

# Minnesota State College Southeast

## MECH 1631: Motors & Drives

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 1

Lab Hours/Week: 4

OJT Hours/Week: \*.\*

Prerequisites:

This course requires the following prerequisite  
MECH 1610 - Basic Industrial Controls

Corequisites: None

MnTC Goals: None

This course adds to student's knowledge of motors and motor control systems. VFDs will be introduced and applied for control of a three-phase motor. Positioning systems using both stepper and servo drives are explored. Application of industrial equipment is emphasized, and students are required to use and interpret equipment manuals to control and integrate the equipment. Control of DC and single-phase motors are also introduced. (Prerequisite: MECH1610) (3 Credits: 1 lecture/2 lab)

**B. COURSE EFFECTIVE DATES:** 05/12/2020 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. DC and Single-Phase Motors
2. Three Phase Motors and Drives
3. Stepper Motors and Drives
4. Servo Motors and Drives

#### **D. LEARNING OUTCOMES (General)**

1. Analyze a DC motor system
2. Set up and operate a DC motor system
3. Examine a DC generator
4. Set up and operate a DC generator/Tachometer
5. Analyze designs of single-phase motors
6. Explore speeds of single-phase motors
7. Investigate the operating principals of three phase motors
8. Explore the components of three phase motors
9. Explore how the speed of three-phase motor is controlled
10. Install three phase motor protective devices
11. Assemble motor systems that control three phase motors
12. Investigate VFD operation
13. Program a VFD
14. Connect devices to a VFD to control a three-phase motor
15. Troubleshoot a three-phase motor control system
16. Explore stepper motors
17. Assemble stepper motor systems
18. Program stepper motor systems
19. Troubleshoot a stepper motor control system
20. Explore stepper motors
21. Assemble stepper motor systems
22. Program stepper motor systems
23. Troubleshoot a stepper motor control system
24. Explore motor feedback systems
25. Explore servo drives motors
26. Assemble servo drives systems
27. Program servo drives motor systems
28. Troubleshoot a servo motor control system

#### **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

#### **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted