Course Prefix/No.: **EEM 221**
Course Title: **DC/AC Drives**
Lecture Hours/Week: **2.0**
Lab Hours/Week: **3.0**
Credit Hours/Semester: **3.0**

Distance Learning Attendance/VA Statement
Textbook Information

COURSE DESCRIPTION
This course covers the principles and operation and application of DC drives and AC drives.

COURSE COMPETENCIES
Upon successful completion of this course, the student should be able to:

Module 1 – DC Drive Fundamentals, DC Controllers, and Braking
- Discuss DC drive fundamentals.
- Discuss the operation of a Switching Amplifier Field Current Controller.
- Discuss the operation of the SCR Armature Voltage Controller.
- Discuss the operation of the BDCM Controller.
- List and discuss the advantages and disadvantages to the six different types of braking.

Module 2 – DC Chopper Drives
- Describe the operation of a chopper circuit.
- Discuss the differences between the buck chopper and the boost chopper.
- List the four quadrants of motor operation.
- Discuss the operation of a four-quadrant chopper drive.

Module 3 – DC Drive Troubleshooting and Setup
- Discuss the main areas to check when troubleshooting a drive.
- Discuss the safety precautions that must be taken while troubleshooting an AC drive system.
- Calculate for phase imbalance.
- Troubleshoot an inoperable DC drive system.
- List and explain the various adjustments that are found on a DC drive.

Module 4 – AC Drive Fundamentals, VVI's, and CSI's.
- Discuss AC drive fundamentals.
- Explain the importance of the V/Hz ratio.
- Discuss the operation of Variable Voltage Inverters.
- Discuss the difference between the Chopper controlled VVI, the Phase controlled VVI, and the PWM VVI Drive.

- Discuss the difference between the Chopper controlled CSI and the Phase controlled CSI.

Module 5 – Flux Vector Drives

- Discuss, in general, the theory of current vectors in an AC Induction motor.
- Correctly plot the sum of current vectors.
- Explain the operation of the Flux Vector Drive.
- Discuss some advantages and disadvantages of the Flux Vector Drive.

Module 6 – AC Drive Troubleshooting and Setup

- Discuss the main areas to check when troubleshooting a drive.
- Discuss the safety precautions that must be taken while troubleshooting an AC drive system.
- Calculate for phase imbalance.
- Troubleshoot an inoperable AC drive system.
- List and explain the various adjustments that are found on an AC drive.

MINIMAL STANDARDS

Assignments and attendance must be completed as designated in "Evaluation Strategies/Grading." Criteria for minimal acceptable performance will be provided by the instructor.

REQUIREMENTS

Attendance Policy

The college attendance policy, stated in the college handbook, will be honored. The instructor will provide specific requirements for the course.

Academic Honesty

Students are expected to adhere to the college policy regarding student conduct as stated in the college handbook.

Assignments

Students are expected to complete all assignments and any supplementary exercises designated by the instructor.

EVALUATION STRATEGIES/GRADING

Successful completion of the course requires the completion of each module with an average of 70 points. Grades will be calculated from work attitude, all tests/projects, homework assignments, and laboratory assignments.

Grading Scale:

A = 90.0 - 100
B = 80.0 - 89.9
C = 70.0 - 79.9
D = 60.0 - 69.9
F = 00.0 - 59.9

Evaluation Method:

Tests/Projects (minimum of six)	50% of the course
Lab Work	25% of the course
Work Attitude	25% of the course
	100% Final Grade

Work Attitude is defined as:

- Participation
- Cooperation
- Appearance
- Effort
- Safety
- Independently
- Responsibility
- Professionalism
- Attendance
- Self Motivation
- Works

ENTRY LEVEL SKILLS

The student must be able to demonstrate knowledge of basic electrical terminology and a capability to perform basic mathematical equations. The student should have a familiarity with solid state devices, (particularly MOSFETs and Thyristors), as well as rotating machinery.

PREREQUISITE: EEM 215

CO-REQUISITES: None

Disabilities Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.

Effective: 2009FA