

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

Course Title and Number: Wind Turbine Mechanical Systems WTT 210	Academic Term and Year of Assessment Activity (Ex: Fall, 2014): Fall, 2017
Report Submitted By: E. Putze	Number of Students Assessed: 3
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, reading, review 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.
<u>Role in College Curriculum:</u> Technical Core for Wind Energy Technology, AAS
<u>Catalog Description:</u> This course is designed to introduce students to the mechanical systems that make up the subsystems of wind turbines. The course includes the rotor reduction gear, as well as the blade pitch gears and control system. It will emphasize development of the knowledge and hand skills needed when installing, repairing and replacing turbine components using common tools and equipment.

Assessment Methods
Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.
<u>Lab Exercises:</u> Amatrol's <i>Wind Turbine Nacelle Learning System</i> software and hands-on trainer were used for lab exercises. The following topics were covered: <i>Turbine Control System, Hydraulic Power, Brakes and Lubrication, Yaw System, Monitoring and Communications, and Nacelle Troubleshooting</i> . The instructor was present throughout all labs; facilitated learning through demonstration and interaction with students; and observed student performance. Troubleshooting, individually and in teams; demonstration and operation of multimeters; and analysis and interpretation of schematic diagrams were all demonstrated by students and assessed by the instructor.
<u>Written Tests:</u> Written tests, which were primarily multiple choice, were based mostly on material in <i>Maintenance Fundamentals for Wind Technicians</i> ; author: Wayne Kilcollins; publisher: Delmar, Cengage Learning; 2013 and Amatrol's <i>Wind Turbine Nacelle Learning System</i> software. One-on-one instruction and Blackboard assignments were utilized to enable learning. Fourteen tests were given.
<u>Final Exam:</u> Each student was required to troubleshoot faults on the Amatrol Wind Turbine Nacelle trainer using a multimeter and schematic diagrams.

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)	2.94	0.06	3.0
++ 1(b)	2.85	0.15	3.0
++ 1(c)	2.85	0.15	3.0
++ 2(a)	2.83	0.17	3.0
++ 2(b)	2.83	0.17	3.0
++ 2(c)	2.83	0.17	3.0
++ 2(d)	2.83	0.17	3.0
++ 3(a)	3.0	0.0	3.0
++ 3(b)	2.94	0.06	3.0
Total Answers	25.9	1.1	27
Percentage	95.93%	4.07%	100%
<p>+ Based on Lab Exercises scores, Lab Worksheets scores, and Final Exam scores combined.</p> <p>++ 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.</p>			

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: <i>Demonstrate safety procedures when working on mechanical devices</i>	+ (a) Students were required to wear proper clothing, shoes, and Personal Protective Equipment (PPE) and demonstrate proper safety procedures when performing lab exercises and final exam on Amatrol hands-on trainers, which incorporate hydraulic, mechanical, and electrical	98%	2%	Yes

	components. The instructor was present throughout all labs; facilitated learning through demonstration and interaction with students; and observed student performance.			
Learning Outcome 1: <i>Demonstrate safety procedures when working on mechanical devices</i>	++ (b) <u>Chapter 3 Test, Question #1 (M/C):</u> “When working on electrical equipment, the purpose of LOTO is to ensure electrical circuits remain.” <u>Answer:</u> “De-energized”	95%	5%	Yes
Learning Outcome 1: <i>Demonstrate safety procedures when working on mechanical devices</i>	++ (c) <u>Chapter 3 Test, Question #8 (M/C):</u> “Isolating, de-energizing, and disabling any system to prevent re-energizing results in.” <u>Answer:</u> “A zero-energy condition”	95%	5%	Yes
Learning Outcome 2: <i>Learn how to use fasteners and describe differences</i>	++ (a) <u>Chapter 6 Test, Question #2</u> “Which of the following is used if the rotation of an assembly might cause loosening of the fastener?” <u>Answer:</u> “Left-hand lay”	94.4%	5.6%	Yes
Learning Outcome 2: <i>Learn how to use fasteners and describe differences</i>	++ (b) <u>Chapter 6 Test, Question #7</u> “A bolt and nut tightened to the required torque level causes the bolt to act like a(n):” <u>Answer:</u> “Spring in tension”	94.4%	5.6%	Yes
Learning Outcome 2: <i>Learn how to use fasteners</i>	++ (c) <u>Chapter 6 Test, Question #8</u> “Radial lines and/or alphanumeric markings on a fastener’s head indicate:”	94.4%	5.6%	Yes

<i>and describe differences</i>	<u>Answer: "Grade"</u>			
Learning Outcome 2: <i>Learn how to use fasteners and describe differences</i>	++ (d) <u>Chapter 6 Test, Question #18</u> "Bolts in a circular configuration should be tightened in a." <u>Answer: "Designated pattern and then marked"</u>	94.4%	5.6%	Yes
Learning Outcome 3: <i>Use of torque wrenches and understand torque</i>	++ (a) <u>Chapters 1 & 2 Test, Question #6 (M/C):</u> "Torque to the generator can be adjusted using: <u>Answer: "Blade pitch control"</u>	100%	0%	Yes
Learning Outcome 3: <i>Use of torque wrenches and understand torque</i>	++ (b) <u>Chapter 5 Test, Question #15 (M/C):</u> "The higher torque of the main shaft compared to that of the high-speed gearbox shaft requires the physical size of the parking brake of direct-drive systems, which do not have gearboxes, to be:" <u>Answer: "Much larger than high-speed gearbox shaft parking brakes"</u>	98%	2%	Yes

⁺ The Lab Exercises score, Lab Worksheets score, and Final Exam score for each student were combined and used to assess performance by extrapolating number of students successfully meeting the course outcome and number of students not meeting the course outcome

⁺⁺ 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 or appropriate scores as indicated above, the performance standard of 75% was exceeded by all nine indicators spread over the three Learning Outcomes

assessed.

Previous Assessment Reports and Results

Date of Previous Assessment: N/A

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".

Course outcomes will be refined and expanded.

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

- Approved as presented
- Approved with recommendations for future reports (Explanation Required)
- Resubmission Required. Reason for Resubmission:

Date: