Final ePortofolio Reflective Letter

Throughout this course, I have gained a much stronger understanding of fluid mechanics and how it is applied to real engineering problems. At the beginning of the semester, I knew some of the basic concepts, but I had very little experience applying them to practical engineering designs. By completing homework assignments, tests, and the final pump design project, I developed the ability to analyze fluid systems and make engineering decisions based on calculations and technical data. Looking back at my work in this ePortfolio, I can clearly see how much I have improved during the semester.

One of the main objectives of this course was to understand the properties of fluids and how they affect engineering systems. Through assignments involving density, viscosity, pressure, Reynolds number, and specific gravity, I learned how fluid properties influence the behavior of flow in pipes and equipment.

Another important objective was learning to calculate pressure and forces in static fluids. During the homework assignments and exams, I solved problems involving hydrostatic pressure, manometers, submerged surfaces, and force calculations. These activities helped me understand how pressure changes in depth and how engineers determine the forces acting on structures and equipment. I also learned about buoyancy and stability through the floating body laboratory. Before completing this experiment, I did not fully understand how the center of gravity and metacentric height affect stability. After performing the calculations and analyzing the results, I developed a better understanding of why floating structures remain stable or become unstable.

http://sites.wp.odu.edu/bisrat26/wp-content/uploads/sites/41362/2026/06/Test-1-reflection.pdf

One of the topics I improved the most in was pipe flow analysis. Throughout the semester, I calculated Reynolds numbers, friction factors, pipe friction losses, and minor losses for different pipe systems. I also learned how valves, elbows, and fittings affect the total head loss in a system. Completing the Hardy Cross method and pipe network problems improved my confidence in solving more complicated flow systems.

The Bernoulli equation became one of the most important tools I used during this course. I applied it in many homework assignments and tests to calculate pressure changes, flow velocities, and energy losses. As the semester progressed, I became much more comfortable deciding when Bernoulli's equation should be used and how it should be combined with the continuity equation and head loss equations (https://sites.wp.odu.edu/bisrat26/2026/07/07/test-3-reflection/).

The biggest accomplishment for me during this course was completing the final pump design project. This project required me to combine nearly every concept learned during the semester. I designed a complete coolant transfer system, selected pipe sizes, calculated friction losses, determined the required pump head and flow rate, selected a Sulzer centrifugal pump, evaluated the system curve, selected an electric motor and prepared a complete bill of materials. This project showed me how individual fluid mechanics concepts work together in real engineering design.

My learning is demonstrated throughout my homework, tests, and final project. As I reviewed my portfolio, I noticed that my calculations became more organized and my engineering reasoning became stronger as the semester progressed. I also became more confident using engineering references, pump catalogs, and design standards to support my decisions.

I feel that I improved the most in solving engineering design problems instead of simply solving textbook equations. Early in the semester, I focused mainly on finding numerical answers. By the end of the course, I learned that engineering design also requires making reasonable assumptions, selecting appropriate equipment, checking whether the design is practical, and clearly explaining the reasoning behind each decision.

The material covered in this course directly relates to my career goals as a mechanical engineering technologist. At work, I regularly work with mechanical equipment and understand that pumps, piping systems, valves, and cooling systems are used in many industrial applications. This course has helped me better understand how these systems operate and why proper design is important for efficiency, reliability, and safety.

I have already applied several concepts from this course while thinking about equipment used in my workplace. Understanding fluid flow, pressure losses, cavitation, and pump operation has helped me better understand how industrial systems function and why maintenance and proper equipment selection are so important.

In the future, I expect to use the knowledge from this course whenever I work with cooling systems, water distribution systems, HVAC equipment, manufacturing processes, or industrial pumping systems. The ability to calculate flow rates, head losses, select pumps, and analyze piping systems will be valuable throughout my engineering career.

After taking this course, I believe I have become a better engineering student because I have improved my problem-solving skills, technical writing, and ability to organize complex calculations. I also learned the importance of checking my work carefully before submitting it. One lesson I learned from my tests was that overlooking a small requirement, such as calculating

NPSH during the pump design project, can affect the completeness of the entire solution. This experience reminded me to carefully review project requirements before considering a design complete.

My strengths include working through calculations step by step, organizing engineering reports, and applying engineering equations to practical problems. I also became more comfortable using Excel to organize calculations and create graphs for laboratory reports. One area I still want to improve is reviewing my work more carefully to ensure that I do not overlook important design requirements or assumptions.

Before taking this course, I thought fluid mechanics was mainly about solving equations. Now I understand that it is much more than mathematics. Fluid mechanics is a practical engineering subject that combines theory, experimentation, design, and engineering judgment. Throughout the semester, many of my original assumptions changed because I learned how engineers apply these concepts to solve real industrial problems.

If I were starting this course again, I would advise myself to begin assignments earlier, carefully review every project requirement before submitting my work, and spend more time studying engineering concepts instead of only focusing on the calculations. I would also ask questions sooner whenever I am unsure about a topic. These changes would help me complete assignments more efficiently and avoid missing important requirements.

Overall, this course has strengthened both my technical knowledge and my confidence as a future mechanical engineering technologist. The work collected in this ePortfolio reflects the progress I made throughout the semester and demonstrates that I have achieved the learning

objectives of the course. I believe the knowledge and skills I gained in Applied Fluid Mechanics will continue to benefit me in future engineering courses and throughout my professional career.