

Student Learning Outcomes Assessment Summary

Certificate, Instrumentation Technology

Community and Technical College

AY 2014/15 and 2015/16

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1. Assessment Information Collected

Note: "Test Results" reflect aggregated data from several test questions selected during each semester, reflecting the individual SLOA topic.

Percentages reported here represent the percentage of the class that have met the desired outcomes; the minimum target is 75%. Individual topic observations are included in the discussion session.

Note: "Skill Observations" reflect instructor observation of overall class performance on specific activities.

a. SLOA 1: Instrumentation Knowledge

i. Test Results from PRT 140 – Instrumentation I

1. Final Exams 2015, 2016: 71% and 76%, respectively.

a. Note: additional hands-on work in 2016.

ii. Test Results from PRT 144 – Instrumentation II

1. Final Exams 2014, 2015: 80% and 82%, respectively.

b. SLOA 2: Process Controls Knowledge

i. Test Results from PRT 140 – Instrumentation I

1. Final Exams 2015, 2016: 72% and 80%, respectively.

ii. Test Results from PRT 144 – Instrumentation II

1. Final Exams 2014, 2015: 80% and 78%, respectively.

c. SLOA 3: Control Valves

i. Test results/skill observation from PRT 248 –Valve Maintenance

1. Final Exams 2015, 2016: 84% correct (combined data)

2. All students taking PRT 248 are given in an in-class lab assignment with the DAC Control Valve Characteristics Trainer #618. The students are asked to identify the distinct flow characteristics of three unidentified valves. During the class period the students gather percent-open data along with actual flow measurements in GPM. The assignment is to complete a graph and

identified the previously unknown valve characteristics as equal percentage, linear or quick opening. The students were all able to collect the data and correctly identify the valve with its inherent flow design characteristic.

- d. SLOA 4: Fundamentals of AC/DC physics – ELT 101/102
 - i. This SLOA was evaluated extensively for the 2014 assessment cycle. No changes were recommended at that time. No new material to evaluate this cycle.
- e. SLOA 5: Functioning control loop
 - i. Skills assessment: ELT 246/PRT 240 project:
 - 1. 88% of students were successful in completing the programmable logic controller (PLC) project. Students demonstrated knowledge of control loop components, electrical diagrams, ladder logic programming, and troubleshooting of functions.

2. Conclusions drawn from the information summarized above

- a. SLOA 1: Instrument Knowledge
 - i. Students demonstrated knowledge of the theory behind process measurement, the mechanical details of process instrumentation, and the dynamics of control (including PID tuning of controllers).
- b. SLOA 2: Process Controls Knowledge
 - i. Students demonstrated knowledge of control theory and control loop function. Students demonstrated knowledge of advanced control schemes. Student results indicate that the basics of process control theory are adequately covered in the current curriculum.
- c. SLOA 3: Control Valves
 - i. The in-class exercises with the DAC Control Valve Trainer are very effective in teaching the fundamentals of control valve characteristics.
- d. SLOA 4: Fundamentals of AC/DC Physics
 - i. No new conclusions to report.
- e. SLOA 5: Functioning Control Loop
 - i. Student results indicate the basics of control loop construction and function are adequately covered.

3. Curricular changes resulting from conclusions drawn above

- a. SLOA 1: Instrument Knowledge
 - i. Detailed review of the test results shows that there is value in continuing to increase focus on the mechanical details of instrumentation, and to increase hands-on activities with instrumentation.
- b. SLOA 2: Process Controls Knowledge
 - i. The courses are covering the basics of process controls sufficiently. Continued emphasis on advanced control schemes is planned. Although we have trainers to demonstrate most simple control loops, students have commented that it would be helpful to operate a more complex cascading control loop; we are investigating ways to develop one with our existing trainers and operating system.
- c. SLOA 3: Control Valves
 - i. Control valve work in PRT 248 is very effective – plan to continue with intensive hands-on work.
- d. SLOA 4: Fundamentals of AC/DC Physics
 - i. No changes to recommend at this time.
- e. SLOA 5: Functioning Control Loop
 - i. Plan for next year: Provide more specific expectations of project, set project timeline with milestones, and move student electrical drawings to the start of the project.

4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting

- a. Brian Ellingson, Associate Professor, Program Coordinator
- b. Robert Hook, Assistant Professor
- c. Teresa Lantz, Assistant Professor