Final e-Portfolio Reflective Letter Fluid Mechanics Chris Betton

Looking back on my experiences from this semester, I can say that I have improved upon many essential professional skills as an engineer. I believe that I am a better communicator, better with time management, increased level of knowledge, a better leader and a better team member because of this course. In this letter I will highlight a variety of class assignments and activities that were most beneficial in the development of these attributes.

Firstly, the Ed+Gineering Project was an outstanding way of solidifying my knowledge of fluid mechanics and engineering concepts while also working on qualities of a professional engineer. Throughout the course project my team and I implemented steps of the engineering design process with the goal of delivering a Fluid Mechanics inspired presentation and design project to a class of 4<sup>th</sup> graders. We interviewed the class, brainstormed design projects, developed a lesson plan, practiced our lesson with peers and received feedback to improve our lesson before finally delivering the final product to the 4<sup>th</sup> grade class. This helped me to better understand how to execute steps of the engineering design process in a realistic way. We did preliminary research to identify the best way to deliver a lesson plan to the students by taking surveys of their interests and connecting those interests to engineering concepts. This project helped me gain a better foundational knowledge of fluid mechanics by requiring me to break down concepts in a manner that is comprehensible to 4<sup>th</sup> graders. This increased my level of knowledge because I would not have been able to explain things to the students without having a wellfounded knowledge myself. In developing the lesson plan with my teammates, I also became a better communicator. I had to listen to my teammates and work with them to combine our ideas into a lesson plan that was seamless. This was made possible by giving and receiving constructive feedback. The honest peer feedback helped me trust my teammates and increased the quality of our work. Another way my communication skills were improved was by working with a teammate who was an education major. By working with a teammate outside of my discipline I had to communicate my technical knowledge without so much verbiage that can cause ideas to become overly complicated. For example, when describing Bernoulli's principle, I had to break it down into real world applications that demonstrated how energy is conserved. One example I used is when a large truck passes by a stationary car, the truck can be felt being pulled toward the truck due to the low-pressure area it creates with its speed sheering the air around it.

The tests and homework assignments in this course have also provided an exemplary learning experience over the course of this semester. I feel confident in my level of knowledge in relation to the course objectives after completing these assignments. The <u>first test</u> helped me understand the nature of fluids by demonstrating how pressure changes in a system. The first test showed that devices such as manometers can be used to monitor pressure across a system component and subsequently give insight on the operation f that component. <u>Test two</u> demonstrated how to compute forces in a stagnant fluid and forces caused by the motion of fluids in a pipe. This test showed that pipe hangers are crucial to supporting piping with fluids in motion. Our <u>homework assignments</u> throughout the course demonstrated how fluid dynamics work in pipes and fittings. I learned about energy losses that occur and analyzed fluids at a microscopic level when investigating turbulent vs laminar flow. Our homework assignment 3.3, I had to use affinity laws to analyze pump characteristics at various speeds and impeller diameters. In homework assignment 3.2 I was able to practice calculating flow characteristics in parallel branches. This is important when a system has bypass piping for warm up or for controlling flow across a

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heat exchanger. Furthermore, the <u>small engineering project</u> demonstrated how all of the objectives we worked toward over the semester were necessary to be able to design a functional fluid system. This project required me to compute static pressures, compute friction losses, and compute and select an appropriate pump for the system. This specific industrial problem showed that fluid properties can be analyzed to assess a system for cavitation, water hammer and make design decisions that will assist electrical and civil engineers in their decisions.

Before this course began, I thought the material would be difficult to understand. After completing the course I feel that the material is not difficult but did take time and determination to understand. I feel that my biggest improvement over this course was in understanding Bernoulli's equation and managing my time wisely. Both od these outcomes are evident in my final project. In my first test I did not even complete the entire assignment due to poor time management and lack of preparation. As the course went on I became more comfortable with the material and gave more effort on the homework assignments. This improved effort helped me to be more successful on the final project. No matter what engineering career I decide to get into, I will undoubtably use concepts of fluid mechanics in my job. Fluids are an integral part of a variety of applications, from building designs to propulsion and even transportation. This course also prepared me by improving my Microsoft excel skills. I am confident that I can use excel to perform many calculations including iterative processes. This skill is evident in my "Small Engineering Project" seen on my projects page of my portfolio. I had a great learning experience over the course of this class and I feel that it has prepared me for the rest of my university experience and my career thereafter. If I could give my past-self advice I would tell myself to prioritize time wisely and start on assignments early. This would make it easier to plan accordingly and be prepared when unforeseen circumstances arise.