Assessment: Course Four Column

Courses (CTE) - Electrical Systems Technology

ELM 126:Motor Maintenance

Course Outcomes	*Assessment Measures*	*Results*	*Actions*
Apply basic troubleshooting procedures to motors - Apply basic troubleshooting procedures to motors in industry. **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Written -** Written course work and study is the main method by which I measure this outcome. Students are required to participate in lectures, complete homework, and pass texts/quizzes. Small labs were also used to gauge practical learning and retention. **Criterion:** Participation, all homework completed, and 70% or better on tests/quizzes. All labs completed on time and with a grade of 70% or better.	**Reporting Period:** 2017-2018 **Criterion Met:** Yes 90% of students were able to meet all assessment criteria. The remaining 10% were given remedial work, and chances to correct their errors. Lab work was completed by all students on time and with a minimum grade of 70%. Results Analysis: This outcome needs to be more hands on/lab related. In the future, I will be incorporating more lab time with basic troubleshooting principles. (12/11/2018)	**Action:** By Spring 2019, students can expect to spend more time in the lab with this outcome with in depth study, and application, of basic troubleshooting principles. (12/11/2018)
Basic preventive maintenance procedures to motors in industry - Apply basic preventive maintenance procedures to motors in industry. **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Lab -** Students are required to tear down a motor to inspect bearings, demonstrate lubrication procedures, and identify failure modes. **Criterion:** Oral quizzes on motor teardown and identification. Final project is to develop a preventive maintenance plan for specific motors.	**Reporting Period:** 2017-2018 **Criterion Met:** Yes All students were able to complete the required coursework with satisfactory grades and understanding of motor PM principles. Also, students were able to develop a PM plan using the knowledge and resources gained in class. Results Analysis: I am pleased with this outcome and how the results are achieved. I will not be changing anything related to this learning outcome. (12/11/2018)	
Identify causes of motor failure in industry - Identify causes of motor failure in industry.	**Quiz -** Picture and test results identification. Quizzes on testing equipment and procedures. Perform	**Reporting Period:** 2017-2018 **Criterion Met:** Yes Students seemed to struggle a bit with the test equipment.	**Action:** Introduce meters and their uses at an earlier point of the program; probably early in the

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Course Outcome Status: Active **Next Assessment:** 2022-2023	tests on various motors with various results; determine whether motor is good or bad based upon results. **Criterion:** Visual demonstration of test equipment use and results found. Identification of pictures relating to certain motor conditions and be able to identify failure modes/areas.	By the end of the class, all students were proficient in the use of various pieces test equipment and meters used to identify motor condition. Results Analysis: The end result was successful, but it took some additional work to have all students on the same level by the conclusion of the course. (12/11/2018)	first semester and make it a point to use meters regularly. (12/11/2018)
Poor motor efficiency - Identify poor motor efficiency based on environment of motor operation. **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Lab -** Look at motor nameplate information and determine acceptable environment for operation. If motor was not in correct environment, determine causes of inefficiency on said motor. **Criterion:** Be able to decipher motor nameplate data and describe what the information means. Use code book to determine motor applications and acceptable environmental conditions.	**Reporting Period:** 2017-2018 **Criterion Met:** Yes Students were able to use motor nameplate data to determine the correct location for specific motor styles/frames. Using this information, students were able to correctly place a motor in its correct location to be the most efficient and safe. Results Analysis: Students were well verse din the use of the code and identification of nameplate data from previous classes. Motor identification is a point taught in other motor classes, so this outcome was an easy transition for the students. (12/11/2018)	
Correct test procedures with meters and various other instruments - Apply correct test procedures with meters such as Megger, PF Meter, and DVOM's **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Lab -** Use test equipment to get readings from known bad and good motors. Lab work and written quizzes interpreting readings. **Criterion:** Safely and effectively use test equipment to determine the state of a motor's health.	**Reporting Period:** 2017-2018 **Criterion Met:** Yes All students were able to use all necessary test equipment by the end of the course. No safety violations or performance issues were witnessed during the lab's used for this outcome. Results Analysis: The use of the various test equipment went well. After explanations of how each instrument worked, students were able to perform the necessary tests successfully. (12/11/2018)	
Motors will be the No. 1 call they will receive for troubleshooting/ repairs - Make students aware that motors will be the No. 1 call they will receive for troubleshooting/ repairs.	**Assignment - Lab -** Used printed material from Mobil and Exxon on 1) Motor Care & Lubrication, Motor Efficiencies, Motor failures in the field, and Efficiency Opportunities	**Reporting Period:** 2017-2018 **Criterion Met:** Yes Students gained a knowledge of the workings of motors and primary reasons for trouble calls. Tested students on various motor controls by having them complete exercises	

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Course Outcome Status: Active **Next Assessment:** 2022-2023	through Motor Maintenance. **Criterion:** Gave 2 separate exams on motors, the importance of lubrication, insulation failures due to heat and overloading of motors.	in the Troubleshooting Electric Motors Book. (11/15/2018)	
Motors disassemble, inspect for repairs, megger the windings for shorts or grounds and inspect the motor termination box - Brought in a number of motors for the students to disassemble, inspect for repairs, megger the windings for shorts or grounds. Also to inspect the motor termination box to insure adequate insulation for the motor leads in use and the spares not in use. **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Lab -** Inspected each motor for correct reassembly. Confirmed Megger (Insulation) values. Inspect all motor terminations, cooling fans, motor nameplate, motor housing for physical damage. **Criterion:** NA	**Reporting Period:** 2017-2018 **Criterion Met:** Yes All students showed an increase in overall motor knowledge and the most common factors that cause motor failure. (11/15/2018)	
Apply bearing and lubrication selection depending on manufacturer - Apply bearing and lubrication selection depending on manufacturer. **Course Outcome Status:** Active **Next Assessment:** 2022-2023	**Assignment - Lab -** Identify specific types of lubrication needed based on the bearing and manufacturer specifications. Use cross reference charts to find other manufacturer's compatible lubricants. **Criterion:** Demonstrate knowledge of bearing and lubrication types through written test grades of 70% or higher.	**Reporting Period:** 2017-2018 **Criterion Met:** Yes Students were able to use the material supplied to them to determine bearing and lubrication specifications. Using the internet as a search engine also made this outcome successful for cross reference purposes. Results Analysis: Successful completion of this outcome shows that the methods used for teaching and instruction is adequate. (12/11/2018)	**Action:** None needed. (12/11/2018)