Revised 10-06-17

Eastern West Virginia Community and Technical College
COURSE ASSESSMENT REPORT

Course Title and Number: Supervisory Control & Data Acquisition WTT 230	**Academic Term and Year of Assessment Activity (Ex: Fall, 2014):** Spring, 2019
Report Submitted By: E. Putze	**Number of Students Assessed:** 3
Date Report Submitted: 8-2-2019	**Number of Sections Included:** 1
Course Delivery Format (list all modalities used in sections assessed. Ex: web based, VDL, traditional section, hybrid course, etc.): Lab exercises with hands-on training and computer applications, project, lectures, reading, web-based assignments, one-on-one instruction	

Course Role in the Curriculum
Provide a description of the role the course serves in the curriculum (i.e. general education requirement, program technical core, restricted elective, etc.). Note all as appropriate.
Role in College Curriculum: Technical Core for Wind Energy Technology, AAS   Catalog Description: This course provides hands-on experience working with industrial data communications hardware found in a commercial wind farm. Supervisory Control and Data Acquisition (SCADA) systems in the wind industry will be used to practice maintenance and operational tasks.

Assessment Methods
Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.
Lab Exercises & Project: Innotek SCADA training system with Allen-Bradley MicroLogix controller, inputs, outputs, and applications; Amatrol Programmable Controller System trainer with Allen-Bradley CompactLogix controller, PanelView Plus 600 HMI, inputs, outputs, and applications; Rockwell Studio 5000, Logix 500 and Factory Talk View Studio software; and VMware were used for lab exercises, hands-on training, computer applications, and project. Setup, programming, troubleshooting, and the use of controllers and HMI were covered. The instructor was present throughout all labs; facilitated learning through demonstration and interaction with students; and observed student performance. Analysis and interpretation of ladder diagrams were demonstrated by students and assessed by the instructor. A project which required programming of logic controllers, HMI screens, and connectivity was implemented. Each student participated in all programming phases and troubleshooting. The project was demonstrated and results were interpreted by the student and assessed by the instructor.   Written Tests: Written tests, which were primarily multiple choice, were based mostly on material in *SCADA: Supervisory Control and Data Acquisition; author: Stuart A. Boyer; publisher: ISA – International Society of Automation; 2010*. One-on-one instruction, group instruction, online Blackboard assignments, and Amatrol online learning were utilized to

enable learning. Selected questions from the ten tests given were used for assessment.

Assessment Results
Provide a summary of results including tables/charts. Incorporate information from previous assessments as appropriate. Append additional pages if necessary. If appending, include notation in box to "See attached".

Course Outcome & Indicator	# of Students Answering Correctly	# of Students Answering Incorrectly	Composite
1(a)	2.0	1.0	3.0
1(b)	3.0	0.0	3.0
1(c)	3.0	0.0	3.0
1(d)	3.0	0.0	3.0
2(a)	3.0	0.0	3.0
2(b)	3.0	0.0	3.0
2(c)	3.0	0.0	3.0
2(d)	3.0	0.0	3.0
3(a)	3.0	0.0	3.0
3(b)	3.0	0.0	3.0
3(c)	3.0	0.0	3.0
4(a)	3.0	0.0	3.0
4(b)	3.0	0.0	3.0
4(c)	3.0	0.0	3.0
4(d)	3.0	0.0	3.0
Total Answers	44.0	1.0	45.0
Percentage	97.78%	2.22%	100%

Course Level Assessment Summary of Outcomes, Indicators and Results					
Add additional rows to table if necessary					
Learning Outcomes (Insert learning outcomes assessed during this cycle)	**Indicator** (Insert indicators used for each outcome: exam question, scoring rubric, etc. Be specific)	**Percent of Correct Responses**	**Percent of Incorrect Responses**	**Performance Standard Met (75%)*** (yes or no)	
Learning Outcome 1: *Describe SCADA systems in industrial/wind businesses*	(a) <u>Unit 4 Test, Question #2 (M/C):</u> "Which of the following is true?" <u>Answer:</u> "The MTU controls the communication process with the RTU"	66.67%	33.33%	No	

