WESTERN IOWA TECH COMMUNITY COLLEGE
Course Syllabus

Term:
Course Number and Section: ELE 312 ___
Course Title: Variable Frequency Drives for Motor Control
Semester Hours: 1.00
Meeting time/location:
Instructor:
Phone: 712.274.8733 Ext.
E-mail: @witcc.edu
Office Location:
Office Hours:

COURSE DESCRIPTION AND PREREQUISITES/COREQUISITES:

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

Prerequisite: ELE 195 Motor Control ELE 112 Basic Electrical Theory
Corequisite: None

REQUIRED TEXTBOOKS/MATERIALS

COURSE OBJECTIVES

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

1. Describe the function and operation of common types of variable speed drives
2. Describe the advantages and disadvantages of using an AC drive versus a DC drive
3. Operate a motor through programming of a variable frequency drive
4. Describe how motor jogging is accomplished with a variable frequency drive
5. Describe how frequency affects the speed of an AC induction motor
6. Define reflected wave voltage and its effect on an AC induction motor
7. Describe how to program a variable speed drive for multiple speed selections
8. Explain how the volts per frequency ratio affects the torque capabilities of a motor
9. Define ramping and explain its importance
10. Describe injection braking using a variable frequency drive
11. Describe how a variable frequency drive detects faults
12. Describe how to troubleshoot a circuit that includes a variable frequency drive

CONTENT OUTLINE:

I. Variable Frequency Drives -- AC Drives
II. Variable Frequency Drives -- Speed and Torque Control
III. Variable Frequency Drives -- Acceleration, Deceleration, and Braking
IV. Variable Frequency Drives -- Fault Diagnostics and Troubleshooting

COMPETENCIES:

At the conclusion of the course the student will be able to:
1. Describe the application of variable frequency drives
2. Apply variable frequency drives to control process acceleration, speed and torque
3. Recognize diagnostic features and common troubleshooting techniques of variable frequency drives
4. Operate a three wire control circuit using a variable frequency AC drive
5. Program, connect, and operate a variable frequency drive for motor jogging
6. Control motor speed using a keypad of a variable frequency drive
7. Program and operate a variable frequency drive to ramp a motor to its rated speed
8. Program and operate a variable frequency drive to ramp a motor to a stop

9. Program and operate a variable frequency AC drive to provide DC injection braking to a motor
10. Determine faults based on the fault display of a variable frequency AC drive
11. Troubleshoot a circuit that includes a variable frequency drive
12. Program a variable frequency drive to automatically reset a fault

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