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Synchronizing Teaching Resources of Energy Conservation Principle in Mechanical Engineering Courses- Year 2 Updates

The conservation of energy, mass, and momentum are three governing laws of physics that are regularly uttered in teaching engineering courses. Mechanical energies in the form of kinetic and potential forms are the most common forms of energy in dynamics. Fluid flow energies relating to pressure, velocity, elevation, fluid friction, pump, and turbine are covered in fluid dynamics. In thermodynamics course, the first law deals with heat energy and work that can alter internal energy in a system. In all these courses, the conservation of energy states that the amount of energy remains constant, that means that energy is neither created nor destroyed but transferable from one form to another, keeping the total energy same within a fixed domain. Students are initially exposed to energy balance equation in their first Thermodynamics course. In this course, emphasis is placed upon those parameters of specific interest related to energy to this subject. We attempted to tie the concepts of the energy balance equation through 1st Law in thermodynamics to those emphasized in Fluid Mechanics. This was accomplished by taking the students from the starting point of the thermodynamics' first law for Energy Balance equation to the finished Fluid Mechanics' Bernoulli's equation. In the following semester, students were again taken through the process of converting the 1st Law of thermodynamics to Bernoulli's equation of fluid mechanics. Direct and indirect assessments were then conducted to measure students' understanding on the energy and its conservation. Through a series of questionnaire and their feedback, Students were found to be more knowledgeable in the conservation of energy through the synchronization of energy balance concepts in these two courses. This presentation is a part of work-in-progress project that we first presented at 2022 WVAS meeting.

Keywords

Energy, Kinetic Energy, Potential Energy, Conservation of Energy, COE, Thermodynamics, Fluid Mechanics, Heat Transfer, Dynamics, Synchronization of Teaching Resources for Conservation of Energy