Learning Outcome 1: *Describe SCADA systems in industrial/wind businesses:*	(b) <u>Unit 5 Test, Question #2 (M/C):</u> "Sensors and actuators communicate with an RTU using the same: A. Protocol B. Medium C. Twisted-pair of copper wires D. A & B <u>Answer:</u> "D"	100%	0%	Yes
Learning Outcome 1: *Describe SCADA systems in industrial/wind businesses:*	(c) <u>Unit 6 Test, Question #5 (M/C):</u> "Which of the following is more economical:" <u>Answer:</u> "Moving digital signals in a serial manner"	100%	0%	Yes
Learning Outcome 1: *Describe SCADA systems in industrial/wind businesses:*	(d) <u>Unit 8 Test, Question #12 (M/C):</u> "SCADA communication methods include: A. Satellite B. Cell phone C. Internet D. All of the above <u>Answer:</u> "D. All of the above"	100%	0%	Yes
Learning Outcome 2: *Describe SCADA functionality in systems*	(a) <u>Unit 6 Test, Question #2 (M/C):</u> "At any point in time communication between an RTU and a field instrument is:" <u>Answer:</u> "One-way"	100%	0%	Yes

Learning Outcome 2:
 	
Describe SCADA functionality in systems
	(b) <u>Unit 9 Test, Question #4 (M/C):</u> "For each item in the following list write:
	
	     'M' if it is a <u>monitoring</u> function of an RTU
	
	     'C' if it is a <u>controlling</u> function of an RTU
	
	     'T' if it is a <u>totalizing</u> function of an RTU
	
	     actuating the yaw-drive motors"
	
	<u>Answer:</u> "C"
		100%	0%	Yes

Learning Outcome 2: *Describe SCADA functionality in systems*	(c) <u>Unit 10 Test, Question #2 (M/C):</u> "The 'report-by-exception' method of alarm monitoring informs the operator of:" <u>Answer:</u> "The status changes of alarms on a periodic basis"	100%	0%	Yes
Learning Outcome 2: *Describe SCADA functionality in systems*	(d) <u>Unit 10 Test, Question #6 (M/C):</u> "When an alarm is issued, the operator:" <u>Answer:</u> "Must acknowledge it to the MTU before visual and audible signals will cease"	100%	0%	Yes
Learning Outcome 3: *Understand PLC control of SCADA systems in industrial environments*	(a) <u>Unit 3 Test, Question #6 (M/C):</u> "Digital computers reduce the need for:" <u>Answer:</u> "Relays"	100%	0%	Yes
Learning Outcome 3: *Understand PLC*	(b) <u>Unit 5 Test, Question #1 (M/C):</u> "Most controllers are usually located in or near the:"	100%	0%	Yes

control of SCADA systems in industrial environments	Answer: "RTU's"			
Learning Outcome 3: *Understand PLC control of SCADA systems in industrial environments*	(c) Unit 5 Test, Question #7 (M/C): "Which of the following is a mathematical representation of controller functionality?" Answer: "Algorithm"	100%	0%	Yes
Learning Outcome 4: *Understand communications systems utilized in industry*	(a) Units 1 & 2 Test, Question #1 (M/C): "Which of the following best describes SCADA?" Answer: "Distant facilities and limited control instructions"	100%	0%	Yes
Learning Outcome 4: *Understand communications systems utilized in industry*	(b) Unit 3 Test, Question #5 (M/C): "A system that only gathers data and information is called:" Answer: "Telemetry"	100%	0%	Yes
Learning Outcome 4: *Understand communications systems utilized in industry*	(c) Unit 8 Test, Question #2 (M/C): "The seven functional layers of the Open Systems Interconnection (OSI) model define:" Answer: "Communication requirements between data terminals"	100%	0%	Yes
Learning Outcome 4: *Understand communications systems utilized in industry*	(d) Unit 8 Test, Question #6 (M/C): "Modulation and demodulation is performed by the:" Answer: "Modem"	100%	0%	Yes

* Please note if using a different minimum performance standard.

Conclusions
Provide a brief summary of conclusions derived based on analysis of data. Append additional pages if necessary. If appending, include notation in box to "See attached".
The performance standard of 75% was exceeded by fourteen of fifteen questions spread over the four Learning Outcomes assessed.

Previous Assessment Reports and Results
Date of Previous Assessment: Spring, 2017 **List of Outcomes Not Met:** N/A **Summary of Actions Taken to Address Unmet Learning Outcomes: Append additional pages if necessary. If appending, include notation in box to "See attached".** N/A
N/A

Action Plan and Date for Reassessment
Identify action plan for improvement or maintaining current performance levels including outcomes identified for re-assessment, curriculum revision, LOT proposal, new or revised course activities to reinforce learning outcomes, etc. Append additional pages if necessary. If appending, include notation in box to "See attached".
Will better emphasize important principles in lectures.

Assessment Committee Recommendation/Approval (To be posted by Assessment Committee Chair)

Approved as presented
x Approved with recommendations for future reports (Explanation Required)
    • Use current template
    • Present Assessment Results in a more familiar and accessible format
    • Include more detail in the Action Plan which addresses any specific shortcoming(s)
 	
Resubmission Required. Reason for Resubmission:
 	
Date: 9/13/19