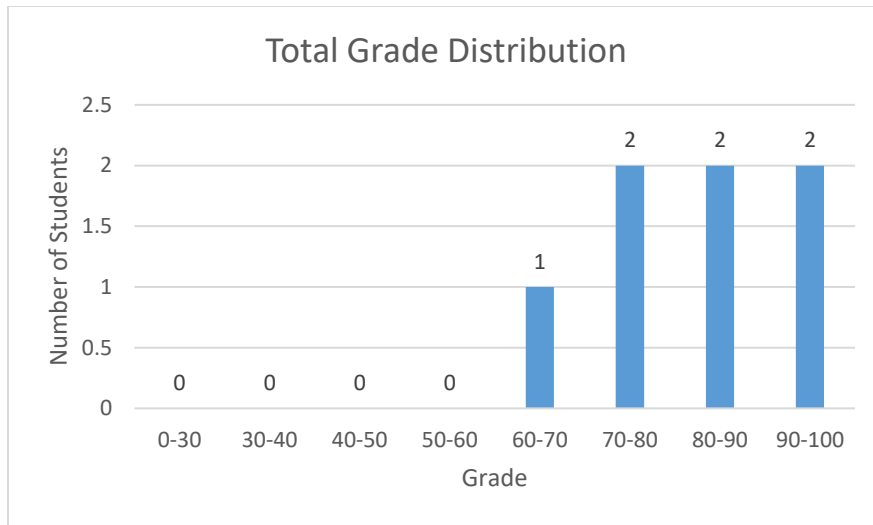
# Final Exam Report

12/14/2022

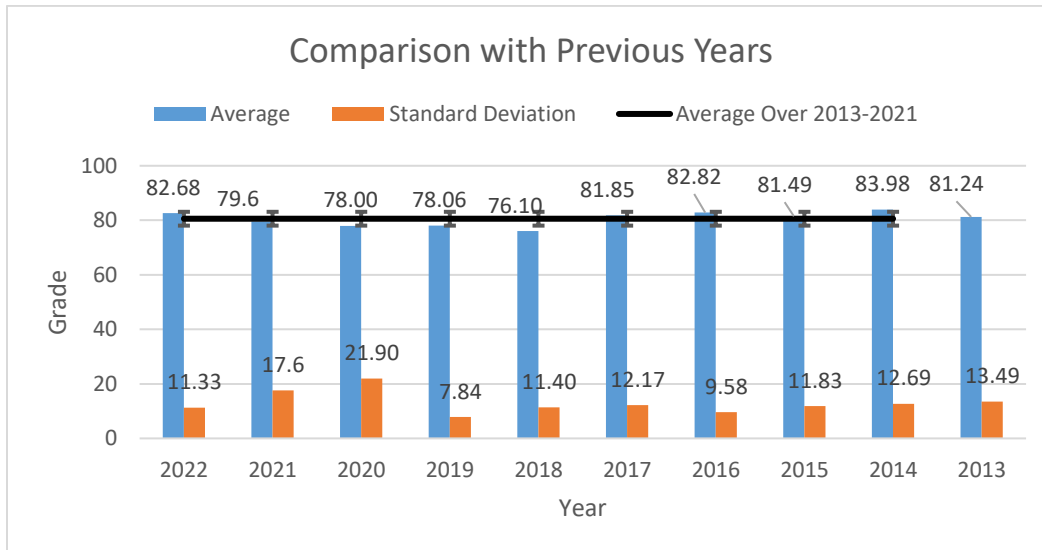
## 1. Summary

Total number of students	7
Attended	7
Missed	0
Number of problems	6
Average grade	82.68
Standard deviation of grades	11.33

