



## North Central State College

### MASTER SYLLABUS

2026-2027

- A. Academic Division: Engineering Technology, Business & Criminal Justice Division
- B. Discipline: Electronic Engineering Technology
- C. Course Number and Title: EMMT2120 AC/DC Drives
- D. Assistant Dean: Brooke Miller, M.B.A.
- E. Credit Hours: 2  
Lecture: 1 hour  
Laboratory: 2 hours
- F. Prerequisites: None
- G. Last Course/Curriculum Revision Date: Fall 2026    Origin date: 01/25/2018
- H. Textbook(s) Title: None
- I. Workbook(s) and/or Lab Manual: Amatrol E-learning AC/DC Drives
- J. Course Description: This course covers an overview of DC and AC motors used in motion control and electronic devices and circuits used in DC and AC drives. Fixed output and phased controlled DC supplies needed for DC motor speed control and pulse width modulated (PWM) and variable frequency drive (VFD) inverters that provide AC motor speed control are also covered.
- K. College-Wide Learning Outcomes

| College-Wide Learning Outcome          | Assessments - - How it is met & When it is met |
|----------------------------------------|------------------------------------------------|
| Communication – Written                |                                                |
| Communication – Speech                 |                                                |
| Intercultural Knowledge and Competence |                                                |
| Critical Thinking                      |                                                |
| Information Literacy                   |                                                |
| Quantitative Literacy                  |                                                |

- L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

| Outcomes                                                                                   | Assessments – How it is met & When it is met |
|--------------------------------------------------------------------------------------------|----------------------------------------------|
| 1. Demonstrate the ability to read motor diagrams and wire them correctly                  | Labs, final exam                             |
| 2. Demonstrate knowledge of the fundamental operation of DC Drive systems.                 | Labs, final exam, Homework/e-learning        |
| 3. Demonstrate knowledge of the fundamental operation of Variable Frequency Drive systems. | Labs, final exam. Homework/e-learning        |

| Outcomes                                                                                  | Assessments – How it is met<br>& When it is met |
|-------------------------------------------------------------------------------------------|-------------------------------------------------|
| 4. Demonstrate knowledge of the fundamental operation of Servo and Stepper Drive systems. | Labs, final exam. Homework/e-learning           |
| 5. Demonstrate knowledge of AC Pulse Width Modulation                                     | Labs                                            |

M. Recommended Grading Scale:

| NUMERIC | GRADE | POINTS | DEFINITION    |
|---------|-------|--------|---------------|
| 93–100  | A     | 4.00   | Superior      |
| 90–92   | A-    | 3.67   | Superior      |
| 87–89   | B+    | 3.33   | Above Average |
| 83–86   | B     | 3.00   | Above Average |
| 80–82   | B-    | 2.67   | Above Average |
| 77–79   | C+    | 2.33   | Average       |
| 73–76   | C     | 2.00   | Average       |
| 70–72   | C-    | 1.67   | Average       |
| 67–69   | D+    | 1.33   | Below Average |
| 63–66   | D     | 1.00   | Below Average |
| 60–62   | D-    | 0.67   | Below Average |
| 00–59   | F     | 0.00   | Failure       |

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.\* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences. Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

\* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

**Important information regarding College Procedures and Policies can be found on the syllabus supplement located at**

**<https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf>**



North Central State College  
SYLLABUS ADDENDUM

|                     |                                                                 |                   |                                               |
|---------------------|-----------------------------------------------------------------|-------------------|-----------------------------------------------|
| Academic Division:  | Engineering Technology, Business<br>& Criminal Justice Division | Discipline:       | Industrial Technology, Industrial Maintenance |
| Course Coordinator: | Dave Wright                                                     |                   |                                               |
| Course Number:      | EMMT 2120                                                       | Course Title:     | DC / AC Drives                                |
| Semester / Session: | Fall 2026                                                       | Start / End Date: | 08/17/2026 thru 12/11/2026                    |

**Instructor Information**

|                  |                            |                 |                                |
|------------------|----------------------------|-----------------|--------------------------------|
| Name:            | Kevin Smith / Dave Boehler | Credentials:    |                                |
| Phone Number:    | 419-755-4529               | E-Mail Address: | Dwright@ncstatecollege.edu     |
| Office Location: | Kehoe Center – IST Lab     | Office Hours:   | Tuesday & Thursday 7am to 7 pm |

**I. Topical Timeline / Course Calendar (Subject to Change):**

| Weeks | Topics                                                               | Assignment                 | Due Date   |
|-------|----------------------------------------------------------------------|----------------------------|------------|
| 1     | INTRODUCTION TO DC MOTION CONTROL / BASIC DC DRIVES - SCR CONTROL    | Complete Amatrol Quiz, LAP | 08/28/2026 |
| 2     | DC SPINDLE DRIVES / DC SERVO AXIS DRIVES                             | Complete Amatrol Quiz, LAP | 09/11/2026 |
| 3     | DC PULSE WIDTH MODULATION DRIVES                                     | Complete Amatrol Quiz, LAP | 09/25/2026 |
| 4     | DC DRIVE TROUBLESHOOTING                                             | Complete Amatrol Quiz, LAP | 10/09/2026 |
| 5     | Introduction to AC Variable Frequency Drives                         | Complete Amatrol Quiz, LAP | 10/23/2026 |
| 6     | Speed and Torque Control                                             | Complete Amatrol Quiz, LAP | 11/06/2026 |
| 7     | Acceleration/Deceleration and Braking                                | Complete Amatrol Quiz, LAP | 11/27/2026 |
| 8     | AC Variable Frequency Drives - Fault Diagnostics and Troubleshooting | Complete Amatrol Quiz, LAP | 12/11/2026 |

**II. Grading and Testing Guidelines:**

Final Grade Calculation

| Activity                     | Qty | Points | Percentage |
|------------------------------|-----|--------|------------|
| Amatrol Quiz                 | 10  | 100    | 25         |
| LAP (learning activity pack) | 10  | 100    | 75         |
|                              |     |        |            |
|                              |     |        |            |

There are 3 tasks that must be accomplished for each Topic:

1. Take the prequiz on the Amatrol LMS, Review the material, Take the quiz for that topic.
2. Complete the LAP (learning activity packet) on the trainer for your course. Have all exercises signed off by the instructor.
3. Complete the skill assessment for that topic.

**Course Number:** \_\_\_\_\_  
**Semester / Session:** \_\_\_\_\_

**Course Title:** \_\_\_\_\_  
**Start / End Date:** \_\_\_\_\_

- II. Students are expected to work in a manner that is respectful of others. This includes avoiding loud or abusive language.
- III. Student is responsible for ensuring all work is turned in by the end of the semester.