

**Eastern West Virginia Community and Technical College  
COURSE ASSESSMENT REPORT**

<b>Course Title and Number:</b> Maintenance Applications, ELM 218	<b>Academic Term and Year of Assessment Activity (Ex: Fall, 2014):</b> Fall, 2020
<b>Report Submitted By:</b> E. Putze	<b>Number of Students Assessed:</b> 6
<b>Date Report Submitted:</b> 1-13-2021	<b>Number of Sections Included:</b> 1
<b>Course Delivery Format (list all modalities used in sections assessed. Ex: web based, VDL, traditional section, hybrid course, etc.):</b> Lab work, reading, Blackboard assignments, written exercises, demonstrations, lecture	

**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 or Restricted Elective for Wind Energy Technology

Catalog Description: This course introduces the student to a comprehensive coverage of maintenance troubleshooting principles, procedures and practices used in maintaining industrial systems. Electrical, refrigeration, boiler, HVAC, mechanical and fluid power systems will be studied. Safety, services and repair principles and practices will be covered.

**Assessment Methods**

**Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.**

Lab Exercises & Demonstrations: LabVolt electrical, power generation & transmission, motors, and pneumatics hands-on trainers were used for lab exercises and demonstrations. The following topics were covered: electricity & circuits, electric motors, electricity generation and transmission, safety procedures and equipment, thermal cameras, pneumatic systems, and programmable logic controllers. The instructor was present throughout all labs; facilitated learning through demonstration and interaction with students; and observed student performance.

Reading Assignments, Written Exercises, & Blackboard Assignments: The following topics were covered by reading assignments, written exercises, and Blackboard assignments: electricity & circuits, electric motors, vibration analysis, lubrication analysis, electricity generation and transmission, power supplies, troubleshooting, safety procedures and equipment, thermal cameras, data acquisition, maintenance management, simple machines, pneumatic systems, boilers, refrigeration, compressors, and programmable logic controllers.

Blackboard Tests: Blackboard tests, which were primarily multiple choice, were based on the material covered in the reading and Blackboard assignments. Selected questions from tests given were used for assessment.

Hands-On Tests: Each student was required to assemble simple electric motor circuits, configure electrical measuring tools, analyze and interpret results, and understand vocabulary.

**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".**

<b>Course Outcome &amp; Indicator</b>	<b># of Students Answering Correctly</b>	<b># of Students Answering Incorrectly</b>	<b>Composite</b>
1(a)	6	0	6
1(b)	6	0	6
1(c)	6	0	6
2(a)	6	0	6
3(a)	6	0	6
3(b)	6	0	6
3(c)	5	1	6
3(d)	6	0	6
3(e)	6	0	6
3(f)	6	0	6
3(g)	6	0	6
<b>Total Answers</b>	65	1	66
<b>Percentage</b>	98.5%	1.5%	100%
<b>Course Outcome &amp; Indicator</b>	<b># of Students Scoring 100%</b>	<b># of Students Scoring &lt; 100%</b>	<b>Composite</b>
4(a)	5	0	5
<b>Totals</b>	5	0	5
<b>Percentage</b>	100%	0%	100%

**Course Level Assessment Summary of Outcomes, Indicators and Results**

Add additional rows to table if necessary

<b>Learning Outcomes (Insert learning outcomes assessed during this cycle)</b>	<b>Indicator (Insert indicators used for each outcome: exam question, scoring rubric, etc. Be specific)</b>	<b>Percent of Correct Responses</b>	<b>Percent of Incorrect Responses</b>	<b>Performance Standard Met (75%)* (yes or no)</b>
Learning Outcome 1:  <i>Understand how to utilize a computerized maintenance</i>	(a) Test <u>Question (M/C)</u> : "For all machines and equipment, a good PM record-keeping system includes detailed:"  <u>Answer:</u> "Inventory information, Inspection"	100%	0%	Yes

