

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrical/Electromechanical Technology Program
Revision Date: August 22, 2022

I. CATALOG DESCRIPTION

Course Number: ELEC1474
Course Title: Predictive Maintenance Principles
Prerequisite(s): ELEC1217
Catalog Description: Orientation, planning, and practical application of setting up a predictive maintenance program for inspection, testing, cleaning, fabricating, and adjusting of equipment.
Credit Hours: 2
Class Hours: 15
Lab Hours: 45
Total Contact Hours: 60

II. COURSE OBJECTIVES: *Course will:*

- A. Allow the student, through classroom and hands-on experience, to become familiar with planning and practical application of a predictive maintenance program including, but not limited to: the various technologies and practices used throughout industry today.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
1. Describe the general industry practiced types of maintenance.
 2. Set up a good predictive maintenance schedule.
 3. Understand Hypot & Megger use.
 4. Understand Vibration analyzers.
 5. Properly use the Thermography equipment.
 6. Understand the use of Ultrasonic Testing.
- B. General Learning Outcomes (GELOs)
1. GELO #3: Critical Thinking & Problem Solving
Outcome 1: Collect, identify, interpret, and analyze data
Outcome 2: Synthesize information to arrive at reasoned solutions

IV. CONTENT/TOPICAL OUTLINE

- A. Predictive Maintenance
1. The student learn the steps necessary to set up an efficient maintenance system and how it relates to plant production.
- B. Electrical review
1. Through study and by testing in lab this review will develop in the student an appreciation for electrical apparatus with respect to fundamental electrical phenomenon.
 2. Temperature characteristics of metals and insulation
 3. Capacitors-testing
 4. Corona
 5. Circuit faults
- C. Insulation Resistance

1. The student will develop through study an understanding of insulation materials. With the use of test equipment the student will demonstrate the proper procedure to test and evaluate insulation.
2. Leakage
3. Capacity
4. Absorption
5. Spot test
6. Meggers
7. Cleaning and drying
8. Hi-potential tests
- D. Batteries
 1. The student will acquire a basic knowledge of batteries and their characteristics
 2. Secondary
 3. Use and care
- E. Vibration
 1. The student will learn the basic procedures in testing and analyzing vibrations
- F. Infrared
 1. Students will learn the many different ways infrared testing can be used by the maintenance technician to solve problems before they interrupt production
 2. Infrared scanners
 3. Infrared video cameras
- G. PM with the Megger
 1. The student will check various pieces of equipment using the Megger to determine the quality of the insulation of the equipment in question
- H. PM with Hypot
 1. The student will become familiar with the Hypot, using it to determine the integrity of insulation of a motor or transformer
- I. Analyzing vibration
 1. The student will be able to use the vibration meter to make specific measurements that will tell them the condition of rotating machinery
- J. Infrared Testing
 1. The student will become familiar with the infrared scanner and camera and develop necessary skills to troubleshoot electrical and mechanical problems with these devices
- K. Ultrasonics
 1. The student will become familiar with ultrasonic testing methods and equipment
- L. Oil Analysis
 1. The student will become familiar with oil analysis as a method of machine condition monitoring and troubleshooting

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Supplies: Notebook, pen and pencil
- C. Other Resources: Reference notebook to be purchased at the bookstore

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture
 2. Lab
 3. Homework/Quizzes
 4. Utilizing online shell for documentation and homework/quizzes

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Participation
 - 2. Exams and Quizzes
 - 3. Homework
 - 4. Lab performance

VIII. SPECIFIC COURSE REQUIREMENTS

- A. A minimum grade of D is required.
- B. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.