

**Industrial Automation Program
Basic Fluid Power Courses**

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Motivation: This project was designed to increase collaborative learning with classmates and better engage faculty in learning projects. Also, a goal was to create a real world application laboratory to stimulate students' interest.

Problem Statement: Lab projects very quickly become routine and lack team building concepts without proper equipment that stimulates a creative or critical thinking approach. Students do not achieve full learner outcome requirements which are reflected in the final course grade and retention of information in advanced courses.

Approach: Using a grant from the National Fluid Power Association, lab projects were developed around the purchase of Festo's MechLab Systems. The system allowed students to work in small groups to first design electropneumatic systems through a computer simulated program. This step of the design process engaged the teams in creating systems that controlled learning stations such as part feeder, conveyor system, and press operation. Students then used the computer generated systems to make pneumatic hose connections on the learning stations. The final step of the projects was to integrate the computer program with the actual learning center. An additional step was then added to create mal-functions (troubles) in both computer circuits and the learning stations. Faculty used Festo-created curriculum to keep all lab projects standardized between the different groups.

Results: Grades achieved from the class which used the Festo Learner Stations were compared with previous classes using just pneumatic equipment. These grades showed an increase on both practical exams as well as written exams. Students also indicated a better satisfaction rating on end of the courses surveys with lab projects. The Instructor observed a much more productive lab environment. Generation X students seem to focus more on the computer design part of labs while older students adapted better to physical connection of equipment. Both groups complemented each other very positively. Older students' computer skills grew through assistance of generation X while the less experienced generation X gained knowledge on hardware connections from the older students. Lab partnerships were arranged using this model.

Conclusions: We saw several improvements in the lab objectives creating a better learning environment for students. The Festo stations helped facilitate the needed student engagement making lab a fun and more productive part of the class. Less pressure was felt by the instructor to create labs for students thanks to the excellent curriculum written by Festo to support their Mechlab Systems. This model will be incorporated in training for secondary education students transitioning into post secondary training. Assessment on retention of information will be conducted in the fall of 2009 Electromechanical Systems course.