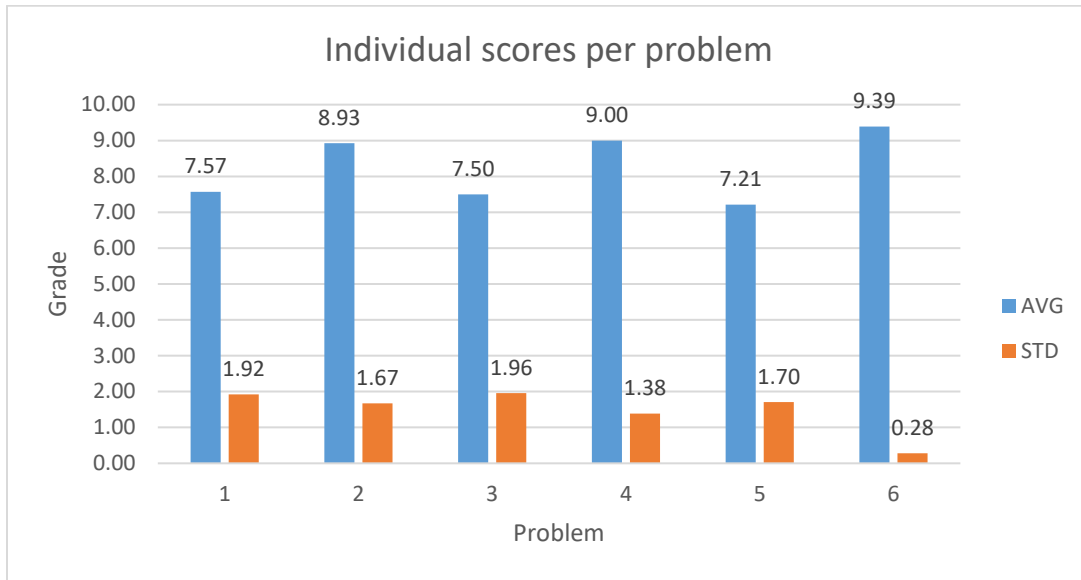
## 2. Grade distribution



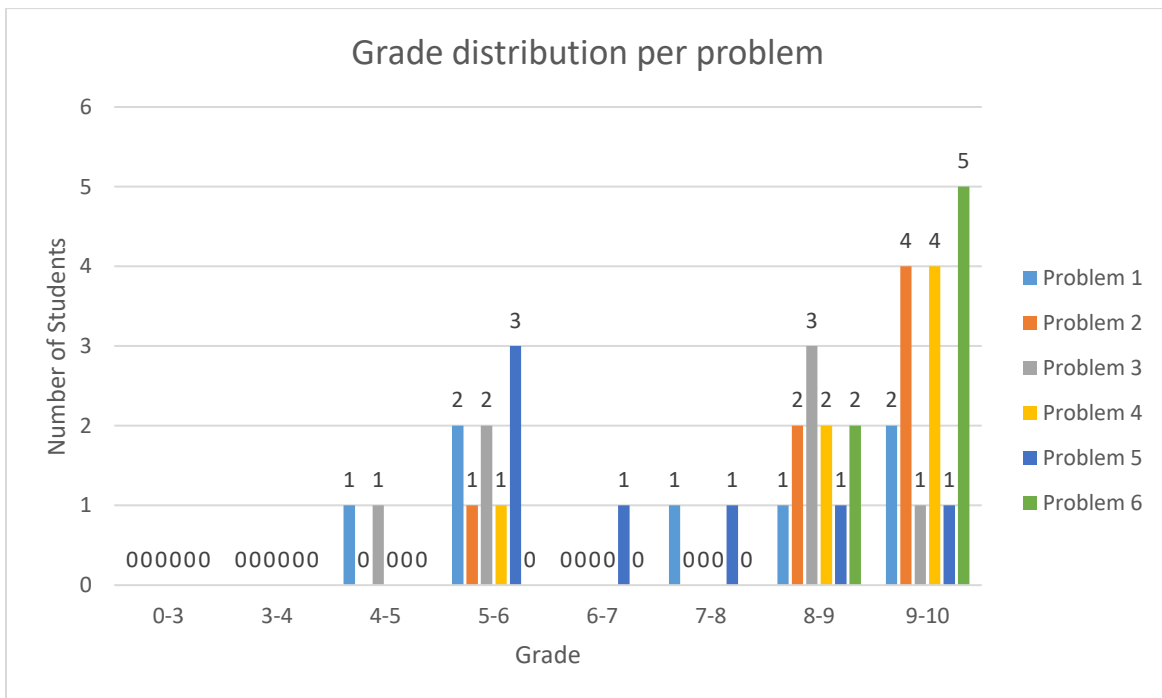
## 3. Comparison with past years



#### 4. Individual problem breakdown



#### 5. Grade distribution per problem



## 6. Comments

### PROBLEM 1

- One student received 100% score
- Some of students could not integrate correctly the velocity distribution, and did not find the relation between H and b
- Two students used  $Q = \rho UA$ , which is valid only if area, density and velocity are constant on the section.
- Overall, the approach of using mass and momentum equations was understood by everyone

### PROBLEM 2

- Four students received 100% score
- One student did not apply BCs to obtain the final expression for the velocity field
- One student could not simplify the momentum equation appropriately and the integration process had several errors

### PROBLEM 3

- One student received 100% score
- Several students had trouble to use the moment equation and did not calculate the tipping velocity correctly
- Three students used the balance of forces, instead of considering the moment, obtaining a wrong value for the velocity
- All students answered correctly to the question on the variation of angle for the wind  
Most of the students imposed Re scaling, but could not obtain the new tipping velocity

### PROBLEM 4

- Two students received 100% score
- Several students could not derive the appropriate boundary layer thickness with the given formula
- One student derived the frequency correctly, but made a calculation error
- One student used  $U\omega$  for the velocity and did not solve point b)
- Overall, most of the students applied the concepts of boundary layer theory successfully

### PROBLEM 5

- One student received 100% score
- Many students struggled to find the velocity in the initial pipe and could not apply energy equation correctly
- Several students could not use the energy equation with the second pipe and obtain the new velocity in the pipe
- Two students could only approach point a) but could not obtain satisfactory solutions

- Some students did not exclude pipe 2, when considering the flow through pipe 1 and 3, obtaining a wrong value for the velocity
- Overall, this was the problem that had the lowest score

#### PROBLEM 6

- No student received 100% score
- However, all the students solved the problem, with minor mistakes
- Two students used the formula for  $u_r$  instead of  $u_\theta$  in the calculation
- Some students forgot to add the hydrostatic variation on the surface of the dome
- All students approached point c) but some got wrong value for the mass