Eastern West Virginia Community and Technical College
COURSE ASSESSMENT REPORT

Course Title and Number: Power Generation & Transmission, WTT 160	**Academic Term and Year of Assessment Activity (Ex: Fall, 2014):** Spring, 2017
Report Submitted By: E. Putze	**Number of Students Assessed:** 4
Date Report Submitted: 4-18-2018	**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 work, lectures, reading, review assignments	

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 is a study of the components and process of electrical power generation, control, and delivery systems for wind energy. This course will serve as the basis for an understanding of power generation and distribution. Students will learn how power is transported from the wind farm to homes and businesses. Troubleshooting techniques and procedures will be discussed and demonstrated. This course will cover working with very high voltage transmission equipment and safety procedures.

Assessment Methods

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

Lab Exercises: Festo Lab-Volt's *AC Power Transmission Training System* was used for lab exercises. The following topics were covered: *3-phase AC Power Circuits, 3-phase Transformer Banks,* & *AC Transmission Lines.* The instructor was present throughout all labs; facilitated learning through demonstration, lectures, and interaction with students; and observed student performance. Assembling circuitry from diagrams, individually and in teams; demonstration and operation of circuits and measuring tools; analysis and interpretation of results; and computation were all demonstrated by students and assessed by the instructor.

Written Tests: Written tests, which were primarily multiple choice, were based mostly on material in *Electric Power System Basics for the Nonelectrical Professional;* author: Steven W. Blume; publisher: John Wiley & Sons, Inc.; 2007. Lectures and fill-in-the-blank reviews were utilized to enable learning. Selected questions from the five tests given were used for assessment.

Final Exam: Each student was required to assemble two electrical circuits, configure electronic 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".

Course Outcome & Indicator	+ Probable # of Students Answering Correctly	+ Probable # of Students Answering Incorrectly	Composite
1(a)	3.40	0.60	4.0
1(b)	3.40	0.60	4.0
1(c)	3.40	0.60	4.0
2(a)	3.40	0.60	4.0
2(b)	3.16	0.84	4.0
2(c)	3.61	0.39	4.0
3(a)	3.40	0.60	4.0
3(b)	3.40	0.60	4.0
3(c)	3.40	0.60	4.0
4(a)	3.61	0.39	4.0
4(b)	3.61	0.39	4.0
4(c)	3.61	0.39	4.0
Total Answers	41.40	6.60	48
Percentage	86.25%	13.75%	100%

+ Since results for test questions are unavailable, the class average for each test associated with a particular question was used to assess performance by extrapolating probabilities of number of students answering correctly and incorrectly.

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: *Understanding of power how power is generated*	+ (a) Test #1, Question #2 (T/F): "Electric power systems store electrical energy for later use:" Answer: "False"	85%	15%	Yes
Learning Outcome 1: *Understanding of power how power is generated*	+ (b) Test #1, Question #11 (M/C): "Electric generators and motors operate on the principle of magnetic:" Answer: "Induction"	85%	15%	Yes

Learning Outcome 1: *Understanding of power how power is generated*	+ (c) Test #1, Question #20 (M/C): "High-voltage power lines are used to allow for a(n) _____ in current for an equal amount of power:" Answer: "Decrease"	85%	15%	Yes
Learning Outcome 2: *Understanding of single and three phase power systems*	+ (a) Test #1, Question #13 (M/C): "AC voltage generation using three coils produces 3 electrical phases that lag one another by:" Answer: "120°"	85%	15%	Yes
Learning Outcome 2: *Understanding of single and three phase power systems*	+ (b) Test #2, Question #2 (M/C): "Three single-phase transformers operating as a single unit are called:" Answer: "Banked"	79%	21%	Yes
Learning Outcome 2: *Understanding of single and three phase power systems*	+ (c) Test #3, Question #17 (M/C): "Which type of relay is used to ensure that frequency, voltage, phase angle, and rotation requirements are met before circuit breakers are closed to connect two three-phase systems together:" Answer: "Permissive"	90.18%	9.82%	Yes
Learning Outcome 3: *Demonstrate circuit theory and use of*	+ (a) Test #1, Question #1 (M/C): "Ohm's Law is:" Answer: "Voltage equals	85%	15%	Yes

schematics to analyze circuits	Current times Resistance"			
Learning Outcome 3: *Demonstrate circuit theory and use of schematics to analyze circuits*	+ (b) Test #1, Question #5 (M/C): "Electric potential is measured in:" Answer: "Volts"	85%	15%	Yes
Learning Outcome 3: *Demonstrate circuit theory and use of schematics to analyze circuits*	+ (c) Test #1, Question #7 (M/C): "Electrons flowing in a conductor is called:" Answer: "Current"	85%	15%	Yes
Learning Outcome 4: *Discuss fusing and circuit protection equipment*	+ (a) Test #3, Question #8: "A distribution feeder typically has a total of:" Answer: "Four overcurrent relays"	90.18%	9.82%	Yes
Learning Outcome 4: *Discuss fusing and circuit protection equipment*	+ (b) Test #3, Question #13: "Which type of relay is used to help prevent a cascading outage:" Answer: "Under-frequency"	90.18%	9.82%	Yes
Learning Outcome 4: *Discuss fusing and circuit protection equipment*	+ (c) Test #3, Question #16: "Which type of relay is used to safely connect a three-phase generator to a three-phase system:" Answer: "Synchronizing"	90.18%	9.82%	Yes
+ Since results for test questions are unavailable, the class average for each test associated with a particular question was used to assess performance by extrapolating probabilities of number of students answering correctly and incorrectly.				

* 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".**
Using probabilities of number of students answering assessed questions correctly and incorrectly, the performance standard of 75% was exceeded by all twelve questions spread over the four Learning Outcomes assessed.

Previous Assessment Reports and Results
Date of Previous Assessment: Spring, 2015 (by different instructor) **List of Outcomes Not Met:** Performance standard of 75% exceeded for all Learning Outcomes **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".**
Course outcomes will be expanded.

Assessment Committee Recommendation/Approval **(To be posted by Assessment Committee Chair)**
x Approved as presented ☐ Approved with recommendations for future reports (Explanation Required) ☐ Resubmission Required. Reason for Resubmission: **Date: 5/11/18**

Additional comments:
The Committee recognizes that these reports were created using limited assessment results. However, faculty's approach to this problem was both ingenious and creative, and his contribution to the assessment of the Wind Tech program is commendable.