

YOGENDRA PANTA, Dept of Mechanical Engineering, West Virginia University Institute of Technology, Montgomery, WV, 25136, and KENAN HATIPOGLU, Dept of Electrical Engineering, West Virginia University Institute of Technology, Montgomery, WV, 25136. Fluid Power Activities in College-Level Fluid Mechanics Teaching.

At West Virginia University Institute of Technology (WVU Tech), we implemented “*demonstration based learning environment*” in “Fluid Mechanics” course to engage the students in hands-on learning activities. Over the past semester, we made students engaged in several classroom activities including classroom demonstration and semester projects.

Demonstration activities can be accomplished in fluid mechanics class using simple syringes filled with a fluid such as air or water. This can simulate the cylinders filled with fluid as cylinders acting pneumatically or hydraulically. These activities not only create a fun learning environment but also foster more student engagements and curiosities.

To introduce any new topic, we first orchestrated some demonstrations with the fluid power kits. Then we encouraged students’ participation for assembling, testing, and finally proving the concept. Fluid Power kits including excavator, lifter, cherry picker, robot arm, and clamp were assembled in the classroom. We noticed that students were understanding numerous fluid mechanics concepts including fluid flow, pressure, compressibility, force, energy, pipe losses. These fundamental concepts help to learn governing principles of fluid mechanics including Bernoulli’s principle, continuity, momentum, and energy equations. We had good class discussions and brainstorming in each demonstration. Students chose semester projects to expand their fluid concepts into greater details. Students assembled the supplied fluid power kits, test and record data, compare model-prototype to relate with real-world applications. Students’ assessments and classroom survey reveal the effectiveness of active learning in classroom and in projects.

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