

**Western Iowa Tech Community College
Course Outline of Record**

Course Identification:

Revision Date: 10/29/07

Course Title: Motor Control Prefix & No.: ELT 208

Semester Credit Hours: 2

Lecture Contact Hours per Semester: 16

Lab Contact Hours per Semester: 32

Other (work experience, OJT, clinical, practicum, internship) hours per Semester: _____

Course/Lab Fee: ___ yes no

Rationale: _____

Pre and Post Assessments: _____

Course Description:

This course is designed to introduce the student to the principles of DC and AC motors and their connection and application. A working knowledge of transformers, including single and three phase connection to various voltages and applications, is given.

Co-requisites: _____

Pre-requisites: _____

Course Needs Statement:

AC and DC electric motors are found in industrial, commercial, and residential applications. This course covers electric relay control of AC electric motors and how to: operate, install, design, and troubleshoot AC electric motor control circuits for various applications, thus broadening their employment opportunities.

Required Textbooks and/or materials:

Yes _____ No _____ Other _____

Course Objectives:

The course will provide information which should enable the student to:

1. Discuss the three categories of motor control types, their characteristics and location
2. Distinguish between overload relays and fuses
3. Describe the major types of overload relays (thermal and magnetic)
4. Explain basic relay construction
5. Describe the purpose and functioning of dashpot timers
6. Describe the different types of time delay relays, time delay circuits and methods for time delay

7. Recognize various schematic symbols used in motor control circuit diagrams
8. Describe the distinguishing characteristics of a schematic diagram and a wiring diagram
9. Explain the different methods for starting squirrel cage induction motors
10. Understand the starting methods for wye-delta, synchronous, and wound rotor motors
11. Perform maintenance and troubleshooting activities in motor systems
12. Explain basic controller functions
13. Identify three types of speed controllers, and describe their operation
14. Describe typical applications for DC motor speed control systems
15. Define terms commonly used in DC motor control systems
16. Describe how to control motor speed using a rheostat in the shunt field of a DC motor
17. Explain how a rheostat in the armature circuit of a DC motor is used to control torque
18. Explain variable voltage controllers operation
19. Explain the operation of a single-phase motor controller
20. Describe the operation of a three-phase motor controller
21. Identify a Ward/Leonard motor controller, and describe its operation
22. Discuss types of maintenance and their applications
23. List inspection procedures
24. Describe proper testing procedures
25. Describe proper cleaning procedures
26. Describe correct troubleshooting technique for a specific problem
27. Describe procedure for isolating the problem

Content Outline:

- 1) Motor Controls - Basic
- 2) Motor Controls - Overload Relays
- 3) Motor Controls - Time Delay Relays
- 4) Motor Controls - Schematic Symbols
- 5) Motor Controls - Schematics
- 6) Motor Controls - Squirrel Cage Motors
- 7) Motor Controls - Wye-Delta
- 8) Motor Controls - Installing
- 9) DC Motors: Wiring Diagrams and Troubleshooting
- 10) DC Motor Controllers - Controller Function
- 11) DC Motor Controllers – 2

Course Competencies:

At the conclusion of the course the student will be able to:

1. Compare and contrast the three basic types of control systems
2. Recognize different schematic symbols
3. Wire a normally open/closed contact
4. Recognize differences between schematic and wiring diagrams
5. Identify the proper connection of a wye-delta motor
6. Troubleshoot a control system from a properly installed control cabinet
7. Identify basic parts of a DC motor and explain the function of these parts
8. Define the types of insulation material used in commutators
9. Interpret motor wiring diagrams
10. Describe the operation of a three-phase motor controller

Reminder: Each Course Outline of Record is expected to be reviewed every three (3) years.