North Central State College

MASTER SYLLABUS	2025-2026

A. Academic Division: Engineering Technology, Business & Criminal Justice Division

B. Discipline: Electronic Engineering Technology

C. Course Number and Title: ELET2240 Programmable Logic Controllers

D. Assistant Dean: Brooke Miller, M.B.A.

E. Credit Hours: 3
Lecture: 2 hours
Laboratory: 2 hours

F. Prerequisites: None

G. Last Course/Curriculum Revision Date: Fall 2025 Origin date: 05/11/2011

H. Textbook(s) Title: Content is on Canvas and Course provided Post Document Files

I. Workbook(s) and/or Lab Manual: Content is on Canvas and Course provided Post Document Files

J. Course Description: This course will cover the basic principles behind the operation of programmable controllers, the relationship between PC's and relay ladder logic, programming of PC's, and troubleshooting of programmable controller circuits. CTAG: CTEET003

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. Use a variety of industrial switches, loads and relays to wire, test and troubleshoot logic circuits from a ladder diagram.	Homework, quizzes, and labs- First half of term Midterm Final.
2. Explain and describe the use of numbering systems.	Homework and quiz – First half of term Midterm Final

Outcomes	Assessments – How it is met & When it is met
3. Draw the symbols and describe the function of 80% of the ANSI electrical logic symbols.	Homework, quizzes, and labs- First half of term Midterm Final.
4. Discuss the History of control systems and PLCs.	Homework assignment – First half of term
5. Describe the basic operations and functions of a PLC using block diagrams and simplified schematics.	Homework, quizzes, and labs – First half of term Midterm Final.
6. Demonstrate editing and programming ability on the PLC using EZLadder software.	Homework, quizzes, and labs – Entire term Midterm Final.
7. Layout, install, test and troubleshoot a PLC system.	Lab – First half of term
8. Demonstrate an understanding of 60% of the PLC programming language	Homework, quizzes, and labs – Entire term Midterm Final.
9. Demonstrate an understanding the use of Ethernet, CAN, DeviceNet, CBus and other industrial networking schemes and the transfer of data.	Homework, quizzes and exercises - Second half of term Final exam.
10. Demonstrate an understanding of basic troubleshooting techniques on a PLC.	Lab exercises – Entire term

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	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
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, and Criminal Justice	**Discipline:**	Electronic Engineering Technology
Course Coordinator:	Jonathan DeWitt		
Course Number:	ELET2240	**Course Title:**	Programmable Logic Controllers
Semester / Session:	Spring 2025 / Session A & B	**Start / End Date:**	1/12/2026 – 5/8/2026

Instructor Information

Name:	Jonathan DeWitt	**Phone Number:**	419-755-4776
		E-Mail Address:	jdewitt@ncstatecollege.edu
Office Location:	007 AT Kehoe	**Office Hours:**	M & W – 2:30 PM-4:30 PM

Note: Access to a computer with Windows 11 or later operating system is required to run the EZLadder PLC programming software. Mac OS, Chromebook OS, and Linux OS will not work to run the software.

I. Topical Timeline (Subject to Change):

Week	Topics	Assignment	Due Date
1	Introduction to PLCs	Pick Up Your PLC Kit	At close of week 1 per designation in Canvas
2	History and block diagrams of PLC and PLC modules	Your First PLC Lab Quiz 2- History of the PLC	At close of week 2 per designation in Canvas At close of week 2 per designation in Canvas
3	Communicating with Your PLC	Lab 3 and Lab 4-2 Qz_Wk_3	At close of week 3 per designation in Canvas At close of week 3 per designation in Canvas
4	Digital Inputs and Outputs	Labs 5-1 through 5-4 QuizWk4	At close of week 4 per designation in Canvas At close of week 4 per designation in Canvas
5	Installing a NC Pushbutton and Documenting Your Programs	Lab 5-5, Lab 6-1 QuizWk5	At close of week 5 per designation in Canvas At close of week 5 per designation in Canvas
6	Describe the main parts, purpose and function of a Programmable Logic Controller (PLC). Discuss some general concepts of PLCs Determine when program series or AND circuits vs. programming parallel or OR circuits. List some advantages of PLCs versus hard-wired,	Lab 6-2, Lab 6-3	At close of week 6 per designation in Canvas