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)
<i>monitoring system (CMMS)</i>	reports, Maintenance records, & Failure logs”			
Learning Outcome 1:  <i>Understand how to utilize a computerized maintenance monitoring system (CMMS)</i>	(b) <u>Question (M/C)</u> : “Frequency of PM inspections should be:”  <u>Answer</u> : “Dependent upon many factors, including manufacturer’s recommendations and criticality of the operation”	100%	0%	Yes
Learning Outcome 1:  <i>Understand how to utilize a computerized maintenance monitoring system (CMMS)</i>	(c) <u>Question (M/C)</u> : “Which of the following is not a part of planned (or preventive) maintenance (PM):”  <u>Answer</u> : “Conducting inspections and making repairs during peak production”	100%	0%	Yes
Learning Outcome 2:  <i>Examine vibration analysis and lubrication oil analysis reports</i>	(a) <u>Question (M/C)</u> : “Which of the following statements concerning lubricants is incorrect:”  <u>Answer</u> : “Any amount of lubricant above the specified minimum may be applied”	100%	0%	Yes
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(a) <u>Question (M/C)</u> : “Increasing the cross-sectional area of a conductor generally:”  <u>Answer</u> : “Decreases resistance”  OR	100%	0%	Yes

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)
	(a) <u>Question (M/C)</u> : “Increasing the operational temperature of a conductor generally:”  <u>Answer</u> : “Increases resistance”			
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(b) <u>Question (M/C)</u> : “A _____ rate induces a higher potential difference in a given coil.”  <u>Answer</u> : “higher”	100%	0%	Yes
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(c) <u>Question (M/C)</u> : “Electrons move in one direction only and at a constant speed with _____ current.”  <u>Answer</u> : “direct”	83%	17%	Yes
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(d) <u>Question (M/C)</u> : “If an AC circuit is purely resistive, it does not have:”  <u>Answer</u> : “Capacitance or Inductance”	100%	0%	Yes
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(e) <u>Question (M/C)</u> : “The AC potential waveform is known as a _____ wave.”  <u>Answer</u> : “sine”	100%	0%	Yes

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)
<i>is generated and transmitted</i>				
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(f) <u>Question (M/C)</u> : "The root mean square (RMS) value of voltage or current is _____ times the amplitude."  <u>Answer</u> : "0.707" & "Half the square root of 2"	100%	0%	Yes
Learning Outcome 3:  <i>Describe how single and three phase electricity is generated and transmitted</i>	(g) <u>Question (M/C)</u> : "The standard frequency in the United States is:"  <u>Answer</u> : "60 Hz"	100%	0%	Yes
Learning Outcome 4: <i>Understand how to utilize and maintain industrial programmable controller systems</i>	(a) Lab Exercise	100%	0%	Yes

\* Please note if using a different minimum performance standard.

Conclusions
<b>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".</b>
The class average for hands-on testing given during the semester, which considerably overlapped the material, was 94%
Average of Performances for Each Assessed Learning Outcome:
Learning Outcome 1: 100.0%

<b>Conclusions</b>
<b>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".</b>
Learning Outcome 2: 100.0% Learning Outcome 3: 97.6% Learning Outcome 4: 100.0%
The performance standard of 75% was met or exceeded on all four assessed Learning Outcomes. The performance standard of 75% was met or exceeded on all twelve indicators spread over the four Learning Outcomes assessed.

<b>Previous Assessment Reports and Results</b>
<b>Date of Previous Assessment:</b> 2/6/2019 <b>List of Outcomes Not Met:</b> <i>Understand how to utilize and maintain industrial programmable controller systems.</i> <b>Summary of Actions Taken to Address Unmet Learning Outcomes:</b> Append additional pages if necessary. If appending, include notation in box to "See attached".
A more in depth explanation of, and lab training with, programmable logic controller ladder diagrams was developed for this iteration of the course with the goal of achieving 100% on the assessed indicator associated with this topic.

<b>Action Plan and Date for Reassessment</b>
<b>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".</b>
PMMI certification tests are being replaced by NIMS certification tests beginning Spring 2021, and the Electrical Systems Certification will be used as the first-year exit test. The switch was made given NIMS certifications are aligned to Amatrol online courses, which are extensively used in Eastern's Wind Energy Technology and Electromechanical Technology courses, whereas the PMMI certifications incorporate more in-depth, industry-specific material not necessarily covered. Just one student has passed the equivalent PMMI exam during the past several years, so our goal is to give our students a better opportunity to earn a certification in basic electricity.

<b>Assessment Committee Recommendation/Approval (To be posted by Assessment Committee Chair)</b>
<input type="checkbox"/> Approved as presented <input checked="" type="checkbox"/> <b>Approved with recommendations for future reports</b> – Please use the newest (2019 Revision) form for future reports. The committee also recommends using a broader variety of assessment methods (outside just the test questions) to illustrate outcome performance. <input type="checkbox"/> Resubmission Required. Reason for Resubmission: <b>Date:</b> 1/25/21