

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrical/Electromechanical Technology Program
Revision Date: August 21, 2023

I. CATALOG DESCRIPTION

Course Number: ELEC1446
Course Title: Industrial Machines & Mechanical Systems
Prerequisite(s): ELEC1474
Pre/Corequisite(s): ELEC1356ELEC1337, MACH1131
Catalog Description: The study of troubleshooting, repairing, and installing of mechanical equipment.
Credit Hours: 4
Class Hours: 30
Lab Hours: 90
Total Contact Hours: 120

II. COURSE OBJECTIVES: *Course will:*

- A. Introduce mechanical repair.
- B. Introduce calculating short circuit currents and protective devices.
- C. Introduce electrical tubing and steel piping.
- D. Introduce Assembly, Alignment & Tensioning of Belt/Chain drives.
- E. Introduce machine repair laboratory.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Use machine blueprints and manuals
 - 2. Know various methods of disassembly.
 - 3. Calculate short circuit currents.
 - 4. Select proper protective devices.
 - 5. Identify differences between tubing and pipe.
 - 6. Demonstrate proper bending techniques.
 - 7. Know the assembly of various drive components.
 - 8. Know the proper method of tensioning belts and chains.
 - 9. Perform troubleshooting of various machines.
 - 10. Perform repair of various machines.
- B. General Education Learning Outcomes (GELOs)
 - 1. GELO #3: Critical Thinking & Problem Solving
Outcome 1: Collect, identify, interpret and analyze data.

IV. CONTENT/TOPICAL OUTLINE

- A. Mechanical Repair
 - 1. Goal Statement: With the use of machine blueprints and manuals the student will demonstrate his/her knowledge of disassembly and repair of various machines.
 - a. Gear boxes
 - b. Transmissions
 - c. Reducers
 - d. Clutches & brakes
- B. Calculating Short Circuit Currents, Protective Devices

1. Goal Statement: An understanding of the potential destructive effects of short circuits and the methods to calculate them and protect machines with the use of proper protective devices will be realized by the student.
 - a. Calculating and use of charts
 - b. Protective devices
 1. fuses
 2. circuit breakers
- C. Electrical Tubing and Steel Piping
 1. Goal Statement: The student will learn how to bend, ream, and thread conduit by observing demonstrations by the instructor and then by doing the proper procedures themselves.
 - a. Application of NEC (National Electrical Code)
 1. EMT
 2. liquid tight & flexible
 3. rigid
 - b. Steel pipe
 1. cutting
 2. threading
 2. Remarks: Lab will be used for the bending, reaming and threading of conduit to supplement the instructor demonstration of this section
- D. Assembly, Alignment & Tensioning of Belt/Chain drives
 1. Goal Statement: The student will use various drive components such as motors, gearboxes, transmissions, clutches and brake to assemble required projects students will use the components to provide them with the proper designing/tensioning of belts and chains.
 - a. Direct drive
 - b. Belted drive
 - c. Clutch and brake units
 - d. Chain drive
- E. Hydraulic Troubleshooting
 1. Goal Statement: The student will be able to understand troubleshooting techniques and methods by using Hydraulic principles learned in the previous semester.
- F. Laboratory
 1. Goal Statement: The student will gain additional experience troubleshooting and repairing machines in the machine tool technology, welding technology, and building construction technology, plus various projects brought in for repair.
 - a. Required lab projects will include the following:
 1. Disassembling & assembling & evaluating worn gear reduction drives, and spun gears reduction drives.

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): None
- B. Other Resources: Technical Handouts
- C. Supplies: The student will be required to furnish his/her own tools. A list of required tools will be furnished.

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture
 2. Lab

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 60 is required.
- B.** Cheating within the Manufacturing Division: Any violation of academic integrity on assignments, quizzes, or tests will result in a grade of 0 on that assignment, quiz, or test. A second violation in any course after the initial infraction will result in a grade of F for that course. Any additional violations while in the program will result in a suspension from the program.
- C.** Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.