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MET 330

Dr. Ayala

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Final ePortfolio Reflective Letter

Over the last semester I have learned a lot about fluid mechanics from Dr. Ayala. After completing thermodynamics last semester, I was determined to retain more of the information taught in fluid mechanics than I did in thermodynamics because I was always told fluid mechanics and thermodynamics were the most difficult, yet important, courses in the undergraduate engineering program. The work I completed while taking the course addressed all the learning objectives laid out in the syllabus. The first test and accompanying homework assignments taught me how to describe the nature of fluids and define different fluid properties such as viscosity and pressure. This was done by learning Bernoulli's equation and applying it to different systems in the homework problems. The first part of the class also taught me how to compute pressure and the forces (magnitude, location, and direction) associate with it in a stagnant fluid. This was used explicitly in the first test as I had to determine the pressure in the outlet of a pipe based on the pressure in the inlet tank. The second part of the class taught me how to discuss what buoyancy is and determine object stability while floating or submerged in the fluid. This concept was cemented by determining how a body of a particular weight would float in the lazy river I designed for test 2. Test 2, and the homework assignments that led to it, also taught me how to solve for different very specific industrial problems, such as, open-channel flow, cavitation, water hammer, drag, lift, forces in pipes, and learn about different instruments to measure fluid flow quantities (such as, pressure, fluid velocity, flow velocity, etc.). This was covered in test 2 when designing the open channel for the lazy river. The third test and the homework assignments that accompanied it, firmly utilized the ability to compute

friction losses in pipes for a variety of configurations (series, parallel, network, etc.) by solving for a variety of component losses in the piping system in test 3. Test 3 also heavily emphasized the ability to explain fluid dynamics in pipes and fittings as we had to determine the flow of a piping system with a valve closed to different amounts. The project utilized all the previously mentioned objectives and included the ability to explain how fluid-machinery works (focused on pumps), by requiring us to calculate pump head and flow rate for our designed piping systems. Additionally, the project required the ability to compute and select the appropriate pump for different pipe system configurations, this was done by using the pump head and flow rate calculated previously in the project in combination with the provided Sulzer catalog.

My learning is demonstrated in all the assignments, however the project demonstrates a compilation of everything learned in the course. I feel I am the most successful at remembering Bernoulli's equation and determining what terms are not needed. This skill was used in all three of the tests. I recently accepted a job at the United States Patent and Trademark Office as a Patent Examiner so, if I am assigned to a technology that involves the flow of fluid this course would intersect heavily. I have been able to apply the concepts from the project to my current position at Newport News Shipbuilding when I was tasked with determining if a defect in a tank was still acceptable, I used the concept of pressure vessels used to design the project tanks. I will use these skills in the future when working with fluid piping systems in my career or in my personal life. Fluid mechanics is important for every mechanical engineer to learn as many industries including shipbuilding, power plants, and automotive use these principles. I may use what I learned in my career as a Patent Examiner if assigned to a technology that requires the flow of fluids. The only advice I would give to myself If I had to take this class again is to be patient when frustrated and go to Dr. Ayala for help sooner than later.

This class has helped me improve immensely as an engineer by exposing me to the piping side of engineering and showing me how to use excel to do my work. My biggest accomplishment in this course was doing as well as I have in it. The course requires a lot of attention and I have made it my number one

priority to ensure I do the best I can. Through this class I mastered Bernoulli's equation which was utilized in every assignment. I also mastered spotting and calculating energy losses which were exercised in most assignments and reached a crescendo in the third test. My strength is being determined to do enough of the test correctly to get an acceptable grade on each test. My weakness is not spending an adequate amount of time doing practice problems before the test so I don't spend the majority of three days working on each test. Before this course, I thought about it as intimidating and difficult. I still think it is a difficult course, but I do not find it as intimidating as I did prior to taking it because I was able to grasp most of the concepts and have a much better understanding of fluid mechanics than I did before the course.