Multi-State Advanced Manufacturing Consortium

US DOL SPONSORED TAACCCT GRANT: TC23767

MSAMC Master Performance Based Objectives (PBO) Review Template

Instructions

The following tab lists PBOs for the topic area ***Instrumentation***. Please review each of the PBOs, and rate each PBO with one of the following ratings:

1 = Skill or understanding is required for employees.
2 = Skill is useful, but is not crucial for employees.
3 = Skill is not useful for employees, or isn't relevant for typical work assignments.
0 = PBO is unclear.

Additionally, for each PBO, note any comments or recommendations that you may have about how to improve the PBO. If any PBOs or skill sets seem to be missing from the list, please add them in the space at the bottom of the list.

Please enter your information below	
Name:	
Company/Plant:	
Department/Division:	
Industry/Segment:	
Email:	
Phone:	

Instrumentation

M-S AMC Industry Partner PBO Review

Please review the following PBOs to identify the appropriate skill set for a given job title / category / classification (see row 10 below).

* In the "**Importance**" column, identify how important each PBO is for someone in the relevant position. For each PBO, type 1 if the PBO must be covered in the coursework, enter 2 if the PBO is helpful but not necessary and would not impair the performance of the employee in the workplace if missed, and enter 3 if the PBO would not benefit the student or doesn't apply to the typical work assignments. If you don't understand the PBO, enter 0.

* Note any comments or feedback for improving each PBO (in the "Comments" column).

Note: It is the intention of competency based instruction to have each student individually demonstrate their proficiency of the skills indicated.

Reviewing PBOs fc ***TYPE JOB TITLE HERE*** (from whose perspective are you rating PBO importance?)

Sub-Topic	Level	Topic	PBO ID	Performance Based Objective (PBO)	Importance 1 = Need 2 = nice to have 3 = N/A 0= Don't understand	Comments *Notes to improve the PBO, PBO is unclear, etc.*
	1	IN	1	Convert PSIA readings to PSIG, inches of mercury, inches of water, Bars, and Atmospheres. (written exercise)	*Enter 1, 2, 3, or 0 here*	
	1	IN	22	Solve for the missing variables in the following equations: (Written exercise) F = P x A E = I x R F = 9/5 x C + 32 C = (F – 32) x 5/9 Density = Mass / Volume Flow rate = Volume / Time		
	1	IN	2	List the advantages of a 4-20 milliamp Current loop as compared to other forms of data transfer in an industrial environment (written exercise)		
	1	IN	3	Given transmitter current (4 –20 ma) and the input resistance of a receiving device, calculate the input voltage under changing conditions (i.e. changing power supply voltage, additional series connection resistance, etc.) (Written exercise with calculator)		
	1	IN	4	Match process control characteristics with the following control schemes: Open Loop, Closed Loop On-Off control, proportional control, Proportional plus Integral control and PID control. (Written exercise with book reference)		
	1	IN	5	Match all of elements in a PID controller with their purpose. (Written exercise with book reference)		
	1	IN	6	Match all common devices used in instrumentation applications with their proper symbols. (Written exercise with book reference)		
	1	IN	7	Identify common Pressure transducers and match them to a description of operation and their symbol. (Written exercise with book reference)		
	1	IN	8	Identify common Temperature transducers and match them to a description of operation and their symbol. (Written exercise with book reference)		

	1	**IN**	**9**	Identify common flow transducers and match them to a description of operation and their symbol. (Written exercise with book reference)		
	1	**IN**	**10**	Identify common level transducers and match them to a description of operation and their symbol. (Written exercise with book reference)		
	1	**IN**	**11**	Identify common Analytic transducers and match them to a description of operation and their symbol. (Written exercise with book reference)		
	1	**IN**	**12**	Using a Hart Protocol Communications device, connect to a transmitter and record the displayed process variables. (I.e. measured variable, upper and lower range limits, Analog output, etc.) (Hands-on exercise with Hart communicator & working transmitter)		
	1	**IN**	**13**	Using a Hart Protocol Communications device, connect to a flow transmitter and perform a loop test. (Hands-on exercise with Hart Communicator & working transmitter)		
	1	**IN**	**14**	Using a Hart Protocol Communications device, connect to a flow transmitter and change the Upper and Lower Range values. (Hands-on exercise with Hart Communicator & working transmitter)		
	1	**IN**	**15**	Using commercial web sites locate and download specifications on selected transducers, transmitters and actuators. (Exercise using the Internet)		
	1	**IN**	**16**	Wire a differential pressure transducer/transmitter to a load and measure output current under varying input conditions noting that variations in supply voltage and load resistance do not affect output current. Adjust Upper and lower range values. (Optional – pending equipment availability)		
	1	**IN**	**17**	Manually adjust the zero and span points on a transmitter without a Hart Protocol communications device. (Hands-on Lab exercise)		
	1	**IN**	**18**	Wire a thermocouple to an intelligent transmitter, and using a Hart Communicator set the upper and lower range values. Note the output current with changing temperature to verify the new range values. (Hands on lab exercise)		
	1	**IN**	**19**	Demonstrate the proper use of a current source simulator, process meter (Fluke) and Milliamp clamp on ammeter. (Hands-on exercise)		
	1	**IN**	**20**	Given plant Instrumentation prints, identify all symbols, connections, loops and sub-loops. Identify the state of digital (PLC) outputs necessary to actuate all control and proportioning valves in the system. (Written exercise with book reference)		

	1	**IN**	**21**	Given the following: - Instrumentation drawing - PLC I/O diagram - All field voltages under a faulted condition and currents as measured with an ammeter Troubleshoot and identify the faulted component(s) and describe additional actions that could be further taken to isolate the faulted device.		

Additions: Please add any additional objectives that we may have overlooked.

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RELEVANCY REMINDER:

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