	relay-controlled electrical circuits. List major PLC functions. Describe the fashion that PLCs run their programs. List common PLC ratings. Identify the components of a typical PLC block diagram.		
7	Converting Hardwired Relay Circuits into PLC Programs	Lab 7-1 through Lab 7-3	At close of week 7 per designation in Canvas
8	Midterm Exam	Midterm Exam	At close of week 8 per designation in Canvas
9	Timers	Lab 8-1 through Lab 8-3	At close of week 9 per designation in Canvas
10	Counters	Lab 9-1 through Lab 9-4 TMR_CNTR Quiz	At close of week 10 per designation in Canvas At close of week 10 per designation in Canvas
11	Free-Wheeling Timers, 7-segment Displays, Analog Inputs	Lab 11-1 through Lab 11-4 Week 11 Quiz	At close of week 11 per designation in Canvas At close of week 11 per designation in Canvas
12	Comparison Functions	Lab A, Lab 12-1 through Lab 12-3	At close of week 12 per designation in Canvas
13	Latching Functions Networks	Lab 13, Lab 13R	At close of week 13 per designation in Canvas
14	Sequencers	Lab 14-2, Lab 14-3	At close of week 14 per designation in Canvas
15	Final Exam	Final Exam	At close of week 15 per designation in Canvas
16	Finishing Up	Final Chance to Turn in Any Late Assignments	At close of week 16 per designation in Canvas

II. Course Assignments:

1. Use of forums to discuss class activities, labs and problems.
2. Using a DVM reading and viewing assignment, and lab exercise.
3. Reading assignments and questions from “Basic of Control Systems”.
4. View Videos on basic electricity and answer homework questions.
5. Read assignment and answer questions on Series and parallel circuits.
6. Watch Video, and answer assignment questions on switches.
7. Read the booklet “Ladder Diagrams” and answer homework questions.
8. Read “Digital Logic Functions” and answer homework questions.
9. Perform Logic Lab.
10. Read Relay assignments and answer questions on types, parts of, and implementation of relay circuits.
11. Reading assignments on Electromechanical vs. Solid State relays.
12. Reading assignments on relay voltages, currents and switching capacity.
13. Perform Relay lab.
14. View various videos on PLCs and answer questions about the video topics.
15. Reading assignment on PLCs and the history of.
16. Review of the PLC student kit, installation of EZLadder programming software, USB-to-Serial adapters, connecting the PLC to the PLC and downloading the test program.
17. Read assigned chapters of the “Student Course Study book” and answer assigned questions.

18. Program each weeks PLC lab exercises and submit the program through Canvas.

III. Grading and Testing Guidelines:

Midterm Exam = 15%
Final Exam = 20%
Quizzes = 25%
Labs = 40%
Total = 100%

IV. Examination Policy:

Quizzes and exams are placed online at scheduled times throughout the course. They will show up in the weekly modules and on the Canvas Calendar. You will have a minimum of 1 week to take the quiz or exam. After each due date the quiz or exam will be closed. There is no makeup available.

V. Class Attendance and Homework Make-Up Policy:

Canvas automatically logs the date, time, and what you accessed, what labs you have turned in, what quizzes and exams you have attempted. There is no Make-up allowed. This is an online class. It is 3 credit hours with a lab component (2 lecture/2 lab). Our Ohio Board of Regents dictates that we must assign a minimum of 2 hours of homework per week for every credit hour. Add it up. In a regular in-the-seat class with scheduled hours, your state board, the college, and your instructor would expect you to spend a minimum of 10 hours working on this class! (4 in the seat classroom hours + 6 hours of homework). The same time commitment is expected from you in an online class. The difference is that you can set your own hours. The best recommended practice is to set regular times for yourself and commit to them.

VI. Classroom Expectations:

As an NC State Student, be it online or hybrid, your conduct in this course is subject to the NC State Code of Conduct.

As a future professional in your field, you will be expected to conduct yourself as a professional in this course in ALL work and communications – be it assignments, discussion forums, Canvas Inbox, emails, etc.